NATIONAL OPEN UNIVERSITY OF NIGERIA

GST103: COMPUTER FUNDAMENTALS (3 credits)

COURSE MANUAL

Dr. Greg O. Onwodi

MODULE 1: INTRODUCTION TO COMPUTERS

In this module we shall discuss the following topics:

- Basic concepts
- Historical overview of the development of computers
- Generations of computers
- Classification of computers

STUDY UNIT 1: BASIC CONCEPTS

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Definition of the computer

Basic understanding of data processing

The concept of data and information

Methods of data processing

Characteristics of a computer

1.0 Introduction

Computer is fast becoming the universal machine of the 21st century. Early computers were large in size and too expensive to be owned by individuals. Thus they were confined to the laboratories and few research institutes. They could only be programmed by computer engineers. The basic applications were confined to undertaking complex

calculations in science and engineering. Today, computer is no longer confined the laboratory. Computers and indeed, computing have become embedded in almost every item we use. Computing is fast becoming ubiquitous. Its application transcends science, engineering, communication, space science, aviation, financial institutions, social sciences, humanities, the military, transportation, manufacturing, extractive industries to mention but a few. This unit presents the background information about computers.

2.0 Objectives

The objective of this unit is to enable students understand the following basic concepts:

(a) Definition of the computer

(b) Basic understanding of data processing

(c) The concept of data and information

(d) Methods of data processing

(e) Characteristics of a computer

3.0 Definitions

Computer: A computer is basically defined as a tool or machine used for processing data to give required information. It is capable of: a. taking input data through the keyboard (input unit)

b. storing the input data in a diskette, hard disk or other medium c.

processing it at the central processing unit (CPU) and

d. giving out the result (output) on the screen or the Visual Display Unit (VDU).

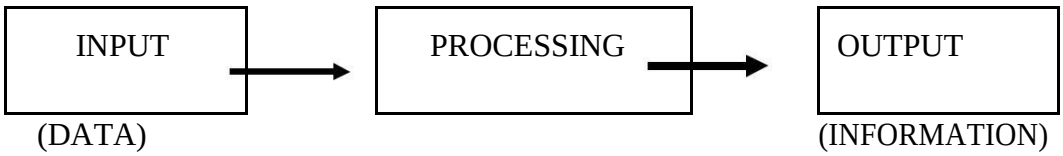

Fig. 1.0: Schematic diagram to define a computer

Data: The term data is referred to facts about a person, object or place e.g. name, age, complexion, school, class, height etc.

Information: Is referred to as processed data or a meaningful statement e.g. Net pay of workers, examination results of students, list of successful candidates in an examination or interview etc.

3.1 Methods of Data Processing

The following are the three major methods that have been widely used for data processing over the years:

a. Manual method

b. Mechanical method and

c. Computer method.

Manual Method

The manual method of data processing involves the use of chalk, wall, pen pencil and the like. These devices, machine or tools facilitate human efforts in recording, classifying, manipulating, sorting and presenting data or information. The manual data processing operations entail considerable manual efforts. Thus, manual method is cumbersome, tiresome, boring, frustrating and time consuming. Furthermore, the processing of data by the manual method is likely to be affected by human errors. When there are errors, then the reliability, accuracy, neatness, tidiness, and validity of the data would be in doubt. The manual method does not allow for the processing of large volume of data on a regular and timely basis.

Mechanical Method

The mechanical method of data processing involves the use of machines such as typewriter, roneo machines, adding machines and the like. These machines facilitate

human efforts in recording, classifying, manipulating, sorting and presenting data or information. The mechanical operations are basically routine in nature. There is virtually no creative thinking. The mechanical operations are noisy, hazardous, error prone and untidy. The mechanical method does not allow for the processing of large volume of data continuously and timely.

Computer Method

The computer method of carrying out data processing has the following major features:

a. Data can be steadily and continuously processed

b. The operations are practically not noisy

c. There is a store where data and instructions can be stored temporarily and permanently.

d. Errors can be easily and neatly corrected.

e. Output reports are usually very neat, decent and can be produced in various forms such as adding graphs, diagrams, pictures etc.

f. Accuracy and reliability are highly enhanced.

Below are further attributes of a computer which makes it to be an indispensable tool for human being:

3.2 Characteristics of a Computer

Characteristics of Computer

1. **Speed:** The computer can manipulate large data at incredible speed and response time can be very fast.
2. **Accuracy:** Its accuracy is very high and its consistency can be relied upon. Errors committed in computing are mostly due to human rather than technological weakness. There are in-built error detecting schemes in the computer.
3. **Storage:** It has both internal and external storage facilities for holding data and instructions. This capacity varies from one machine to the other. Memories are built up in K(Kilo) modules where K = 1024 memory locations.

4. **Automatic:** Once a program is in the computer's memory, it can run automatically each time it is opened. The individual has little or no instruction to give again.
5. **Reliability:** Being a machine, a computer does not suffer human traits of tiredness and lack of concentration. It will perform the last job with the same speed and accuracy as the first job every time even if ten million jobs are involved.
6. **Flexibility:** It can perform any type of task once it can be reduced to logical steps. Modern computers can be used to perform a variety of functions like on-line processing, multi-programming, real time processing etc.

3.3 The Computing System

The computing system is made up of the computer system, the user and the environment in which the computer is operated.

The Computer System

The computer system is made up of the hardware and the software.

The Hardware

The computer hardware comprises the input unit, the processing unit and the output unit. The input unit comprises those media through which data is fed into the computer. Examples include the keyboard, mouse, joystick, trackball, scanner etc.

The processing unit is made up of the Arithmetic and Logic Unit (ALU), the control unit and the main memory. The main memory also known as the primary memory is made up of the Read Only Memory (ROM) and the Random Access Memory (RAM).

The output unit is made up of those media through which data, instructions for processing the data (program), and the result of the processing operation are displayed

for the user to see. Examples of output unit are the monitor (Visual Display Unit) and the printer.

Software

Computer software are the series of instructions that enable the computer to perform a task or group of tasks. A program is made up of group of instructions to perform a task. Series of programs linked together make up software. Computer programs could be categorized into system software, utility software, and application programs.

Computer Users

Computer users are the different categories of personnel that operates the computer. We have expert users and casual users. The expert users could be further categorized into computer engineers, computer programmers and computer operators.

The Computing Environment

The computing environment ranges from the building housing the other elements of the computing system namely the computer and the users, the furniture, auxiliary devices such as the voltage stabilizer, the Uninterruptible Power Supply System (UPS), the fans, the air conditioners etc. The schematic diagram of the computing system is presented in Fig. 1.2a. to Fig. 1.2e

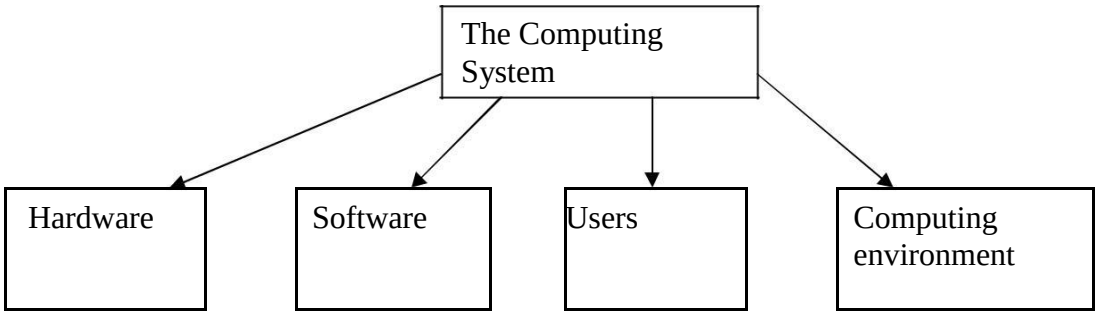

Fig. 1.2a: Schematic diagram of the computing system

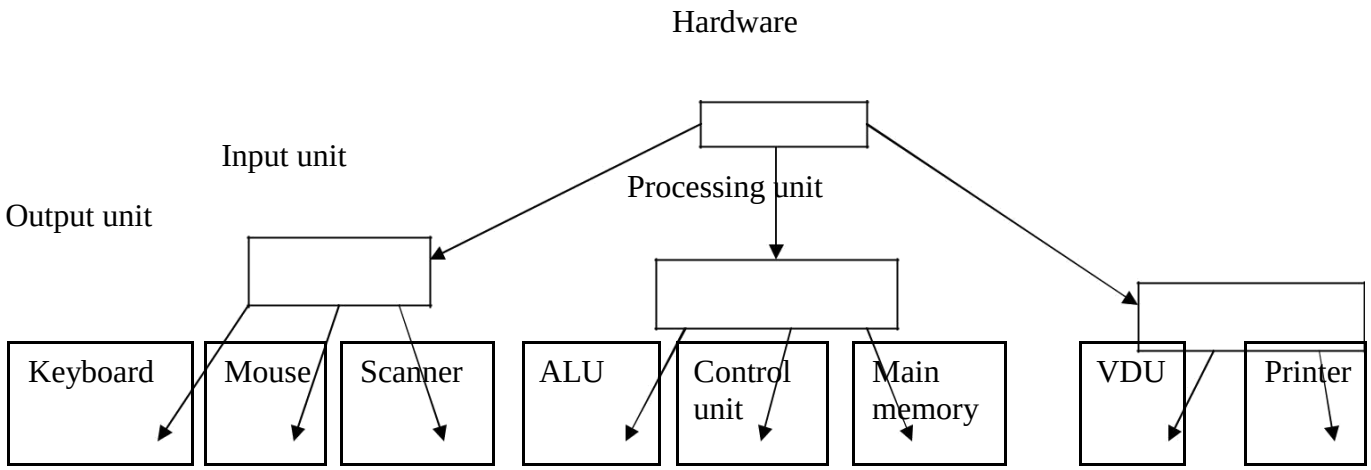

Fig. 1.2b: Computer hardware

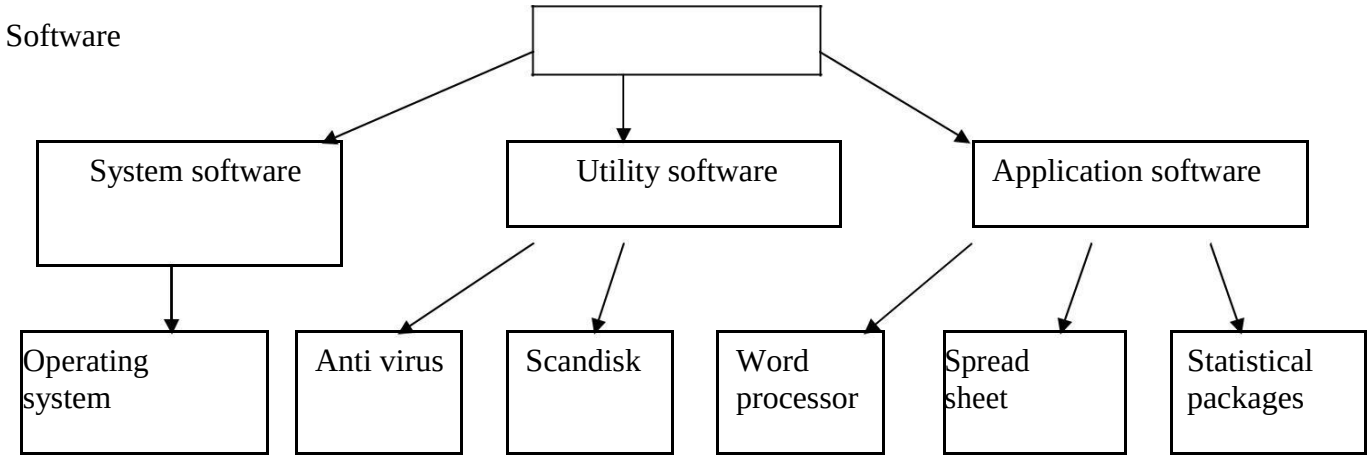

Fig. 1.2c: Computer software

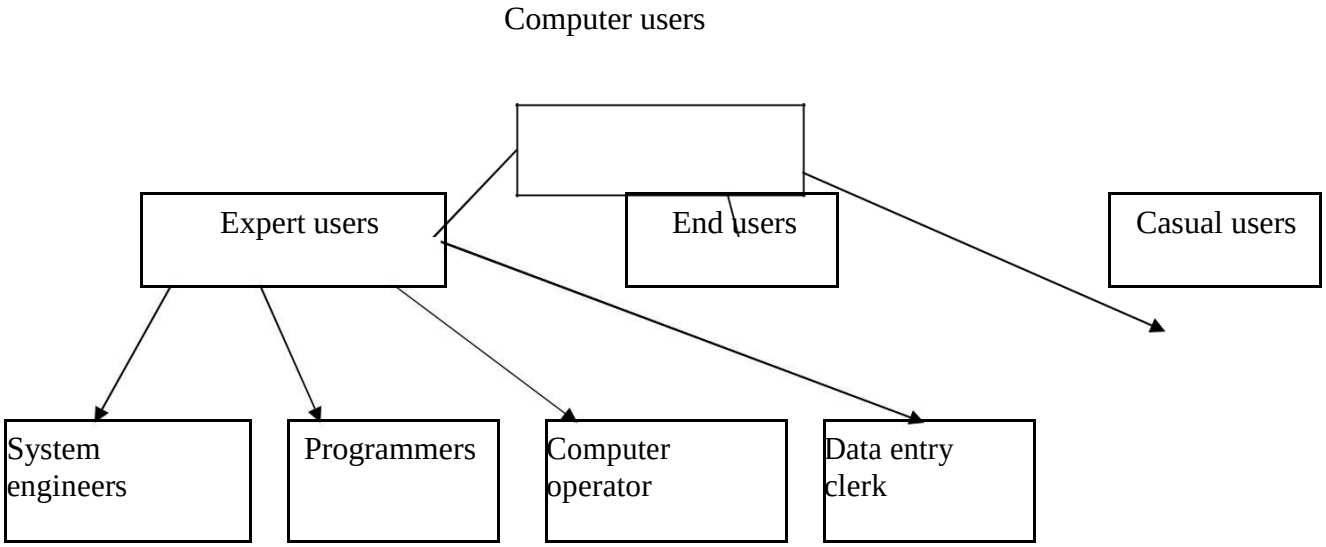

Fig. 1.2d: Computer users

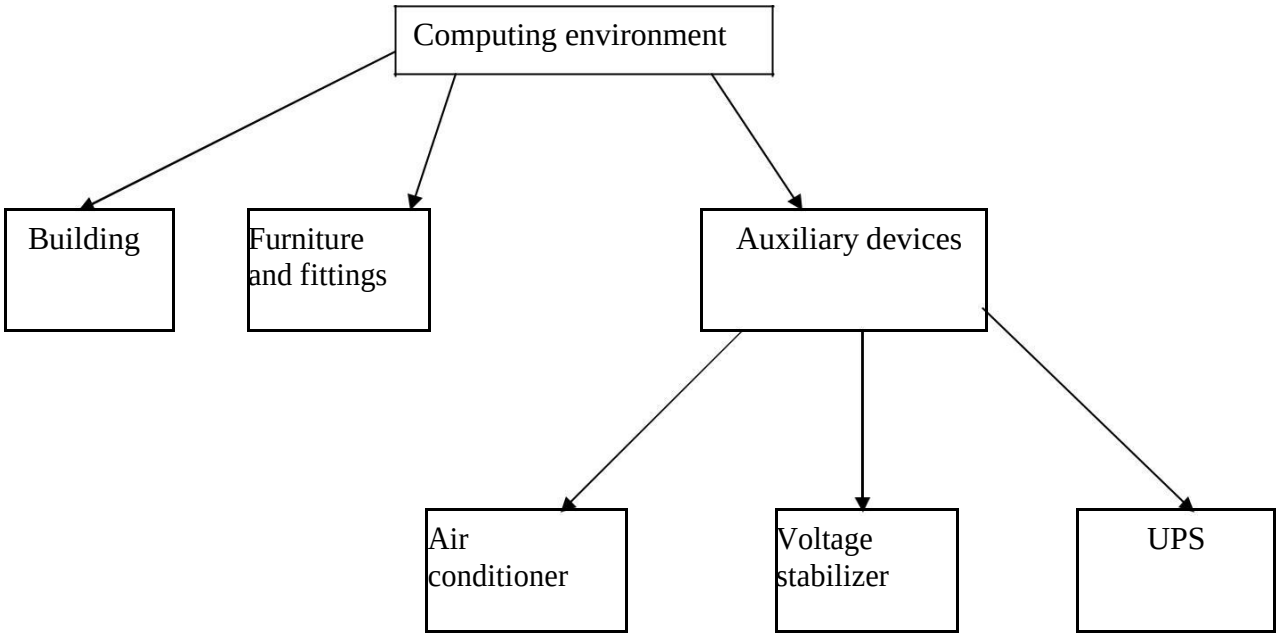

Fig. 1.2e: Computing environment

4.0 Conclusion

The computer is a machine used for a variety of purposes. Its use transcends all areas of human endeavour owing to the advantages of computer method of data processing over the manual and mechanical methods of data processing.

5.0 Summary

In this unit we have learnt the following:

i. Computer is any electronic device that can accept data, process it and produce an output.

ii. The computer method of data processing is superior to the manual and mechanical methods of data processing.

iii. The computing system is made up of the computer system, the users and the computing environment.

6.0 Tutor Marked Assignment

1a. What is a computer?

1b. What are the advantages of computer method of data processing over manual and mechanical methods of data processing.

2. Draw the schematic diagram of a computing system and describe each of the components.

7.0 Further reading and other Resources.

Akinyokun, O.C, (1999). Principles and Practice of Computing Technology. International Publishers Limited, Ibadan.

Balogun, V.F., Daramola, O.A., Obe, O.O., Ojokoh, B.A., and Oluwadare S.A., (2006). Introduction to Computing: A Practical Approach. Tom-Ray Publications, Akure.

STUDY UNIT 2: HISTORICAL OVERVIEW OF THE COMPUTER

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A brief history of computer technology.

Evolution of the computer.

Generations of computer.

1.0 Introduction

The computer as we know it today has evolved over the ages. An attempt is made in this unit to present in chronological order the various landmarks and milestones in the development of the computer. Based on the milestone achievement of each era the computer evolution is categorized into generations. The generational classification however, is not rigid as we may find one generation eating into the next.

2.0 Objectives

The objective of this unit is to enable the student to know the processes leading to the emergence of the modern computer. There can be no present without the past just as the future depends on the present. By the end of this unit, students should be able to appreciate and visualize the direction of research in computer technology in the nearby future.

3.0 A Brief History of Computer Technology

A complete history of computing would include a multitude of diverse devices such as the ancient Chinese abacus, the Jacquard loom (1805) and Charles Babbage's "analytical engine" (1834). It would also include discussion o f mechanical, analog and digital computing architectures. As late as the 1960s, mechanical devices, such as the Marchant calculator, still found widespread application in science and engineering. During the early days of electronic computing devices, there was much discussion about the relative merits of analog vs. digital computers. In fact, as late as the 1960s, analog computers were routinely used to solve systems of finite difference equations arising in oil reservoir

modeling. In the end, digital computing devices proved to have the power, economics and scalability necessary to deal with large scale computations. Digital computers now dominate the computing world in all areas ranging from the hand calculator to the supercomputer and are pervasive throughout society. Therefore, this brief sketch of the development of scientific computing is limited to the area of digital, electronic computers.

The evolution of digital computing is often divided into generations. Each generation is characterized by dramatic improvements over the previous generation in the technology used to build computers, the internal organization of computer systems, and programming languages. Although not usually associated with computer generations, there has been a steady improvement in algorithms, including algorithms used in computational science. The following history has been organized using these widely recognized generations as mileposts.

3.1 First Generation Electronic Computers (1937 – 1953)

Three machines have been promoted at various times as the first electronic computers. These machines used electronic switches, in form of vacuum tubes, instead of electromechanical relays. In principle the electronic switches were more reliable, since they would have no moving parts that would wear out, but technology was still new at that time and the tubes were comparable to relays in reliability. Electronic components had one major benefit, however: they could “open” and “close” about 1,000 times faster than mechanical switches.

The earliest attempt to build an electronic computer was by J. V. Atanasoff, a professor of physics and mathematics at Iowa State, in 1937. Atanasoff set out to build a machine that would help his graduate students solve systems of partial differential equations. By 1941, he and graduate student Clifford Berry had succeeded in building a machine that could solve 29

simultaneous equations with 29 unknowns. However, the machine was not programmable, and was more of an electronic calculator.

A second early electronic machine was Colossus, designed by Alan Turning for the British military in 1943. This machine played an important role in breaking codes used by the German army in World War II. Turning's main contribution to the field of computer science was the idea of the Turing Machine, a mathematical formalism widely used in the study of computable functions. The existence of Colossus was kept secret until long after the war ended, and the credit due to Turning and his colleagues for designing one of the first working electronic computers was slow in coming.

The first general purpose programmable electronic computer was the Electronic Numerical Integrator and Computer (ENIAC), built by J. Presper Eckert and John V. Mauchly at the University of Pennysylvania. Work began in 1943, funded by the Army Ordinance Department, which needed a way to compute ballistics during World War II. The machine wasn't completed until 1945, but then it was used extensively for
calculations during the design of the hydrogen bomb. By the time it was decommissioned in 1955 it had been used for research on the design of wind tunnels, random number generators, and weather prediction. Eckert, Mauchly, and John Von Neumann, a consultant to the ENIAC project, began work on a new machine before ENIAC was finished. The main contribution of EDVAC, their new project, was the

notion of a stored program. There is some controversy over who deserves the credit for this idea, but no one knows how important the idea was to the future of general purpose computers. ENIAC was controlled by a set of external switches and dials; to change the program required physically altering the settings on these controls. These controls also limited the speed of the internal electronic operations. Through the use of a memory that was large enough to hold both instructions and data, and using the program stored in memory to control the order of arithmetic operations, EDVAC was able to run orders of magnitude faster than ENIAC. By storing instructions in the same medium as data, designers could concentrate on improving the internal structure of the machine without worrying about matching it to the speed of an external control.

Regardless of who deserves the credit for the stored program idea, the EDVAC project is significant as an example of the power of interdisciplinary projects that characterize modern computational science. By recognizing that functions, in the form of a sequence of instructions for a computer, can be encoded as numbers, the EDVAC group knew the instructions could be stored in the computer's memory a long with numerical data. The notion of using numbers to represent functions was a key step used by Goedel in his incompleteness theorem in 1937, work which Von Neumann, as a logician, was quite familiar with. Von Neumann's background in logic, combined with Eckert and Mauchly's electrical engineering skills, formed a very powerful interdisciplinary team.

Software technology during this period was very primitive. The first programs were written out in machine code, i.e. programmers directly wrote down the numbers that corresponded to the instructions they wanted to store in memory. By the 1950s programmers were using a symbolic notation, known as assembly language, then hand-

translating the symbolic notation into machine code. Later programs known as assemblers performed the translation task.

As primitive as they were, these first electronic machines were quite useful in applied science and engineering. Atanasoff estimated that it would take eight hours to solve a set of equations with eight unknowns using a Marchant calculator, and 381 hours to solve 29 equations for 29 unknowns. The Atanasoff-Berry computer was able to complete the task in under an hour. The first problem run on the ENIAC, a numerical simulation used in the design of the hydrogen bomb, required 20 seconds, as opposed to forty hours using mechanical calculators. Eckert and Mauchly later developed what was arguably the first commercially successful computer, the UNIVAC; in 1952, 45 minutes after the polls closed and with 7% of the vote counted, UNIVAC predicted Eisenhower would defeat Stevenson with 438 electoral votes (he ended up with 442).

3.2 Second Generation (1954 – 1962)

The second generation saw several important developments at all levels of computer system design, from the technology used to build the basic circuits to the programming languages used to write scientific applications.

Electronic switches in this era were based on discrete diode and transistor technology with a switching time of approximately 0.3 microseconds. The first machines to be built with this technology include TRADIC at Bell Laboratories in 1954 and TX-0 at MIT's Lincoln Laboratory. Memory technology was based on magnetic cores which could be accessed in random order, as opposed to mercury delay lines, in which data was stored as

an acoustic wave that passed sequentially through the medium and could be accessed only when the data moved by the I/O interface.

Important innovations in computer architecture included index registers for controlling loops and floating point units for calculations based on real numbers. Prior to this accessing successive elements in an array was quite tedious and often involved writing self-modifying code (programs which modified themselves as they ran; at the time viewed as a powerful application of the principle that programs and data were fundamentally the same, this practice is now frowned upon as extremely hard to debug and is impossible in most high level languages). Floating point operations were performed by libraries of software routines in early computers, but were done in hardware in second generation machines.

During this second generation many high level programming languages were introduced, including FORTRAN (1956), ALGOL (1958), and COBOL (1959). Important commercial machines of this era include the IBM 704 and 7094. The latter introduced I/O processors for better throughput between I/O devices and main memory.

The second generation also saw the first two supercomputers designed specifically for numeric processing in scientific applications. The term “supercomputer” is generally reserved for a machine that is an order of magnitude more powerful than other machines of its era. Two machines of the 1950s deserve this title. The Livermore Atomic Research Computer (LARC) and the IBM 7030 (aka Stretch) were early examples of machines that overlapped memory operations with processor operations and had primitive forms of parallel processing.

3.3 Third Generation (1963 – 1972)

The third generation brought huge gains in computational power. Innovations in this era include the use of integrated circuits, or ICs (semiconductor devices with several transistors built into one physical component), semiconductor memories starting to be used instead of magnetic cores, microprogramming as a technique for efficiently designing complex processors, the coming of age of pipelining and other forms of parallel processing , and the introduction of operating systems and time-sharing.

The first ICs were based on small-scale integration (SSI) circuits, which had around 10 devices per circuit (or "chip"), and evolved to the use of medium-scale integrated (MSI) circuits, which had up to 100 devices per chip. Multilayered printed circuits were developed and core memory was replaced by faster, solid state memories. Computer designers began to take advantage of parallelism by using multiple functional units, overlapping CPU and I/O operations, and pipelining (internal parallelism) in both the instruction stream and the data stream. In 1964, Seymour Cray developed the CDC 6600, which was the first architecture to use functional parallelism. By using 10 separate functional units that could operate simultaneously and 32 independent memory banks, the CDC 6600 was able to attain a computation rate of 1 million floating point operations per second (1 Mflops). Five years later CDC released the 7600, also developed by Seymour Cray. The CDC 7600, with its pipelined functional units, is considered to be the first vector processor and was capable of executing at 10 Mflops. The IBM 360/91, released during the same period, was roughly twice as fast as the CDC 660. It employed instruction look ahead, separate floating point and integer functional units and pipelined instruction stream. The IBM 360-195 was comparable to the CDC 7600, deriving much of its performance from a very fast cache memory. The SOLOMON computer,

developed by Westinghouse Corporation, and the ILLIAC IV, jointly developed by Burroughs, the Department of Defense and the University of Illinois, was representative of the first parallel computers. The Texas Instrument Advanced Scientific Computer (T I-ASC) and the STAR-100 of CDC were pipelined vector processors that demonstrated the viability of that design and set the standards for subsequent vector processors.

Early in this, third generation Cambridge and the University of London cooperated in the development of CPL (Combined Programming Language, 1963). CPL was, according to its authors, an attempt to capture only the important features of the complicated and sophisticated ALGOL. However, the ALGOL, CPL was large with many features that were hard to learn. In an attempt at further simplification, Martin Richards of Cambridge developed a subset of CPL called BCPL (Basic Computer Programming Language, 1967).

3.4 Fourth Generation (1972 – 1984)

The next generation of computer systems saw the use of large scale integration (LSI – 1000 devices per chip) and very large scale integration (VLSI – 100,000 devices per chip) in the construction of computing elements. At this scale entire processors will fit onto a single chip, and for simple systems the entire computer (processor, main memory, and I/O controllers) can fit on one chip. Gate delays dropped to about Ins per gate.

Semiconductor memories replaced core memories as the main memory in most systems; until this time the use of semiconductor memory in most systems was limited to registers and cache. During this period, high speed vector processors, such as the CRAY 1, CRAY X-MP and CYBER 205 dominated the high performance computing scene.

Computers with large main memory, such as the CRAY 2, began to emerge. A variety of parallel architectures began to appear; however, during this period the parallel computing efforts were of a mostly experimental nature and most computational science was carried out on vector processors. Microcomputers and workstations were introduced and saw wide use as alternatives to time-shared mainframe computers.

Developments in software include very high level languages such as FP (functional programming) and Prolog (programming in logic). These languages tend to use a *declarative* programming style as opposed to the *imperative* style of Pascal, C. FORTRAN, et al. In a declarative style, a programmer gives a mathematical specification of what should be computed, leaving many details of how it should be computed to the compiler and/or runtime system. These languages are not yet in wide use, but are very promising as notations for programs that will run on massively parallel computers (systems with over 1,000 processors). Compilers for established languages started to use sophisticated optimization techniques to improve code, and compilers for vector processors were able to vectorize simple loops (turn loops into single instructions that would initiate an operation over an entire vector).

Two important events marked the early part of the third generation: the development of the C programming language and the UNIX operating system, both at Bell Labs. In 1972, Dennis Ritchie, seeking to meet the design goals of CPL and generalize Thompson's B, developed the C language. Thompson and Ritchie then used C to write a version of UNIX for the DEC PDP-11. This C-based UNIX was soon ported to many different computers, relieving users from having to learn a new operating system each

time they change computer hardware. UNIX or a derivative of UNIX is now a de facto standard on virtually every computer system.

An important event in the development of computational science was the publication of the Lax report. In 1982, the US Department of Defense (DOD) and National Science Foundation (NSF) sponsored a panel on Large Scale Computing in Science and Engineering, chaired by Peter D. Lax. The Lax Report stated that aggressive and focused foreign initiatives in high performance computing, especially in Japan, were in sharp contrast to the absence of coordinated national attention in the United States. The report noted that university researchers had inadequate access to high performance computers. One of the first and most visible of the responses to the Lax report was the establishment of the NSF supercomputing centers. Phase I on this NSF program was designed to encourage the use of high performance computing at American universities by making cycles and training on three (and later six) existing supercomputers immediately available. Following this Phase I stage, in 1984 – 1985 NSF provided funding for the establishment of five Phase II supercomputing centers.

The Phase II centers, located in San Diego (San Diego supercomputing Centre); Illinois (National Center for Supercomputing Applications); Pittsburgh (Pittsburgh Supercomputing Center); Cornell (Cornell Theory Center); and Princeton (John Von Neumann Center), have been extremely successful at providing computing time on supercomputers to the academic community. In addition they have provided many valuable training programs and have developed several software packages that are available free of charge. These Phase II centers continue to augment the substantial high

performance computing efforts at the National Laboratories, especially the Department of Energy (DOE) and NASA sites.

3.5 Fifth Generation (1984 – 1990)

The development of the next generation of computer systems is characterized mainly by the acceptance of parallel processing. Until this time, parallelism was limited to pipelining and vector processing, or at most to a few processors sharing jobs. The fifth generation saw the introduction of machines with hundreds of processors that could all be working on different parts of a single program. The scale of integration in semiconductors continued at an incredible pace, by 1990 it was possible to build chips with a million components – and semiconductor memor ies became standard on all computers.

Other new developments were the widespread use of computer networks and the increasing use of single-user workstations. Prior to 1985, large scale parallel processing was viewed as a research goal, but two systems introduced around this time are typical of the first commercial products to be based on parallel processing. The Sequent Balance 8000 connected up to 20 processors to a single shared memory module (but each processor had its own local cache). The machine was designed to compete with the DEC VAX-780 as a general purpose Unix system, with each processor working on a different user's job. However, Sequent provided a library of subroutines that would allow programmers to write programs that would use more than one processor, and the machine was widely used to explore parallel algorithms and programming techniques.

The Intel iPSC -1, nicknamed “the hypercube”, took a different approach. Instead of using one memory module, Intel connected each processor to its own memory and used a network interface to connect processors. This distributed memory architecture meant memory was no longer a bottleneck and large systems (using more processors) could be built. The largest iPSC-1 had 128 processors. Toward the end of this period, a third type of parallel processor was introduced to the market. In this style of machine, known as a *data-parallel* or SIMD, there are several thousand very simple processors. All processors work under the direction of a single control unit; i.e. if the control unit says “add a to b” then all processors find their local copy of a and add it to their local copy of

b. Machines in this class include the Connection Machine from Thinking Machines, Inc., and the MP-1 from MasPar, Inc.

Scientific computing in this period was still dominated by vector processing. Most manufacturers of vector processors introduced parallel models, but there were very few (two to eight) processors in these parallel machines. In the area of computer networking, both wide area network (WAN) and local area network (LAN) technology developed at a rapid pace, stimulating a transition from the traditional mainframe computing environment towards a distributed computing environment in which each user has their own workstation for relatively simple tasks (editing and compiling programs, reading mail) but sharing large, expensive resources such as file servers and supercomputers. RISC technology (a style of internal organization of the CPU) and plummeting costs for RAM brought tremendous gains in computational power of relatively low cost workstations and servers. This period also saw a marked increase in both the quality and quantity of scientific visualization.

3.6 Sixth Generation (1990 to date)

Transitions between generations in computer technology are hard to define, especially as they are taking place. Some changes, such as the switch from vacuum tubes to transistors, are immediately apparent as fundamental changes, but others are clear only in retrospect. Many of the developments in computer systems since 1990 reflect gradual improvements over established systems, and thus it is hard to claim they represent a transition to a new "generation", but other develop ments will prove to be significant changes.

In this section, we offer some assessments about recent developments and current trends that we think will have a significant impact on computational science.

This generation is beginning with many gains in parallel computing, both in the hardware area and in improved understanding of how to develop algorithms to exploit diverse, massively parallel architectures. Parallel systems now compete with vector processors in terms of total computing power and most especially parallel systems to dominate the future.

Combinations of parallel/vector architectures are well established, and one corporation (Fujitsu) has announced plans to build a system with over 200 of its high and vector processors. Manufacturers have set themselves the goal of achieving teraflops (10_{12}

arithmetic operations per second) performance by the middle of the decade, and it is clear this will be obtained only by a system with a thousand processors or more. Workstation technology has continued to improve, with processor designs now using a combination of RISC, pipelining, and parallel processing. As a result it is now possible

to procure a desktop workstation that has the same overall computing power (100 megaflops) as fourth generation supercomputers. This development has sparked an interest in heterogeneous computing: a program started on one workstation can find idle workstations elsewhere in the local network to run parallel subtasks.

One of the most dramatic changes in the sixth generation is the explosive growth of wide area networking. Network bandwidth has expanded tremendously in the last few years and will continue to improve for the next several years. T1 transmission rates are now standard for regional networks, and the national "b ackbone" that interconnects regional networks uses T3. networking technology is becoming more widespread than its original strong base in universities and government laboratories as it is rapidly finding application in K-12 education, community networks and private industry. A little over a decade after the warning voiced in the Lax report, the future of a strong computational science infrastructure is bright.

4.0 Conclusion

The development of computer span through many generations with each generations chronicling the landmark achievements of the period.

5.0 Summary

In this unit we have learnt that the development of computer spanned through six generations.

6.0 Tutor Marked Assignment

a. Outline the major landmarks of the fourth and the fifth generations of computers.

b. Explain what is meant by stored program computer architecture.

7.0 References and Further Reading

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STUDY UNIT 3: CLASSIFICATION OF COMPUTERS

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- Digital computer
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- Hybrid computer

Classification by purpose

- Special purpose
- General purpose

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1.0 Introduction

The computer has passed through many stages of evolution from the days of the mainframe computers to the era of microcomputers. Computers have been classified based on different criteria. In this unit, we shall classify computers based on three popular methods.

2.0 Objectives

The objectives of this unit are to:

i. Classify computers based on size, type of signal and purpose.

ii. Study the features that differentiate one class of the computer from the others.

3.0 Categories of Computers

Although there are no industry standards, computers are generally classified in the following ways:

3.1 Classification Based On Signal Type

There are basically three types of electronic computers. These are the Digital, Analog and Hybrid computers.

Digital Computer

Represent its variable in the form of digits. It counts the data it deals with, whether representing numbers, letters or other symbols, are converted into binary form on input to the computer. The data undergoes a processing after which the binary digits are converted back to alpha numeric form for output for human use. Because of the fact that business applications like inventory control, invoicing and payroll deal with discrete values (separate, disunited, discontinuous); they are beset processed with digital computers. As a result of this, digital computers are mostly used in commercial and business places today.

Analog Computer

It measures rather than counts. This type of computer sets up a model of a system. Common type represents it variables in terms of electrical voltage and sets up circuit analog to the equation connecting the variables. The answer can be either by using a voltmeter to read the value of the variable required, or by feeding the voltage into a plotting device. They hold data in the form of physical variables rather than numerical quantities. In theory, analog computers give an exact answer because the answer has not

been approximated to the nearest digit. Whereas, when we try to obtain the answers using a digital voltmeter, we often find that the accuracy is less than that which could have been obtained from an analog computer.

It is almost never used in business systems. It is used by the scientist and engineer to solve systems of partial differential equations. It is also used in controlling and monitoring of systems in such areas as hydrodynamics and rocketry; in production. There are two useful properties of this computer once it is programmed:

1. It is simple to change the value of a constant or coefficient and study the effect of such changes.
2. It is possible to link certain variables to a time pulse to study changes with time as a variable, and chart the result on an X-Y plotter.

Hybrid Computer

In some cases, the user may wish to obtain the output from an analog computer as processed by a digital computer or vice versa. To achieve this, he set up a hybrid machine where the two are connected and the analog computer may be regarded as a peripheral of the digital computer. In such a situation, a hybrid system attempts to gain the advantage of both the digital and the analog elements in the same machine. This kind of machine is usually a special-purpose device which is built for a specific task. It needs a conversion element which accepts analog inputs, and output digital value. Such converters are called digitizers. There is need for a converter from analog to digital also. It has the advantage of giving real-time response on a continuous basis. Complex calculations can be dealt with by the digital elements, thereby requiring a large memory, and giving accurate results after programming. They are mainly used in aerospace and process control applications.

3.2 Classification by Purpose

Depending on their flexibility in operation, computers are classified as either special purpose or general purpose.

Special Purpose Computers

A special purpose computer is one that is designed to solve a restricted class of problems. Such computers may even be designed and built to handle only one job. In such machines, the steps or operations that the computer follows may be built into the hardware. Most of the computers used for military purposes fall into this class. Other example of special purpose computers include:

Computers designed specifically to solve navigational problems.

Computers designed for tracking airplane or missiles.

Computers used for process control applications in industries such as oil refinery, chemical manufacture, steel processing and power generation.

Computers used as robots in factories like vehicles assembly plants and glass industries.

General Attributes of Special Purpose Computers

Special purpose computer are usually very efficient for the tasks for which they are specially designed.

They are very much less complex than the General-Purpose Computers. The simplicity of the circuiting stems from the fact that provision is made only for limited facilities.

They are very much cheaper than the General-Purpose type since they involve less components and are less complex.

General-Purpose Computers

General-Purpose computers are computers designed to handle wide range of problems. Theoretically, a general-purpose computer can be adequate by means of some easily

alterable instructions to handle any problems that can be solved by computation. In practice however, there are limitations imposed by memory size, speed and the type of input/output devices. Examples of areas where the general purpose are employed include the following:

- Payroll
- Banking
- Billing
- Sales analysis
- Cost accounting
- Manufacturing scheduling
- Inventory control

General Attributes of General-Purpose Computers

General-Purpose computers are more flexible than special purpose computers. They can handle a wide spectrum of problems.

They are less efficient than the special-purpose computers due to such problems as;

Inadequate storage;

Low operating speed;

Coordination of the various tasks and subsection may take time.

General Purpose Computers are more complex than the special purpose ones.

3.3 Classification of Computers According to Capacity

In the past, the capacity of computers was measured in terms of physical size. Today, however, the physical size is not a good measure of capacity because the modern technology has made it possible to achieve compactness.

A better measure of capacity today is the volume of work that computer can handle. The volume of work that a given computer handles is closely tied to the cost and to the memory size of computer. Therefore, most authorities today accept the price of rental price as the standard for ranking computers.

Here, both memory size and cost shall be used to rank (classify) computer into three main categories as follows:

(a)Microcomputers

(b)Medium/Mini/Small Computers

(c)Large Computer/Main Frames.

Micro Computers

Microcomputers, also known as single board computers, are the cheapest class of computers. In the microcomputer, we do not have a Central Processing Unit (CPU) as we have in the larger computers rather we have a microprocessor chip as the main data processing unit. They are the cheapest smallest and can operate under normal office condition. Examples are IBM, APPLE, COMPAQ, Hewlett Packard (HP), Dell Toshiba, e.t.c.

Different Types of Personal Computers (Micro Computers)

Normally, personal computers are placed on table desk hence they are referred to as desktop personal computers. Still other types are available under the categories of personal computers. They are:

Laptop Computers are small size types that are battery-operated. The screen is used to cover the system while the keyboard is installed flatly on the system unit. They could

be carried about like a box when closed after operation and can be operated in vehicles while on a journey.

Notebook Computer

This is like laptop computers but smaller in size. Though small, it comprises all the components of a full system.

Palmtop Computer

Palmtop computer is far smaller in size. All the components are complete as any of the above but made smaller so that it can be held on the palm.

Uses of Personal Computers

Personal computers can perform the following functions:

Can be used to produce documents like memos, reports, letters and briefs.

Can be used to calculate budget and accounting tasks

It can analyze numeric function

It can create illustrations

Can be used for electronic mails

Can help in making schedule and plan projects.

It can assist in schedules and plan projects.

It can assist in searching for specific information from lists or from reports.

Advantages of Personal Computers

Computer is versatile; it can be used in any establishment.

Has faster speed for processing data.

Can deal with several data at a time

Can attend to several users at the same time, thereby able to process several jobs at a time.

Capable of storing several data.

Operating of Computer is less fatigue

Network possible, that is linking of two or more computers together.

Disadvantages of Personal Computers

Computer is costly to maintain.

It is very fragile and complex to handle

It requires special skill to operate

With the invention and innovation everyday, computer suffers from being obsolete.

It can lead to unemployment when used mostly in less Developed Countries.

Some computers can not function properly without the aid of cooling system e.g. air-condition or fan in some locations.

Mini Computers

The Mini Computers have memory capacity in the range 128K bytes to 256 Kbytes and are also not expensive but reliable and smaller in size compare to mainframe. It was first introduced in 1965; when DEC (Digital Equipment Corporation) built the PDP – 8. Other Mini Computer includes WANG VS.

Mainframe

The Main Frame Computers often called number crunches have memory capacity of the order of 4 Kbytes and they are very expensive. They can execute up to 100MIPS (Meanwhile Instructions Per Second). They have large systems and are used by many people for a variety of purpose.

4.0 Conclusion

Computers are classified based on three major criteria namely size, type of signal being processed and purpose. The classification adopted at any point in time depends on the issues involved. For instance, if our goal is to process different kinds of signals or to accept one type of signal and convert to another form of signal, we should look in the realm of analog or digital or even the hybrid computers. This of course, calls for a converter such as Analog to Digital Converter or Digital to Analog Converter as the case may be.

5.0 Summary

In this unit we have been able to understand the following:

i. Computers could be classified based on three major criteria: size, type of signal being processed and purpose.

ii. Based on size computers are classified as mainframe, mini computer and microcomputer.

iii. Based on the type of signal being processed, computers are classified as analog, digital and hybrid.

iv. Based on purpose, computers are classified as general purpose or special purpose computers.

v. Micro computers now come in different forms due to the continued reduction in size due to advances in electronic technology. Microcomputers could be desktop, laptop or palmtop.

6.0 Tutor Marked Assignment

a) Classify computer based on type of signal.

b) Based on signal being processed, what category does each of these computing equipment belong: petrol pump, thermometer, cellphone, anti-aircraft radar control in a military based, weather forecasting equipment at the metrological station.

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STUDY UNIT 4: COMPUTER VIRUS

Table of Contents

Computer virus

How to detect computer virus

Mode of transmission of computer virus

1.0 Introduction

One of the biggest fears of having computers are viruses, viruses are malicious programs designed entirely for destruction and havoc. Viruses are created by people who either know a lot about programming or know a lot about computers.

2.0 Objectives

The objective of this unit is to introduce students to the concept of computer virus, its mode of transmission, detection, prevention and cure.

3.0 Computer Virus

Computer virus is one of the greatest threats to computers and computer applications. Once the virus is made it will generally be distributed through shareware, pirated software, e-mail or other various ways of transporting data, once the virus infects someone's computer it will either start infecting other data, destroying data, overwriting data, or corrupting software. The reason that these programs are called viruses is because it is spreads like a human virus, once you have become infected either by downloading something off of the Internet or sharing software any disks or write able media that you

placed into the computer will then be infected. When that disk is put into another computer their computer is then infected, and then if that person puts files on the Internet and hundreds of people download that file they are all infected and then the process continues infecting thousands if not millions of people.

MODE OF TRANSMISSION OF COMPUTER VIRUS

The majority of viruses are contracted from mobile external storage devices by bringing information from one source and then put onto your computer. VIRUSES can infect disks and when that disk is put into your computer your computer will then become infected with that virus, a recent survey done in 1997 by NCSA given to 80 percent of PC users showed that 90% of PC users contract viruses by floppy disk from mobile external storage devices.

In the survey done above it showed that the other 20% of viruses were contracted by email attachments and over the Internet. This means that you received an email with an attached file and opened the file. Or downloaded a file over the Internet.

VIRUS PROPERTIES

Your computer can be infected even if files are just copied. Because some viruses are memory resident as soon as a program is loaded into memory the virus then attaches itself into memory.

Can be Polymorphic. Some viruses have the capability of modifying their code which means one virus could have various amounts of similar variants.

Can be memory / Non memory resident. Depending on the virus can be memory resident virus which first attaches itself into memory and then infects the computer. The virus can also be Non memory resident which means a program must be ran in order to infect the computer.

Can be a stealth virus. Stealth viruses will first attach itself to files on the computer and then attack the computer this causes the virus to spread more rapidly.

Viruses can carry other viruses and infect that system and also infect with the other virus as well. Because viruses are generally written by different individuals and do not infect the same locations of memory and or files this could mean multiple viruses can be stored in one file, diskette or computer.

Can make the system never show outward signs. Some viruses will hide changes made such as when infecting a file the file will stay the same size.

Can stay on the computer even if the computer is formatted. Viruses have the capability of infecting different portions of the computer such as the CMOS battery or master

HOW VIRUSES MAY EFFECT FILES

Viruses can affect any files however usually attack .com, .exe, .sys, .bin, .pif or any data files. Viruses have the capability of infecting any file however will generally infect executable files or data files such as word or excel documents which are open frequently.

It can increase the files size, however this can be hidden. When infecting files virtues will generally increase the size of the file however with more sophisticated viruses these changes can be hidden.

It can delete files as the file is ran. Because most files are loaded into memory and then ran once the program is in memory the Virus can delete the file.

It can corrupt files randomly. Some destructive viruses are not designed to destroy random data but instead randomly delete or corrupt files.

It can cause write protect errors when executing .exe files from a write protected disk. Viruses may need to write themselves to files which are executed because of this if a diskette is write protected you may receive a write protection error.

It can convert .exe files to .com files. Viruses may use a separate file to run the program and rename the original file to another extension so the exe is ran before the com.

It can reboot the computer when a files is ran. Various computers may be designed to reboot the computer when ran.

WHAT VIRUSES MAY DO

The following are possibilities you may experience when you are infected with a virus. Remember that you also may be experiencing any of the following issues and not have a virus.

Once the hard drive is infected any disk that is non-write protected disk that is accessed can be infected.

- Deleted files
- Various messages in files or on programs.
- Changes volume label.
- Marks clusters as bad in the FAT.
- Randomly overwrites sectors on the hard disk.
- Replaces the MBR with own code.
- Create more then one partitions.
- Attempts to access the hard disk drive can result in error messages such as invalid drive specification.
- Causes cross linked files.

- Causes a "sector not found" error.
- Cause the system to run slow.
- Logical partitions created, partitions decrease in size.
- A directory may be displayed as garbage.
- Directory order may be modified so files such as COM files will start at the beginning of the directory.
- Cause Hardware problems such as keyboard keys not working, printer issues, modem issues etc.
- Disable ports such as LPT or COM ports
- Caused keyboard keys to be remapped
- Alter the system time / date
- Cause system to hang or freeze randomly.
- Cause activity on HDD or FDD randomly.
- Increase file size.
- Increase or decrease memory size.
- Randomly change file or memory size.
- Extended boot times
- Increase disk access times
- Cause computer to make strange noises, make music, clicking noises or beeps.
- Display pictures
- Different types of error messages

DETECTING VIRUSES

The most commonly used method of protecting against and detecting viruses is to purchase a third party application designed to scan for all types of viruses. A list of these protection programs are listed above.

Alternatively a user can look at various aspects of the computer and detect possible signs indicating a virus is on the computer. While this method can be used to determine some viruses it cannot clean or determine the exact virus you may or may not have.

4.0 Conclusion

Computer viruses are perhaps the greatest threats to the computer. If not detected and promptly cured, computer virus attack could lead to the total breakdown of computer a installation. With the aid of our discussion in this unit, students should be able to prevent, detect and clean viruses in a computer installation.

5.0 Summary

In this unit we have learnt the following:

(a) That computer viruses are programs written by programmers with the aim of causing havoc to the computer.

(b) Computer viruses could lead to malfunctioning and total breakdown of the computer.

(c) Computer viruses are transferred from one computer to another through the use of infested storage media such as diskette, flash drive, CDROM, or across a computer network.

(d) There are antivirus packages specially written to prevent, detect and clean viruses.

6.0 Tutor Marked Assignment

(a) What is a computer virus?

(b) What are the differences and similarities between biological viruses and computer viruses?

(c) How would you prevent virus attack in the student's computer laboratory?

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MODULE 2: COMPUTER HARDWARE AND SOFTWARE

In this module we shall discuss the following:

- Hardware components – (the front, back and inside of the system unit)
- The peripheral devices
- The Auxiliary equipment

STUDY UNIT 1: HARDWARE COMPONENTS (1)

Table of content

Essential components of the computer

The system unit

The front of the system unit

Back of the system unit

Inside the system unit

- Central processing unit (CPU)
- Power supply unit
- Mother board
- Memory chips
- Types of memory

Primary memory

Read only memory (ROM)

Random access memory (RAM)

Secondary memory

Hard Disk

Tertiary memory

Floppy disk (diskette)

CDROM

1.0 Introduction

Your Personal Computer (PC) is really a collection of separate items working together as a team-with you as the captain. Some of these components are essential; others simply make working more pleasant or efficient. Adding extra items expands the variety of tasks you can accomplish with your machine.

1.0 The Objectives

The objectives of this unit are to:

i. Familiarize the student with the components of the computer.

ii. Enable the student to appreciate the importance of each of the components to the overall smooth operations of the computer.

3.0 The System Unit

The system unit is the main unit of a PC. It is the Computer itself while other units attached to it are regarded as peripherals. It could be viewed as the master conductor orchestrating your PC's operation. It is made up of several components like the Motherboard, Processor, Buses, memory, power supply unit, etc. This unit (system unit) has been confused over the years by novices as the CPU. This is not true. The CPU (Central Processing Unit) or simply processor is a component within the system unit and it is not the only thing that makes up the system unit. Hence, it will be wrong to equate the system unit with the CPU.

3.1 Front of the System Unit

Lights

Your unit may display a variety of colored light on the front panel, including power and turbo signals, and light to indicate if the Hard or Floppy disk are being read or written to.

Key Lock

You can stop intruders tampering with your PC by using the Lock on the front panel.

Turning the key prevents the key board from working.

Turbo Button

Some PCs offer a choice of speeds at which they can run. A turbo switch is usually left so the computer runs at its fastest speed.

Reset Button

If your PC “freezes” and won’t respond to any comma nd, try starting it up again using the reset button. Pressing the reset button loses all the work you have not saved in that session, so use it only as a last resort.

Power On/Off

All PCs have main power switch on the system unit. Sometimes this control is placed on the outside back panel.

Floppy Disk Drives

Either, or both, of two standard types of floppy disk drive may be found at the front of the system unit. Some systems also have internal CD-ROM or tape drives.

CD-ROM or DVD drive

3.2 Back of the System Unit

Fan Housing

The electronic components in your PC generate a lot of heat. To prevent overheating, a fan at the back of the unit removes hot air from the system.

Power “in” and “out” Sockets

Cables plugged into these sockets carry power from the electrical outlet to the system unit and from the system unit to the monitor.

Joystick Port

Using a joystick is often much better than pressing keys to control movements when playing a computer game.

Serial Ports

Serial Ports often connect the PC to modem or mouse. Most PCs are fitted with two serial ports that may be labeled “S101” and “S102”, “Serial 1” and “Serial 2”, or “COM 1” and “COM 2”.

Sound Jacks

If you have a sound fitted inside your system unit, you will see a jack or jacks at the back. These can be used to connect your PC to speakers, a microphone, or an eternal sound source.

Keyboard Port

The cable from your keyboards ends with a round connector, which plugs into the keyboard port.

Network Adapter

If an expansion card is fitted to link your PC with other PCs in your office you will see a network connector at the back of the system unit.

Monitor Port

A cable from your monitor plugs into this port and carries display information to the monitor.

Bays for Expansion Cards

PCs are easily expanded-perhaps to provide a modem, sound or faster graphics. You can plug cards into expansion slots inside the PC. The end of an expansion card shows at the back of your machine, allowing you to connect items.

3.3 Inside the system unit

The brain behind everything that happens in your PC is contained within the system unit. Inside the unit are the impressive electronics that run programs, handle instructions, and determine the results. Most of the more important items are described below:

Battery

A small battery powers a clock to keep track of the time when the PC is turned off. It also maintains low electricity to certain RAM chips that record which components are installed.

Disk Drive Controller Card

This card controls the PC's disk drive motors and transfers data. The serial and parallel ports at the back of the card link internal PC components with external devices such as mouse and printer.

Display Adapter Card (Video Card)

All the information your computer will display is stored in its memory. To be useful, you need to see the information. The display adapter card is the link between the PC's memory and the monitor.

Expansion Slots

These long narrow connectors allow you to plug in expansion cards (also known as adapter cards), which offer extra options not available on a basic PC.

ROM Chips

Read-only memory (ROM) chips have data written on them during manufacturing that tells the CPU what to do when the PC is switched on. The data is always there, even when you switch the PC off.

RAM Chips

When a computer is switched on and running a program, RAM (Random Access Memory) is used for purposes such as holding the program and its data. But when the PC is switched off, anything held in RAM is lost.

Empty RAM Chip Slots

These slots let you expand your computer's memory by adding extra RAM chips or modules. Some PC's work even faster because they come equipped with Cache Memory. Cache Memory consists of expensive and very fast memory chips that store the data or instructions that the CPU will look at next. Cache memory can speed up work on your computer enormously.

RAM chip

Central Processing Unit (CPU)

Intel Processor

The Microprocessor, or Central Processing Unit (CPU), is the computer's most important single item. It does all the PC's thinking and runs the programs (series of instructions) that you request.

CPU Support Chips

These chips help the CPU manage all the other parts of the computer.

Math Coprocessor Slot

A math coprocessor, present in some PCs, assists the CPU in its number-crunching activities (if programs have been designed to use it).

CPU fan

Speaker

The speaker emits the computer's sound output.

Power Supply Unit

All the components in a PC need electrical supply. Most need a 5-volt supply although the floppy disk drive motors required 12 volts. If the components were connected to

normal household current, they would blow up, so the power supply unit converts high voltage electrical current to a low voltage.

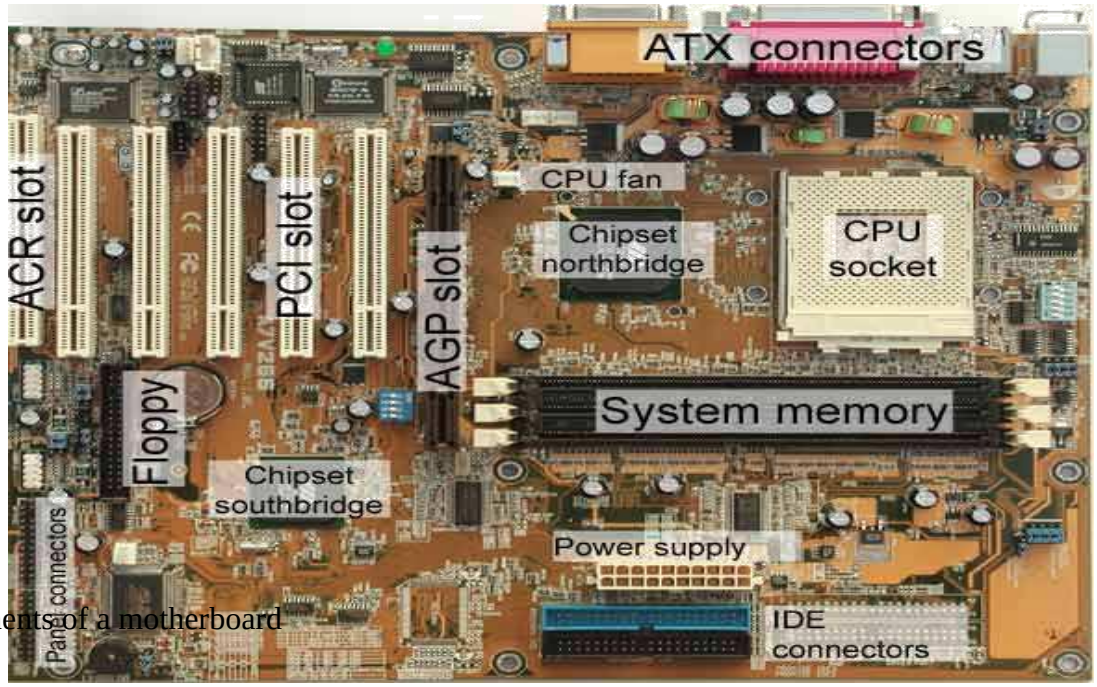
Hard Disk Drive

The hard disk is your computer's main permanent storage unit, holding large amount of data and programs. Unlike data held in RAM, the information on the hard disk is not affected when the PC is turned off – it remains the re unless you instruct the PC to overwrite it or the hard disk is damaged.

Hard drive (Hard disk)

Motherboard

All the electronic components in a PC are mounted on a piece of fiberglass called the motherboard. Fiberglass cannot conduct electricity, so each component is insulated from all the others. Thin lines of metal on the surface of the fiberglass connect pins from one component to another, forming the computer's electrical circuits.



Components of a motherboard

Intel CPUs

The earliest PCs were equipped with a CPU from Intel Corporation called the 8088. the next generation of PCs used CPU known by the number “80286 and were called “PC/AT” computers. Subsequently, PCs have been sup plied with more and more powerful CPUs – the 80386, the 80486, and the more recent and impressive of all, the Intel Pentium (I, II, III, IV& M).

All these PC processors belong to a family called 80 x 86. In general, you can run the same software on PCs containing different CPUs within this family. From the outside, the chips look different only in sizes and number of pin-put inside, an 80486 has over one million components to the 3,500 that were in the first 8088. Because of these differences, the latest Pentiums runs over ten times faster.

What is CPU

The CPU is certainly the most important PC component. CPU stands for *Central Processing Unit*. Let us briefly study that name:

It is a processor, because it processes (moves and calculates) data.

It is central, because it is the center of PC data processing.

It is a unit, because it is a chip, which contains millions of transistors.

CPU Speed

The speed of a CPU is measured in megahertz (MHz). A computer has central clock that keeps all the components in time with each other; one hertz is similar to a clock tick and megahertz is equal to one million ticks per second. If your PC runs at 333 or 400MHz, the central clock ticks 333 or 400 million times every second. As you might imagine, the faster the clock ticks, the faster the computer runs.

Without the CPU, there would be no PC. Like all other hardware components, the CPUs are continually undergoing further development. You can see the explosive technological development in data processing most clearly in the development of newer and faster CPUs. The CPUs have for years doubled their performance about every 18 months and there are no indications that this trend will stop.

When we now look at all the CPUs from a broader perspective, we can see that:

The CPU history is closely tied to the companies IBM and especially *Intel*.

The CPUs have their roots back to Intel's chip *4004* from 1971.

The *compatibility* concept has been important throughout the development.

Generations of CPUs

There are CPUs of many brand names (IBM, Texas, Cyrix, AMD), and often they make models which overlap two generations. This can make it difficult to keep track of CPUs. Here is an attempt to identify the various CPUs according to generation:

History of CPU

The following table shows the different CPU *generations*.

PC	CPUs	Year	Number of transistors
1st. Generation	8086 and 8088	1978-81	29,000
2nd. Generation	80286	1984	134,000
3rd. Generation	80386DX and 80386SX	1987-88	275,000
4th. Generation	80486SX, 80486DX, 80486DX2 and 80486DX4	1990-92	1,200,000
5th. Generation	Pentium Cyrix 6X86 AMD K5 IDT WinChip C6	1993-95 1996 1996 1997	3,100,000 -- -- 3,500,000
Improved 5th. Generation	Pentium MMX IBM/Cyrix 6x86MX IDT WinChip2 3D	1997 1997 1998	4,500,000 6,000,000 6,000,000
6th. Generation	Pentium Pro AMD K6 Pentium II	1995 1997 1997	5,500,000 8,800,000 7,500,000

	AMD K6-2	1998	9,300,000
Improved 6th.	Mobile Pentium II	1999	27,400,000

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Generation	Mobile Celeron Pentium III AMD K6-3 Pentium III CuMine		18,900,000 9,300,000 ? 28,000,000
7th. Generation	AMD original Athlon AMD Athlon Thunderbird Pentium 4	1999 2000 2001	22,000,000 37,000,000 42,000,000

Intel Processor

DISKS

Floppy Disks

Computers use disk to store information. Although there is a permanent hard disk that lives inside the system unit, you can use floppy disks to store and move data easily from one PC to another. Floppy disks come in two sizes, either 5¼ or 3½ inches in diameter. The smaller disks are able to store more data and are also less easily damaged, because of their thicker plastic cases. As both sizes can be either “high” or “low” capacity (or density), there are four main varieties of disks available. High-capacity disks are more expensive, but they can store much more information. Low-capacity disks are generally

labeled DS/DD, which stands for “double sided/doubl e density”, while the high-capacity floppy disks are labeled DS/HD (double sided/high-density”).

Caring for Disks

Treat floppy disks carefully, and you can take them almost anywhere safely. Don’t leave the disks in your PC when you finish a session. Also avoid putting anything heavy on top of your disks or leaving them in extremes of hot or cold temperature. Try not to carry disks loose in pockets or handbags where dust and dirt may get inside the containers. Take care to store them vertically, preferably in a special storage box. Remember too that you should keep floppy disks away from magnetic fields, including hidden magnets such as those in telephone, radio and television speakers, amplifiers, desk fans, and photocopiers. If you do leave floppy disks near magnetic field, your data may become corrupted and will no longer be usable.

Write Protecting Disks

Write – protecting a disk means that you prevent th e computer from erasing or writing over important data or programs that are already there. However, the PC can still read a write-protected disk.

4.0 Conclusion

The system unit is a box housing many components. It is in fact, the most important part of the computer because it houses the processor (CPU) and other essential components that enables the computer to function.

5.0 Summary

In unit we studied the components of the system unit which include the components in the front, the back and those that are inside the.

6.0 Tutor Marked Assignment

a. Make a list of 5 components that could be found inside the computer systems unit.

b. Describe the functions of each of them.

c. Differentiate between CPU and the Systems unit.

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STUDY UNIT 2

HARDWARE COMPONENT (2) – PERIPHERAL DEVICES

Table of contents

Input devices

Computer keyboard

Mouse and joystick

Digital or graphic tablet

Optical character reader (OCR)

Magnetic Ink Character Reader (MICR)

1.0 Introduction

The computer peripheral devices are those devices which are attached to the system unit. The devices are necessary to ensure that the computer is able to accept input and display the result for the user. This section therefore discusses the input unit and the output unit.

2.0 Objectives

The objectives of this unit are to:

i. Expose the students to those components that make up the input unit and the output unit.

ii. Enable students get deeper understanding of the functions of the input and the output unit.

iii. Guide the students on the type of input unit and output unit suitable to a particular computing environment.

3.0 Input Devices

3.1 **Computer Keyboard**

A Computer keyboard is identical to the conventional typewriter keyboard. However, it has more keys than the typewriter keyboard. A computer keyboard can be a dummy type or intelligent type. A computer keyboard is considered too be intelligent if, in addition to

performing the routine functions characteristic of a typewriter keyboard, it can initiate a series of actions for a computer to carry out by mere pressing a key or combination of two or more keys. An intelligent computer keyboard has a set of keys and when one of them is pressed, the computer can be made to carry out a specific function. For example, the pressing of a key may cause the computer to display a menu list from which a human being may be prompted to select one.

The intelligent computer keyboard has four major divisions, namely: Function keys, Alphanumeric keys, Numeric keys and Control keys.

In addition to the four types of keys, there are some special or important keys such as the following:

(a) Return or Enter key
(b) Escape key denoted by ESC
(c) Control key denoted by CTRL
(d) Alternate key denoted by ALT
(e) Delete key denoted by DEL
(f) Insert key denoted by INS
(g) Backspace key
(h) Shift key.

Function Keys

The effects of the functions keys are software package dependent. That is, they mean different translations depending on which software package one is running on the computer. The function keys are traditionally labeled F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11 and F12. The function keys are often arranged to the left of the main keyboard in two columns or they are arranged in a row above the main keyboard. In most software packages, the function key F1 is used to run the HELP program. Word perfect, for example, uses F3 for HELP program and F1 to cancel the last command issued on the computer. The function keys F7 and F12 are used to save a text and block a section of a text respectively in word perfect. Function keys can be programmed to carry out the functions desired by a programmer. For example the function keys F10 may be programmed to display menus. Thus, the operations of the function keys can be

determined by the user or programmed by the software package being used at any point in time.

Alphanumeric Keys

The Alphanumeric keys can be likened with the conventional typewriter keys. They contain alphabetic characters, numeric characters and special characters such as comma, full stop, open bracket, close bracket, asterisk, semicolon, colon, question mark, and so on. Usually, each key carries a character at the lower part and another character at the upper part. The SHIFT key is used to switch on or off the lower and upper characters by the programmer.

Cursor Control Keys

The cursor marks the active or current spot on the screen. It is an indicator that tells the user where in the midst of a document the system is pointing to. It may be a rectangular bar of light or a blinking underscore. When a text is being typed, the cursor moves as the carriage on a keyboard moves and character are typed in. The cursor control keys include four directional arrow keys.

CONTROL KEY	**FUNCTIONS**
↑	Moves the cursor one line up.
	Moves the cursor one line down
	Moves the cursor one character to the right
↓ →	Move the cursor one character to the left.
HOME ←	Moves the cursor to the beginning of a line or page
END	Move the cursor to the bottom left of a page or to the end of the current line in most text editors
PGDN	Moves the cursor to the top of the next page in the document or text. For example, pressing this key while on page 5 of the text will place the cursor at the top of the page 6 of the text.
PGUP	Moves the cursor to the top of the previous page. For example, if you are on page 3 of a document, pressing this key will place the cursor at the top of page 2 of the document

Other cursor control keys are HOME, PAGE UP, PAGE DOWN, and END. These keys

may be part of the numeric keypad or separated from the numeric keypad. Moving the

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cursor around on the screen is one of the most common tasks in an application program. In fact, cursor movement is so important in an application such as word processing that it can usually be accomplished by additional key-driven commands. The control keys and their functions are documented in Table the above table.

Numeric Keypad

The numeric keypad contains a set of keys required for typing or entering number digits 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 into the computer store. A numeric key is often activated by pressing the Numlock Key. The numeric keypad is also used in combination with Alternate (Alt) key to produced extended characters. Extended characters are characters not normally found on most keyboard. For example, to produced the character alpha data denoted ‘ □’, one holds down the Alt key and press 224; to produce character beta denoted by ‘□’, one holds down the Alt key and press 255 and to produce pound sterling denoted by ‘ £’, one holds down the Alt key and press 156.

Shift Key

When the Shift key is pressed, the capital letters on the alphanumeric keys are activated. It also serves as the activator of characters that are at the upper part of each alphanumeric key. The Shift key has no effects on itself; its effect are realized when some other keys are pressed. Thus, if one presses the shift key and then ‘equal’ sign key, the ‘plus’ sign which is at the upper part of the ‘equal’ sign is a ctivated and then it appears on the screen.

CapLock Key

The CapLock Shifts all alphabetic characters into upper case (capital letters). Thus all characters typed are in lower case (small letters) when not pressed.

Alternate Key (Alt)

The Alternate key can be used in combination with numeric keys to generate characters not shown on the keyboard, that is, extended characters. For example, holding the Alt key down and pressing 228 produces the summation (□) sign; holding the Alt key down and pressing 235 produce □ sign. To restart or reboot your computer, press Alt, Ctrl and Del keys simultaneously.

NumLock Key

The Numlock key activates the numeric keypad. Neither NumLock nor CapLock affects the function keys.

Control Key (Ctrl)

The Control key is often used in most text mode to perform block operations like mass deletion, insertion and so on. For example, CTRL + Y deletes a line in most text documents. It can also be used in combination with other keys to move the cursor to different locations in a text or document. In some application packages, the Alt, Ctrl and Shift key are used in combination with the function keys to perform several operations. For example, in Word Perfect word processing package, to centre a text; press Shift and F6; to print a text, press Shift and F7.

Escape Key (Esc)

The Escape key cancels an operation in progress. For example, when one is editing a file or issuing a command, ESC cancels any changes one might have made or terminates the command.

Return or Enter Key

The Return key serves as one of the most important keys on most keyboards. It is actually used to inform the computer the end of an input or command. It performs two functions depending on the program with which it is used. For example, suppose you are asked to respond to an operating system command at the prompt or other entries, the operating system will wait until the return key is pressed before continuing. Pressing the return key also positions the cursor at the beginning of the next line (in text mode), which is the equivalent of pressing the carriage return on a typewriter.

Insert Key (Ins)

Pressing the Insert key puts ones keyboard in insert mode, pressing it again returns to overstrike (typeover) mode. In insert mode, the characters one types are inserted at the cursor position, the character at the cursor position and all characters to the right, shift to make room for them. In overstrike or typeover mode, newly typed characters overwrite the characters at the current cursor position. In most application software insert mode is indicated by a symbol in the status line.

Delete Key (Del)

The delete key deletes the character at the cursor position when pressed and the remaining text moves to the left while the cursor remains at the same position.

Back Space Key

The Back Space Key deletes the characters to the left of the cursor when pressed and all other characters to the right of the cursor are shifted one space to the left.

Spacebar

The Spacebar is the longest key found on most keyboards. It erases characters at the cursor position or gives blank space when pressed.

Tab Key

The Tab Key moves the cursor by five spaces to the right when pressed. The number of positions moved depend on the software or the Tab Set by the operator. The Tab is normally pressed to insert paragraphs during typing. In some programs, when this key is pressed in combination with shift key, the same number of positions is moved backwards.

Print Screen Key (Prtsc)

When the Print Screen key is pressed in combination with the Shift Key, whatever in is the screen will be printed on a printer. The same effect can be achieved by pressing the key alone on some keyboards.

Keeping Your Keyboard Clean and Working

Never spill liquids on your keyboard. Coffee, soda, and other beverage spills can ruin your keyboard. Liquid spills on the keyboard have even been known to cause electrical damage to the PC itself. With that in mind, though you may not stop drinking coffee around your computer, you should at least get a spill-proof mug or keep the coffee on the other side of the desk.

Another enemy of keyboards is static electricity. Static electricity can have the same damaging effect on your keyboard as does liquid. If your keyboard doesn't respond properly after a strong static charge, you may just need to turn off the PC and turn it back on to reset the keyboard. In some cases, however, the static discharge can zap the keyboard and even parts of the PC. If you shuffle your feet across carpet or your PC is in a room with dry air, avoid touching the PC or the keyboard until you have touched something metal to discharge any static. If you don't have a metal desk or bookcase in your work area, consider buying an anti-static mat and keeping it where you can touch it before touching the PC.

Dust, dirt, food crumbs, and hair are other enemies of keyboards. Try to avoid eating over the keyboard and if your computer is in a dirty, dusty area, keep the keyboard covered when not in use.

Some dirt and dust is unavoidable. To keep the keyboard working well, you should occasionally clean it.

3.2 Mouse and Joystick

A mouse looks like the electrical clipper in a barbing saloon. It consists of a pointing device very sensitive to movements. It has a roller ball and two or more buttons which can be pressed to make selection. By moving the mouse on a flat smooth surface and clicking one or combination of two buttons on its upper surface, a computer to which it is connected can be sensitized and commanded to carry out some specific tasks.

A mouse can be used to draw diagrams on computer screen more effectively and efficiently than the computer keyboard. Generally, the keyboard and the mouse do complement each other. For example, the mouse can be used to highlight an item in a menu list while the keyboard Enter Key can be pressed to activate or evoke the command associated with the highlighted item.

A mouse is the primary input device for modern computers that feature operating systems with a graphical user interface, such as Windows 98 or Windows XP. While keyboards obviously excel at entering text, numbers, and symbols, your mouse is the tool you'll use to tell your computer what to do with all the data you've entered.

Joysticks are almost exclusively used with game software and help the user more effectively control the actions of computer-simulated airplanes or arcade-style games.

All modern PC operating systems (Windows 98, Windows XP, and the Macintosh) rely on an on-screen pointer to select and execute commands. A mouse is simply an input device built to help the user control this on-screen pointer in as natural and efficient a manner as possible.

The pointer on the screen mimics the movements of your mouse. As you move your mouse, a ball encased in the bottom of your mouse rolls on the desk and in turn sends signals to the computer as to which direction to move the pointer on the screen. Move the mouse side to side, or up and down, and the on-screen pointer moves in a similar manner.

Once you have the mouse positioned to select the command or data you want to act on, you use the mouse buttons to execute the command. *The mouse controls the on-screen pointer and lets you select program icons, manipulate property sheets, and access data.*

3.3 Output Device

3.3.1 Printers

A printer is the computer component that lets you create copies of the information stored in your computer on paper. The printed material is often called hard copy, to differentiate it from the data stored on a disk, or held in the computer's memory.

There are three basic types of printers available for use with personal computers:

Laser printers. These combine a magnetic roller with powdered ink called toner to transfer high-quality characters or images onto a page.

Inkjet printers. These have small nozzles that actually spray fast-drying ink onto the page to form characters or images. Inkjet printers spray a fine, quick-drying ink through small nozzles to produce characters and images on paper. Although the results are not quite as sharp as those of laser printers, inkjet printers provide very good quality output at a lower cost.*Dot-matrix printers.*

These use a print head to strike an inked ribbon against paper, like a typewriter, creating characters out of a series of dots. Dot-matrix printers are the cheapest printers available. They create text and images on the page by hammering several small pins against an inked ribbon. The more pins used, the better the image--9-pin and 24-pin are common options. The 24-pin printers produce a better quality output, but are somewhat slower than the 9-pin printers.

Print quality for dot-matrix printers is often described in terms of mode: draft mode (low resolution), near-letter-quality mode (medium resolution), or letter-quality mode (high resolution). The speed depends on the mode, with draft mode being the fastest.

The type of printer you choose depends on your budget and the type of output you need. For example, if all you need to print are grocery lists, you may be happy with a dot-matrix printer. In general, dot-matrix printers are noisier, slower, and produce a poorer-quality image than do laser or inkjet printers, but they are also less expensive. If you need to print newsletters, brochures, or illustrated reports, you will probably want a high-quality laser printer. Laser printers cost more than other printers, but they may be worth the price because they are fast, quiet, and produce high-quality text and graphics.

3.3.2 Monitors

. The monitor does not do any processing itself. The monitor only displays the information that the video card tells it to.

Monitor Sizes

The two most common monitor sizes are 15-inch and 17-inch. If you have an older, hand-me-down PC or a very inexpensive starter PC, you may have a smaller 14-inch monitor. 21-inch monitors are also available but mostly used by graphics professionals.

VGA and SVGA Monitors

The two most common acronyms you will see on current monitors are VGA or SVGA. Both of these terms generally refer to how many dots (or pixels) in each direction the monitor can display. VGA is 640x480 (width by height) and SVGA is 800x600. This measurement is called the monitor's *resolution*, and more is better! Most new monitors are capable of displaying at least SVGA quality. In fact, 1,024x768 is somewhat of a minimum to look for.

Almost any VGA or SGVA monitor made in the last few years is capable of displaying any of these resolutions. However, it's actually the video card that determines what resolution your monitor displays at any time. The monitor is capable of switching from one resolution to another on command from the video card.

3.3.3 Scanners

Scanners are peripheral devices used to *digitize* (convert to electronic format) artwork, photographs, text, or other items from hard copy. In a sense, a scanner works as a pair of eyes for your PC. Your eyes see an image and translate the image into electrical impulses that travel to and are interpreted by your brain. Similarly, a scanner captures images and converts them to digital data that travel to and are interpreted by the computer.

A scanner works by dividing an image into microscopic rows and columns and measuring, like the film in a camera, how much light (or lack thereof) reflects from each individual intersection of the rows and columns. Each reflection is recorded as a dot, or picture element (pixel). After the scanner collects information from each dot, it compiles the result into a digital file on the computer.

There are a wide variety of scanners that work in a number of different ways, but the technology behind them is essentially the same. The following sections discuss the more popular types of scanners available today.

Types of scanners

Flatbed Scanners

Flatbed scanners look and behave a lot like a photocopier. You lay the item to be scanned on a glass plate and the scanning head passes below the glass.

Flatbed scanners are very versatile: you can scan objects in a variety of sizes and shapes, including pages from a book, without damaging the original. While flatbed scanners are the best choice for a wide variety of uses, if you plan to do a lot of text scanning (called *OCR* for *Optical Character Recognition*) work, keep in mind that flatbeds only accommodate one page at a time. Scanning multi-page documents can be a slow, tedious process, because you have to manually remove one page and insert the next.

Sheetfed Scanners

Sheetfed scanners look and act more like fax machines. The page or item is fed into the machine, scanned, then spit out on the other end . A sheetfed scanner is a good choice for large volumes of text, but not for handling delicate original photographs. Scanning directly from a book or other three-dimensional object is impossible.

Hand Scanners

Hand scanners are a low-cost alternative to their larger, more sophisticated counterparts. As their name implies, hand scanners are manual devices you move over a flat surface, just as you do your PC's mouse

The hand scanner's advantages are many, but so are its disadvantages. Generally, hand scanners work best for small, uncomplicated images such as company logos or small black-and-white photographs. You might want a hand scanner if you do not plan to use it on a regular basis, because it usually does not require adding internal cards to your CPU, and it's easily disconnected and stored away. Most hand scanners can only scan a four-inch wide image at one time and require a steady hand. You're usually provided with software that helps you "sew up" a series of these 4-inch, side-by-side scans into one image, but this is obviously not as convenient as getting the full image at once.

3.3.4 Speakers and Sound

The built-in speakers in most PC cases are used just for making system sounds, such as warning beeps and action indicators. To play more sophisticated sounds on your PC, you need a set of external speakers. Usually speakers come in pairs, and there is a plug that connects them to your sound card. Arrange the speakers with one on the left and one on the right of your desk or work area to get a stereo effect.

Optionally, some speakers come with a *subwoofer*. This improves the bass (low notes) sound. If you have a subwoofer with your speakers, it should go on the floor under your desk.

Sound is one of the favorite options on today's PCs. In fact, sound is a standard feature of most new PCs.

Everyone has their own uses for sound. You may just want to play a few music CDs with your CD-ROM drive while you are working, or you may use multimedia applications for presentations or educational programs. You may just like the sound of your jet engines roaring as you punch the throttle in a flight simulator.

Components for Sound on Your PC

To produce sound on your PC, you need a sound card and speakers. The *sound card* is an expansion card that plugs into one of the slots on your motherboard. This card processes all of the instructions that have to do with sound, and then sends the sounds to the speakers to be played. The speakers plug into the sound card and

Sound Cards

Sound cards plug into an expansion slot in your PC. The card has a set of connectors that are exposed on the back of the PC; you can plug a microphone and speakers into the

connectors. Some cards include an optional connector for a *line input*, which is used to connect another input source such as the output from a tape player or portable CD player. Other optional connectors can include a joystick connector and a MIDI connector (for connecting a MIDI keyboard). The card may include a volume control, which controls the volume of the speakers and/or headphones.

4.0 Conclusion

The system unit cannot function without the peripheral devices. The input and the output units are very important peripheral devices that must be taken care of in setting up a computer system.

5.0 Summary

In this unit we have learnt the following:

i. Input unit which comprises
   - (a) the keyboard – (the different categories of keys o n the keyboard and their functions).
   - (b) the scanner – different types of scanners

ii. The output unit which is made up of the
   - (a) monitor,
   - (b) the printer and,
   - (c) the speakers.

6.0 Tutor Marked Assignment

a. Justify the need for the input and the output units in a computer system.

b. Describe the functions of the following keys: the numeric keys, control keys, shift keys and the function keys.

c. In what situation will you recommend the laserjet printer and the dot matrix printer.

7.0 References and Further Reading

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STUDY UNIT 3: AUXILLARY EQUIPMENT

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Air conditioner

Voltage stabilizer

Uninterruptible Power Supply System (UPS)

1.0 Introduction

The auxiliary equipment as their name suggests are not computers but are necessary in a computing environment in order to ensure proper functioning and smooth running of computing activities. In this module, we shall address in some details the importance of equipment such as air conditioner, voltage stabilizer, uninterruptible power system and line transformer in a data processing environment.

2.0 Objectives.

The objectives of this unit are to:

i. Identify the auxiliary equipment in a computing environment.

ii. Discuss the importance of the auxiliary equipment to the smooth running of a computing centre.

3.1 Air Conditioner

A Computer is an electronic machine. It is, therefore, capable of generating heat. A computer is manufactured to operate in an environment with a specific temperature range. When the temperature of the environment in which a computer is kept falls outside the specific range, the computer may function badly and consequently get damaged.

The free air is basically, dust laden. Dust is metallic in nature and, as such, capable of conducting electricity. If dust is allowed to settle on a computer, particularly the electronic circuits, the dust can bridge two circuits. The bridging of two electronic circuits may cause a serous damage to the computer. Thus, air conditioners are needed in a computer environment to:

a. Condition the temperature

b. Prevent dust.

3.2 Voltage Stabilizer

A computer when switched on, takes off at a cold state, warms up and gradually gets to a hot state. At a hot state, a computer is always roaming in an attempt to find something to do. In a situation where the public electricity such as that of PHCN in Nigeria is cut suddenly, the computer would suddenly be brought to a halt. The sudden power cut may cause the computer to loose the memory of some basic house keeping operations when power eventually returns and the computer is switched on. The sudden power cut may also cause irreparable damages to the file the computer was processing at the time the power was suddenly cut.

3.3 Line Voltage Transformer

We note that computers are built to operate within a specific range of voltages. In the United State of America, computers are built to operate on 110V. A voltage transformer is a device meant to step up or step down a voltage as the case may be. In Nigeria, for example, a 110V computer requires a voltage transformer to step down the 240V to 110V. Similarly, in USA, a 2409V current is connected directly to a 110V computer, the computer power unit will blow up almost immediately.

Today, the technology has improved tremendously such that if a 240V current is connected directly to a 110V computer, only a fuse, rather than the power unit will blow up. It is worth mentioning, too, that there is an advanced technology today which permits a computer to operate effectively and efficiently with the power line voltage ranging between 110V and 240V. The technology supports an inbuilt switch which can be operated at two terminals namely: the 110V terminus and 240V terminus. In recent times, the technology has been improved upon such that computers are manufactured in such a way that they can sense the voltage that is adequate. Thus, if one connects a 110V computer to a 240V current, the 110V computer has an in-built line transformer which automatically steps down the 240V current to 110V.

3.4 Uninterruptible Power Supply System (UPS)

An Un-interruptible Power System (UPS) is an auxiliary hardware that is capable of:

(a) Converting the public electricity raw line into fine line, that is, conditioning the voltage that is fed into the computer.

(b) Storing electrical energy when the public electricity line is life

(c) Releasing the stored electrical energy to the computer when the public electricity line is dead.

4.0 Conclusion

The computer is an expensive resource and as such requires adequate protection from electrical damage. Similarly, the UPS is an expensive resource; hence there is the need for it to be protected from electrical damage, too. Therefore, in practice, it is desirable that the UPS be protected by a voltage stabilizer which is rugged and less expensive.

The configuration presented in Figure is an example of a computer environment characterized by the multiple levels of protection from electrical damage. This arrangement is desirable in a situation of electrical surge and blown out.

5.0 Summary

In this unit we have learn the following:

i. Auxiliary devices create a facilitative and conducive environment for smooth operation of computers and the user.

ii. Voltage stabilizers help to protect computing equipment from damage due to power surge.

iii. UPS protects the computing equipment and the software from power outage during computing session. The UPS with the help of its internal battery stores electrical energy while power is on and releases power stored to the computer whenever power is off. This enables the user to end the working session and shut down normally.

iv. A voltage transformer is a device meant to step up or step down a voltage as the case may be.

6.0 Tutor Marked Assignment

With the aid of annotated diagram, describe the arrangement of the following auxiliary equipment: UPS, line voltage transformer and voltage stabilizer in relation to PHCN power source and the computer.

7.0 References

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Study Unit 3: COMPUTER SOFTWARE (1)

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System software

-Operating System

- Types of operating System

Language translators

Assemblers

Interpreters

Compilers

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1.0 Introduction

The computer hardware are driven by the software. The usefulness of the computer depends on the programs that are written to manipulate it. Computer software come in different forms: the operating system, utility software, language translators and application software. This unit therefore presents detailed discussions of each category of computer software.

2.0 Objectives

The objective of this unit are to:

i. Identify the different types of computer software.

ii. Discuss the importance of each type of software.

3.0 Computer Software

The physical components of the computer are called the hardware while all the other resources or parts of the computer that are not hardware, are referred to as the Software. Software are the set of programs that makes the computer system active. In essence, the software are the programs that run on the computer.

Then, what is a program? A Program is a series of coded instructions showing the logical steps the computer follows to solve a given problem.

3.1 Classification of Computer Software

The computer software could be divided into two major groups namely System Software (Programs) and Application Software (Programs).

3.1.1 System Software

This is refers to the suits of programs that facilitates the optimal use of the hardware systems and/or provide a suitable environment for the writing, editing, debugging, testing and running of User Programs. Usually, every computer system comes with collection of these suits of programs which are provided by the Hardware Manufacturer.

3.1.1.2 Operating System

An operating system is a program that acts as an interface between a user of a computer and the computer hardware. The purpose of an operating system is to provide an environment in which a user may execute programs.

The operating system is the first component of the systems programs that interests us here. Systems programs are programs written for direct execution on computer hardware in order to make the power of the computer fully and efficiently accessible to applications programmers and other computer users. Systems programming is different from application programming because the requires an intimate knowledge of the computer hardware as well as the end users' needs. Moreover, systems programs are often large and more complex than application programs, although that is not always the case. Since systems programs provide the foundation upon which application programs are built, it is most important that systems programs are reliable, efficient and correct.

In a computer system the hardware provides the basic computing resources. The applications programs define the way in which these resources are used to solve the computing problems of the users. The operating system controls and coordinates the use of the hardware among the various systems programs and application programs for the various users.

The basic resources of a computer system are provided by its hardware, software and data. The operating system provides the means for the proper use of these resources in the operation of the computer system. It simply provides an environment within which other programs can do useful work.

We can view an operating system as a resource allocator. A computer system has many resources (hardware and software) that may be required to solve a problem: CPU time, memory space, file storage space, input/output devices etc.

The operating system acts as the manager of these resources and allocates them to specific programs and users as necessary for their tasks. Since there may be many, possibly conflicting, requests for resources, the operating system must decide which requests are allocated resources to operate the computer system fairly and efficiently. An operating system is a control program. This program controls the execution of user programs to prevent errors and improper use of the computer.

Operating systems exist because they are a reasonable way to solve the problem of creating a usable computing system. The fundamental goal of a computer system is to execute user programs and solve user problems.

The primary goal of an operating system is a convenience for the user. Operating systems exit because they are supposed to make it easier to compute with an operating system than without an operating system. This is particularly clear when you look at operating system for small personal computers.

A secondary goal is the efficient operation of an computer system. This goal is particularly important for large, shared multi-user systems. Operating systems can solve this goal. It is known that sometimes these two goals, convenience and efficiency, are contradictory.

While there is no universally agreed upon definition of the concept of an operating system, we offer the following as a reasonable starting point:

A computer's operating system (OS) is a group of programs designed to serve two basic purposes:

1. To control the allocation and use of the computing system's resources among the various users and tasks, and.
2. To provide an interface between the computer hardware and the programmer that simplifies and makes feasible the creation, coding, debugging, and maintenance of application programs.

Specifically, we can imagine that an effective operating system should accomplish all of the following:

- Facilitate creation and modification of program and data files through an editor program,
- Provide access to compilers to translate programs from high-level languages to machine language,
- Provide a loader program to move the complied program code to the computer's memory for execution,
- Provide routines that handle the intricate details of I/O programming,
- Assure that when there are several active processes in the computer, each will get fair and noninterfering access to the central processing unit for execution,
- Take care of storage and device allocation,
- Provide for long term storage of user information in the form of files, and
- Permit system resources to be shared among users when appropriate, and be protected from unauthorized or mischievous intervention as necessary.

Though systems programs such as editor and translators and the various utility programs (such as sort and file transfer program) are not usually considered part of the operating system, the operating system is responsible for providing access to these system resources.

Types of operating system

Modern computer operating systems may be classified into three groups, which are distinguished by the nature of interaction that takes place between the computer user and his or her program during its processing. The three groups are called batch, time-shared and real time operating systems.

Batch processing operating system

In a batch processing operating system environment users submit jobs to a central place where these jobs are collected into a batch, and subsequently placed on an input queue at the computer where they will be run. In this case, the user has no interaction with the job during its processing, and the computer's response time is the turnaround time-the time from submission of the job until execution is complete, and the results are ready for return to the person who submitted the job.

Time sharing operating system

Another mode for delivering computing services is provided by time sharing operating systems. In this environment a computer provides computing services to several or many users concurrently on-line. Here, the various users are sharing the central processor, the memory, and other resources of the computer system in a manner facilitated, controlled, and monitored by the operating system. The user, in this environment, has nearly full

interaction with the program during its execution, and the computer's response time may be expected to be no more than a few second.

Real time operating system

The third class of operating systems, real time operating systems, are designed to service those applications where response time is of the essence in order to prevent error, misrepresentation or even disaster. Examples of real time operating systems are those which handle airlines reservations, machine tool control, and monitoring of a nuclear power station. The systems, in this case, are designed to be interrupted by external signal that require the immediate attention of the computer system.

In fact, many computer operating systems are hybrids, providing for more than one of these types of computing service simultaneously. It is especially common to have a background batch system running in conjunction with one of the other two on the same computer.

A number of other definitions are important to gaining an understanding of operating systems:

Multiprogramming operating system

A multiprogramming operating system is a system that allows more than one active user program (or part of user program) to be stored in main memory simultaneously.

Thus, it is evident that a time-sharing system is a multiprogramming system, but note that a multiprogramming system is not necessarily a time-sharing system. A batch or real time operating system could, and indeed usually does, have more than one active user

program simultaneously in main storage. Another important, and all too similar, term is ‘multiprocessing’.

A multiprocessing system is a computer hardware configuration that includes more than one independent processing unit. The term multiprocessing is generally used to refer to large computer hardware complexes found in major scientific or commercial applications.

A networked computing system is a collection of physical interconnected computers. The operating system of each of the interconnected computers must contain, in addition to its own stand-alone functionality, provisions for handing communication and transfer of program and data among the other computers with which it is connected.

A distributed computing system consists of a number of computers that are connected and managed so that they automatically share the job processing load among the constituent computers, or separate the job load as appropriate particularly configured processors. Such a system requires an operating system which, in addition to the typical stand-alone functionality, provides coordination of the operations and information flow among the component computers.

The networked and distributed computing environments and their respective operating systems are designed with more complex functional capabilities. In a network operating system the users are aware of the existence of multiple computers, and can log in to remote machines and copy files from one machine to another. Each machine runs its own local operating system and has its own user (or users).

Distributed operating system

A distributed operating system, in contrast, is one that appears to its users as a traditional uniprocessor system, even though it is actually composed of multiple processors. In a true distributed system, users should not be aware of where their programs are being run or where their files are located; that should all be handled automatically and efficiently by the operating system.

Network operating systems

Network operating systems are not fundamentally different from single processor operating systems. They obviously need a network interface controller and some low-level software to drive it, as well as programs to achieve remote login and remote files access, but these additions do not change the essential structure of the operating systems.

True distributed operating systems require more than just adding a little code to a uniprocessor operating system, because distributed and centralized systems differ in critical ways. Distributed systems, for example, often allow program to run on several processors at the same time, thus requiring more complex processor scheduling algorithms in order to optimize the amount of parallelism achieved.

Operating system components

An operating system provides the environment within which programs are executed. To construct such an environment, the system is partitioned into small modules with a well-defined interface. The design of a new operating system is a major task. It is very important that the goals of the system be will defined before the design begins. The type of system desired is the foundation for choices between various algorithms and strategies that will be necessary.

A system as large and complex as an operating system can only be created by partitioning it into smaller pieces. Each of these pieces should be a well defined portion of the system with carefully defined inputs, outputs, and function. Obviously, not all systems have the same structure. However, many modern operating systems share the system components outlined below.

Process Management

A process is the unit of work in a system. Such a system consists of a collection of processes, some of which are operating system processes, those that execute system code, and the rest being user processes, those that execute user code. All of those processes can potentially execute concurrently.

The operating system is responsible for the following activities in connection with processes managed.

- The creation and deletion of both user and system processes
- The suspension are resumption of processes.
- The provision of mechanisms for process synchronization
- The provision of mechanisms for deadlock handling.

Memory Management

Memory is central to the operation of a modern computer system. Memory is a large array of words or bytes, each with its own address. Interaction is achieved through a sequence of reads or writes of specific memory address. The CPU fetches from and stores in memory.

In order for a program to be executed it must be mapped to absolute addresses and loaded in to memory. As the program executes, it accesses program instructions and data

from memory by generating these absolute is declared available, and the next program may be loaded and executed.

The operating system is responsible for the following activities in connection with memory management.

- Keep track of which parts of memory are currently being used and by whom.
- Decide which processes are to be loaded into memory when memory space becomes available.
- Allocate and deallocate memory space as needed.

Secondary Storage Management

The main purpose of a computer system is to execute programs. These programs, together with the data they access, must be in main memory during execution. Since the main memory is too small to permanently accommodate all data and program, the computer system must provide secondary storage to backup main memory. Most modem computer systems use disks as the primary on-line storage of information, of both programs and data. Most programs, like compilers, assemblers, sort routines, editors, formatters, and so on, are stored on the disk until loaded into memory, and then use the disk as both the source and destination of their processing. Hence the proper management of disk storage is of central importance to a computer system.

The operating system is responsible for the following activities in connection with disk management

- Free space management
- Storage allocation

- Disk scheduling.

I/O System

One of the purposes of an operating system is to hide the peculiarities of specific hardware devices from the user. For example, in Unix, the peculiarities of I/O devices are hidden from the bulk of the operating system itself by the I/O system. The I/O system consists of:

- A buffer caching system
- A general device driver code
- Drivers for specific hardware devices.

Only the device driver knows the peculiarities of a specific device.

File Management

File management is one of the most visible services of an operating system. Computers can store information in several different physical forms; magnetic tape, disk, and drum are the most common forms. Each of these devices has it own characteristics and physical organization.

For convenient use of the computer system, the operating system provides a uniform logical view of information storage. The operating system abstracts from the physical properties of its storage devices to define a logical storage unit, the file. Files are mapped, by the operating system, onto physical devices.

A file is a collection of related information defined by its creator. Commonly, files represent programs (both source and object forms) and data. Data files may be numeric, alphabetic or alphanumeric. Files may be free-form, such as text files, or may be rigidly

formatted. In general a files is a sequence of bits, bytes, lines or records whose meaning is defined by its creator and user. It is a very general concept.

The operating system is responsible for the following activities in connection with file management:

- The creation and deletion of files
- The creation and deletion of directory
- The support of primitives for manipulating files and directories
- The mapping of files onto disk storage.
- Backup of files on stable (non volatile) storage.

Protection System

The various processes in an operating system must be protected from each other's activities. For that purpose, various mechanisms which can be used to ensure that the files, memory segment, cpu and other resources can be operated on only by those processes that have gained proper authorization from the operating system.

For example, memory addressing hardware ensure that a process can only execute within its own address space. The timer ensure that no process can gain control of the CPU without relinquishing it. Finally, no process is allowed to do it's own I/O, to protect the integrity of the various peripheral devices.

Protection refers to a mechanism for controlling the access of programs, processes, or users to the resources defined by a computer controls to be imposed, together with some means of enforcement.

Protection can improve reliability by detecting latent errors at the interfaces between component subsystems. Early detection of interface errors can often prevent contamination of a healthy subsystem by a subsystem that is malfunctioning. An unprotected resource cannot defend against use (or misuse) by an unauthorized or incompetent user.

Networking

A distributed system is a collection of processors that do not share memory or a clock. Instead, each processor has its own local memory, and the processors communicate with each other through various communication lines, such as high speed buses or telephone lines. Distributed systems vary in size and function. They may involve microprocessors, workstations, minicomputers, and large general purpose computer systems.

The processors in the system are connected through a communication network, which can be configured in the number of different ways. The network may be fully or partially connected. The communication network design must consider routing and connection strategies, and the problems of connection and security.

A distributed system provides the user with access to the various resources the system maintains. Access to a shared resource allows computation speed-up, data availability, and reliability.

Command Interpreter System

One of the most important component of an operating system is its command interpreter. The command interpreter is the primary interface between the user and the rest of the system.

Many commands are given to the operating system by control statements. When a new job is started in a batch system or when a user logs-in to a time-shared system, a program which reads and interprets control statements is automatically executed. This program is variously called (1) the control card interpreter, (2) the command line interpreter, (3) the shell (in Unix), and so on. Its function is quite simple: get the next command statement, and execute it.

The command statement themselves deal with process management, I/O handling, secondary storage management, main memory management, file system access, protection, and networking.

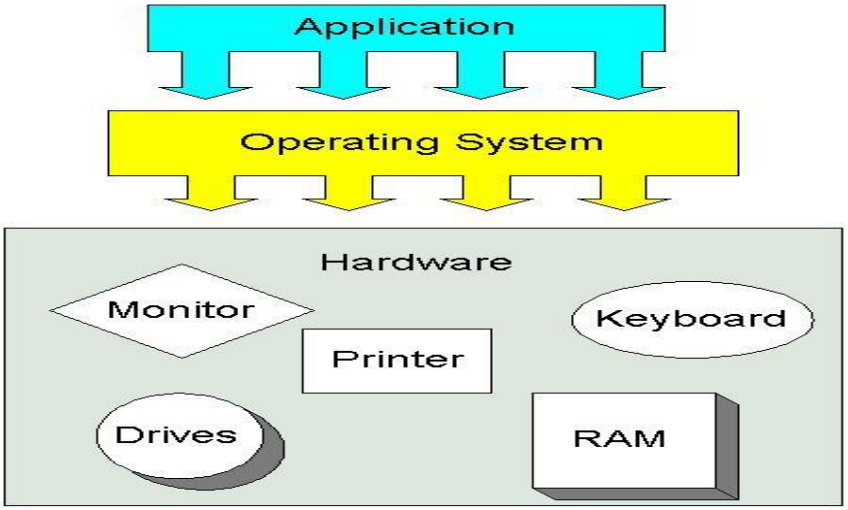

Fig. 1: Relationship between operating system and other components of the computer system.

4.0 Conclusion

Operating system occupies a central place in computer operations. It manages the hardware, other software, the computer peripherals and the user. Operating systems have also evolved in line with the evolutionary trends in computer. This led to a variety of

types of operating systems. This and other issues relating to operating system are discussed in this unit.

5.0 Summary

In this unit we have learnt the following:

i. The operating system is the executive manager of the computer.

ii. Types of operating system.

iii. Functions of operating system.

6.0 Tutor Marked Assignment

a) Discuss the role of operating system in a computing environment.

b) Differentiate between multi-user operating system and network operating system.

c) What is the function of command interpreter in an operating system.

7.0 References and Further Reading

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STUDY UNIT 4: COMPUTER SOFTWARE (2)

Table of Content

Language translator
Utility programs
Application programs

1.0 Introduction

In unit 7, we discussed in full details, the operating system as the executive manager of the computer, its peripheral devices and the users. In this unit, we shall look at other types of software such as the utility programs and the application programs.

2.0 Objectives

The objectives of this unit are to:

i. Conclude our discussion of system software with language translators.
ii. Discuss different categories of utility programs and application programs in greater detail.

3.0 Language Translator

A programming language is a set of notations in which were express our instructions to the computer. At the initial stage of computer development, programs were written in machine language conducting the binary system i.e. 0 and 1. Such programs were hard to write, read, debug and maintain. In an attempt to solve these problems, other computer languages were developed. However, computers can run programs written only in machine language. There is therefore the need to translate programs written in these other languages to machine language. The suites of languages that translate other languages to machine language are called **Language Translator.** The initial program written in a language different from machine language is called the **source program** and its equivalent in machine language is called object program.

Three examples of classes of language translators are Assemblers, Interpreters and Compilers.

1. **Assemblers:** An Assembler is a computer program that accepts a source program in assembly language program reads and translates the entire program into an equivalent program in machine language called the object

program or object code. Each machine has its own assembly language, meaning that the assembly language of one machine cannot run on another machine.

2. **Interpreter:** An Interpreter is a program that accepts program fin a source language, reads, translates and executes it, line by lone into machine language.

3. **Compilers:** A Compiler is a computer program that accepts a source program in one high-level language, reads and translates the entire user's program into an equivalent program in machine language, called the object program or object code.

The stages in compilation include:

- Lexical analysis
- Syntax analysis
- Semantic analysis
- Code generation

For each high-level language, there are different compilers. We can therefore talk of COBOL Compilers, FORTRAN Compilers, BASIC Compilers, etc. A Compiler also detects syntax errors, errors that arise from the use of the language. Compilers are portable i.e. a COBOL Compiler on one machine can run on a different machine with minimum changes.

3.1 Utility Software

This is a set of commonly used programs in data processing departments also called service or general-purpose programs.

They perform the following operations.

(i) File Conversion: This covers data transfer from any medium to another, making an exact copy or simultaneously editing and validating. For example, copying from a hard disk to a diskette.

(ii) File Copy: It makes an exact copy of a file from one medium to another or from an area of a medium to another area of the same medium.

(iii) Housekeeping Operations: These include programs to clear areas of storage, writing file labels and updating common data.

They are not involved in solving the problem at hand. They are operations that must be performed before and after actual processing.

3.2 Application software

Application software is a set of programs designed to solve problems of a specific nature. It could either be supplied by the computer manufacturer or in some cases, the users produce their own application program called USER PROGRAMS. Hence, an application software could be subdivided into two classes, namely; Generalized and User-defined Software.

Under the Generalized software, we have as examples: Word Processing Programs e.g. Word Perfect, Word Star, Microsoft word. Also, Desktop Publishing e.g. Ventura, PageMaker, CorelDraw likewise the Spreadsheet program e.g. LOTUS 1,2,3, Excel, Super-Q while under the User-defined, we could have some User-defined packages for a particular company or organization, for accounting, payroll or some other specialized purposes.

(i) **Word Processor:** A Word Processor is used to create, edit, save and print reports. It affords the opportunity to make amendments before printing is done. During editing character, word sentence or a number of lines can be removed or inserted as the case may be. Another facility possible is spell checking. A document can be printed as many times as possible. Word processors are mainly used to produce: Letters, Mailing lists, Label, Greeting Cards, Business Cards, Reports, Manual, Newsletter. Examples are: WordPerfect, WordStar, Display Writer, Professional Writer, LOTUS Manuscript, Ms-Word, LOCO Script, MM Advantage II etc.

(ii) **Spreadsheet:** Is an application mainly designed for numerical figures and reports. Spreadsheets contain columns and rows, in which numbers can be entered. It is possible to change numbers before

printing is done. Other features of spread sheets is the ability to use formulas to calculate, use sum and average function, ability to perform automatic recalculation and has the capacity to display reports in graphical modes. Spreadsheet is used for Budget, Tables, Cost analysis, Financial reports. Tax and Statistical analysis. Examples are: LOTUS 123, Supercalc, MS Multiplan, MS-excel, VP Planner etc.

(iii) **Integrated Packages:** They are programs or packages that perform a variety of different processing operations using data that is compatible with whatever operation is being carried out. They perform a number of operations like Word Processing, Data-base Management and Spread sheeting. Examples are: Office writer, Logistic Symphony, Framework, Enable, Ability, Smart ware II, Microsoft Work V2.

(iv) **Graphic Packages:** These are packages that enable you to bring out images, diagrams and pictures. Examples are PM, PM Plus, Graphic Writer, Photoshop.

(v) **Database Packages:** It is software for designing, setting up and subsequently managing a database. (A database is an organized collection of data that allows for modification taking care of different users view). Examples are Dbase II, III, IV, FoxBASE, Rbase Data Perfect, Paradox III, Revelation Advanced and MS-Access.

(vi) **Statistical Packages:** These are packages that can be used to solve statistical problems, e.g. Stat graphical, SPSS (Statistical Packages for Social Scientists).

(vii) **Desktop Publishing:** These are packages that can be used to produce books and documents in standard form. Examples are PageMaker, Ventura, Publishers, Paints Brush, Xerox Form Base, News Master II, Dbase Publisher.

(viii) **Game Packages:** These are packages that contain a lot of games for children and adults. Examples are Chess, Scrabble, Monopoly, Tune

Trivia, Star Trek 2, California Game, Soccer Game, War Game, Spy Catcher Dracula in London.

(ix) **Communication Packages:** Examples are Carbon Plus, Data talk V3.3, Cross talk, SAGE Chit Chat, Data Soft.

There are so many packages around, virtually for every field of study but these are just to mention a few of them. Advantages of these packages include quick and cheaper implementation, time saving, minimum time for its design, they have been tested and proven to be correct, they are usually accompanied by full documentation and are also very portable.

User Programs

This is a suit of programs written by programmers for computer users. They are required for the operation of their individual business or tasks. Example is a payroll package developed for salary operation of a particular company.

4.0 Conclusion

Apart from the operating systems, we need program translators for us to be able to program and use the computer effectively. Since computers do not understand natural languages, there is the need to have language translators such as assemblers, interpreters and compilers. Utility programs such file conversion and scandisk on the other hand, enable us to maintain and enhance the operations of the computer. Application and user programs such as the word processors, spreadsheet and the like help us to perform specific tasks on the computer. These are discussed in full details in this unit.

5.0 Summary

In unit, we have discussed the following:

i. Language translators such as the assembler, interpreters and the compilers.

ii. Utility programs such as file conversion, file copy programs and house keeping programs such as scandisk

iii. Application programs such as word processors, spreadsheets and statistical packages.

6.0 Tutor Marked Assignment

You have just been appointed as a consultant to a firm that is about to procure computing hardware and software. Recommend different categories of application packages that would be necessary for the smooth operations of the firm. Justify the need for each item recommended.

7.0 References and Further Reading

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MODULE 3: COMPUTER PROGRAMMING

This topic shall be discussed under the following sub-topics:

- Computer programming languages
- Basic principles of computer programming
- Flowcharts
- Algorithms

STUDY UNIT 1: COMPUTER LANGUAGES

Table of content

Low level language

Machine language

Assemblers

High level language

1.0 Introduction

In this unit, we shall take a look at computer programming with emphasis on:

(a) The overview of computer programming languages.

(b) Evolutionary trends of computer programming languages.

(c) Programming computers in a Beginner All-Purpose Symbolic Instruction Code (BASIC) language environment with emphasis on:

2.0 Objective

The objective of this unit is to introduce the student to the background information about programming the Computer.

3.0 Overview of Computer Programming Languages

Basically, human beings cannot speak or write in computer language, and since computers cannot speak or write in human language, an intermediate language had to be devised to allow people to communicate with the computers. These intermediate languages, known as programming languages, allow a computer programmer to direct the activities of the computer. These languages are structured around unique set of rules

that dictate exactly how a programmer should direct the computer to perform a specific task. With the powers of reasoning and logic of human beings, there is the capability to accept an instruction and understand it in many different forms. Since a computer must be programmed to respond to specific instructions, instructions cannot be given in just any form. Programming languages standardize the instruction process. The rules of a particular language tell the programmer how the individual instructions must be structured and what sequence of worlds and symbols must be used to form an instruction.

(a) An operation code.

(b) Some operands.

The operation code tells the computer what to do such as add, subtract, multiply and divide. The operands tell the computer the data items involved in the operations. The operands in an instruction may consist of the actual data that the computer may use to perform an operation, or the storage address of data. Consider for example the instruction: a = b + 5. The '=' and '+' are operation codes while 'a', 'b' and '5' are operands. The 'a' and 'b' are storage addresses of actual data while '5' is an actual data.

Some computers use many types of operation codes in their instruction format and may provide several methods for doing the same thing. Other computers use fewer operation codes, but have the capacity to perform more than one operation with a single instruction. There are four basic types of instructions namely:

(a) input-output instructions;

(b) arithmetic instructions;

(c) branching instructions;

(d) logic instructions.

An input instruction directs the computer to accept data from a specific input device and store it in a specific location in the store. An output instruction tells the computer to move a piece of data from a computer storage location and record it on the output medium.

All of the basic arithmetic operations can be performed by the computer. Since arithmetic operations involve at least two numbers, an arithmetic operation must include at least two operands.

Branch instructions cause the computer to alter the sequence of execution of instruction within the program. There are two basic types of branch instructions; namely unconditional branch instruction and conditional branch instruction. An unconditional branch instruction or statement will cause the computer to branch to a statement regardless of the existing conditions. A conditional branch statement will cause the computer to branch to a statement only when certain conditions exist.

Logic instructions allow the computer to change the sequence of execution of instruction, depending on conditions built into the program by the programmer. Typical logic operations include: shift, compare and test.

3.1 Types of Programming Language

The effective utilization and control of a computer system is primarily through the software of the system. We note that there are different types of software that can be used to direct the computer system. System software directs the internal operations of the computer and applications software allows the programmer to use the computer to solve user made problems. The development of programming techniques has become as important to the advancement of computer science as the developments in hardware technology. More sophisticated programming techniques and a wider variety of programming languages have enabled computers to be used in an increasing number of applications.

Programming languages, the primary means of human-computer communication, have evolved from early stages where programmers entered instructions into the computer in a language similar to that used in the application. Computer programming languages can be classified into the following categories:

(a) Machine language
(b) Assembly language
(c) High level symbolic language
(d) Very high level symbolic language.

3.1.1 Machine Language

The earliest forms of computer programming were carried out by using languages that were structured according to the computer stored data, that is, in a binary number system. Programmers had to construct programs that used instructions written in binary notation 1 and 0. Writing programs in this fashion is tedious, time-consuming and susceptible to errors.

Each instruction in a machine language program consists, as mentioned before, of two parts namely: operation code and operands. An added difficulty in machine language programming is that the operands of an instruction must tell the computer the storage address of the data to be processed. The programmer must designate storage locations for both instructions and data as part of the programming process. Furthermore, the programmer has to know the location of every switch and register that will be used in executing the program, and must control their functions by means of instructions in the program.

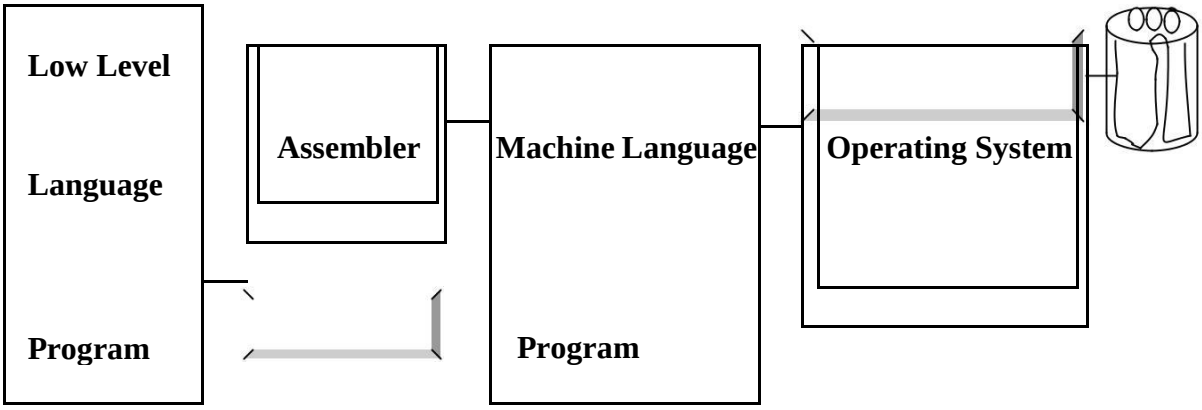
A machine language program allows the programmer to take advantage of all the features and capabilities of the computer system for which it was designed. It is also capable of producing the most efficient program as far as storage requirements and operating speeds are concerned. Few programmers today write applications programs in machine language. A machine language is computer dependent. Thus, an IBM machine language will not run on NCR machine, DEC machine or ICL machine. A machine language is the First Generation (computer) Language (IGL).

3.1.2 Assembly (Low Level) Language

Since machine language programming proved to be a difficult and tedious task, a symbolic way of expressing machine language instructions is devised. In assembly language, the operation code is expressed as a combination of letters rather than binary numbers, sometimes called mnemonics. This allows the programmer to remember the operations codes easily than when expressed strictly as binary numbers. The storage address or location of the operands is expressed as a symbol rather than the actual numeric address. After the computer has read the program, operations software are used

to establish the actual locations for each piece of data used by the program. The most popular assembly language is the IBM Assembly Language.

Because the computer understands and executes only machine language programs, the assembly language program must be translated into a machine language. This is accomplished by using a system software program called an assembler. The assembler accepts an assembly language program and produces a machine language program that the computer can actually execute. The schematic diagram of the translation process of the assembly language into the machine language is shown in the below diagram. Although, assembly language programming offers an improvement over machine language programming, it is still an arduous task, requiring the programmer to write programs based on particular computer operation codes. An assembly language program developed and run on IBM computer would fail to run on ICL computers. Consequently, the portability of computer programs in a computer installation to another computer installation which houses different makes or types of computers were not possible. The low level languages are, generally, described as Second Generation (computer) Language (2GL).



Store

Fig. 1: Assembly Language Program Translation Process

3.1.3 High Level Language

The difficulty of programming and the time required to program computers in assembly languages and machine languages led to the development of high-level languages. The symbolic languages, sometimes referred to as problem oriented languages reflect the type of problem being solved rather than the computer being used to solve it. Machine and assembly language programming is machine dependent but high level languages are machine independent, that is, a high-level language program can be run on a variety of computer.

While the flexibility of high level languages is grater than that of the machine and assembly languages, there are close restrictions in exactly how instructions are to be formulated and written. Only a specific set of numbers, letters, and special characters may be used to write a high level program and special rules must be observed for punctuation. High level language instructions do resemble English language statements and the mathematical symbols used in ordinary mathematics. Among the existing and popular high level programming languages are Fortran, Basic, Cobol, Pascal, Algol, Ada and P1/1. The schematic diagram of the translation process of a high level language into the machine language is shown in the diagram below. The high level languages are, generally, described as Third Generation (computer) Language (3GL).

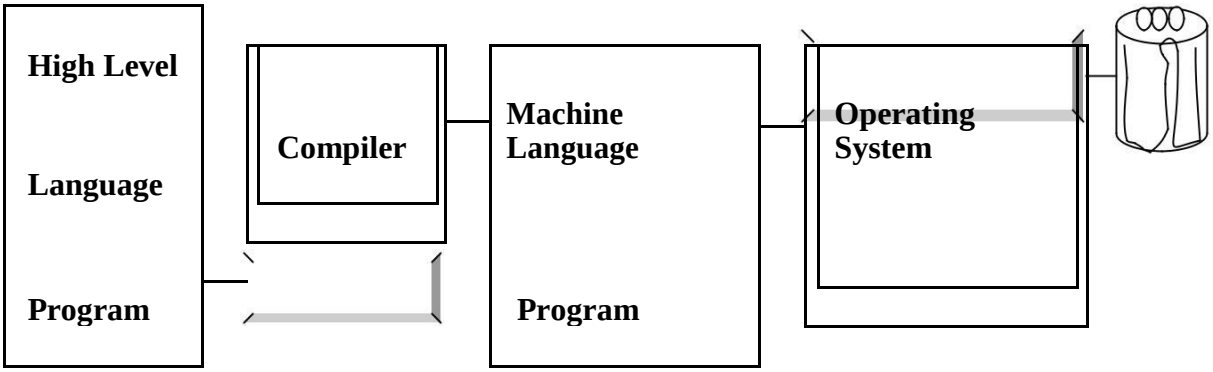


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Fig. 2: High Level Language Program Translation Process

The general procedure for the compilation of a computer program coded in any high level language is conceptualized in the above diagram.

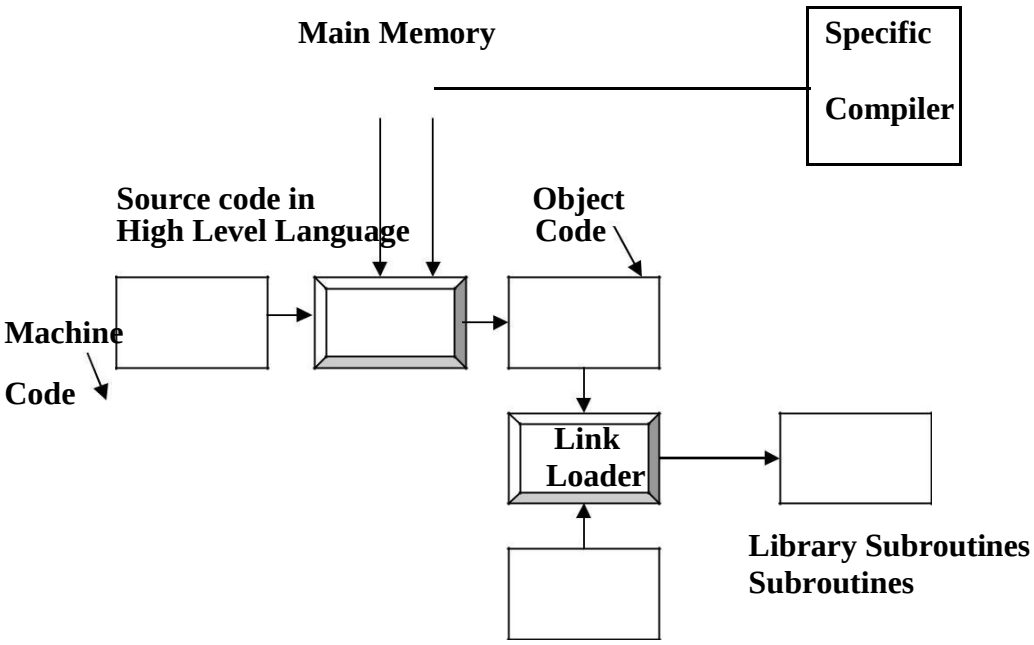

Fig. 3: General Procedure for Compiling High Level Language Program

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3.1.4 Very High Level Language

Programming aids or programming tools are provided to help programmers do their programming work more easily. Examples of programming tools are:

(a) Program development systems that help users to learn programming, and to program in a powerful high level language. Using a computer screen (monitor) and keyboard under the direction of an interactive computer program, users are helped to construct application programs.

(b) A program generator or application generator that assists computer users to write their own programs by expanding simple statements into program code'.

(c) Database management system.

(d) Debuggers that are programs that help computer user to locate errors (bugs) in the application programs they write.

The very high level language generally described as the Fourth Generation (computer) Language (4GL), is an ill-defined term that refers to software intended to help computer users or computer programmers to develop their own application programs more quickly and cheaply. A 4GL, by using a menu system for example, allows users to specify what they require, rather than describe the procedures by which these requirements are met. The detail procedure by which the requirements are met is done by the 4GL software which is transparent to the users.

A 4GL offers the user an English-like set of commands and simple control structures in which to specify general data processing or numerical operations. A program is translated into a conventional high-level language such as Cobol, which is passed to a compiler. A 4GL is, therefore, a non-procedural language. The program flows are not designed by the programmer but by the fourth generation software itself. Each user request is for a result rather than a procedure to obtain the result. The conceptual diagram of the translation process of very high level language to machine language is given in the diagram below.

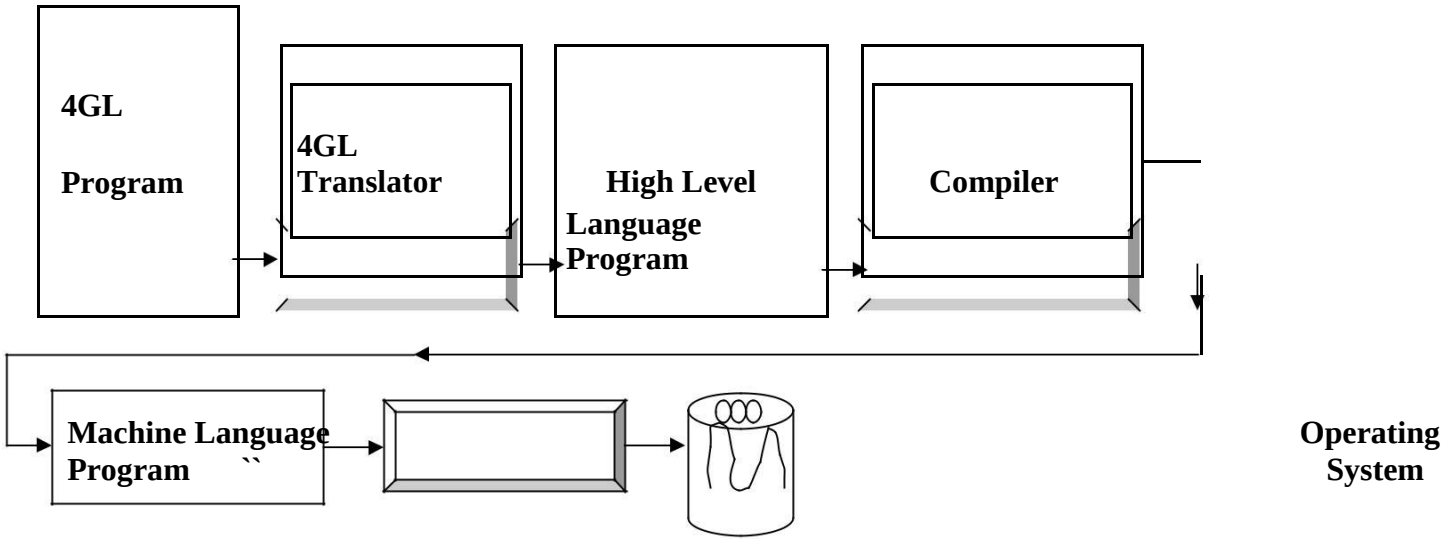

Fig. 4: Program Translation Process

The 4GL arose partly in response to the applications backlog. A great deal of programming time is spent maintaining and improving old programs rather than building new ones. Many organizations, therefore, have a backlog of applications waiting to be developed. 4GL, by stepping up the process of application design and by making it easier for end-users to build their own programs, helps to reduce the backlog.

4.0 Conclusion

Computer programming languages are means by which programmers manipulate the computer. The programming languages emanates from the need to program the computer in languages that would be easy for non-experts to understand and to reduce the enormity of task involved in writing programs in machine code. Programming languages have evolved from the machine language to assembly language, high level language and very high level programming language.

5.0 Summary

We summarize the study of computer programming language as follows:

(a) Machine language is the binary language and its made up of only 0s and 1s which represent the ‘off’ and ‘on’ stages of a comp uter’s electrical circuits.

(b) Assembly language has a one-to-one relationship with machine language, but uses symbols and mnemonics for particular items. Assembly language, like machine language, is hardware specific, and is translated into machine language by an assembler.

(c) High level languages are usable on different machines and are designed for similar applications rather than similar hardware. They are procedural in that

they describe the logical procedures needed to achieve a particular result. High level languages are translated into machine language by a compiler or an interpreter.

(d) In a high level language one specifies the logical procedures that have to be performed to achieve a result. In a fourth generation language, one needs to simply define the result one wants, and the requisite program instructions will be generated by the fourth generation software. Fourth generation languages are used in fourth generation systems in which a number of development tools are integrated in one environment.

6.0 Tutor Marked Assignment

a) What are computer programming languages?

b) Explain the following terms: machine language, source code, assembler, and compiler.

7.0 References and Further Reading

Akinyokun, O.C, (1999). *Principles and Practice of Computing Technology*.

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STUDY UNIT 2 BASIC PRINCIPLES OF COMPUTER PROGRAMMING

Table of Content

Problem solving with Computer.
Principles of programming.
Stages of programming.

1.0 Introduction

Computer programming is both an art and a science. In this unit, we students shall be exposed to some arts and science of computer programming including principles of programming and stages of programming.

2.0 Objectives

The objective of this unit is to expose students to the principles of programming and the stages involved in writing computer programs.

3.0 Problem Solving With The Computer

The computer is a general-purpose machine with a remarkable ability to process information. It has many capabilities, and its specific function at any particular time is determined by the user. This depends on the program loaded into the computer memory being utilized by the user.

There are many types of computer programs. However, the programs designed to convert the general-purposes computer into a tool for a specific task or applications are called 'Application programs'. These are developed by users to solve their peculiar data processing problems.

Computer programming is the act of writing a program which a computer can execute to produce the desired result. A program is a series of instructions assembled to enable the computer to carry out a specified procedure. A computer program is the sequence of simple instructions into which a given problem is reduced and which is in a form the computer can understand, either directly or after interpretation.

3.1 Programming Methodology

Principles of good Programming

It is generally accepted that a good Computer program should have the characteristics shown below:

Accuracy: The Program must do what it is supposed to do correctly and must meet the criteria laid down in its specification.

Reliability: The Program must always do what it is supposed to do, and never crash.

Efficiency: Optimal utilization of resources is essential. The program must use the available storage space and other resources in such as way that the system speed is not wasted.

Robustness: The Program should cope with invalid data and not stop without an indication of the cause of the source of error.

Usability: The Program must be easy enough to use and be well documented.

Maintainability: The Program must be easy to amend having good structuring and documentation.

Readability: The Code of a program must be well laid out and explained with comments.

3.2 Stages of Programming

The preparation of a computer program involves a set of procedure.

These steps can be classified into eight major stages, viz

(i) Problem Definition

(ii) Devising the method of solution

(iii) Developing the method using suitable aids, e.g. pseudo code or flowchart.

(iv) Writing the instructions in a programming language

(v) Transcribing the instructions into “machine sensibl e” form

(vi) Debugging the program

(vii) Testing the program

(viii) Documenting all the work involved in producing the program.

(i) Problem definition

The first stage requires a good understand of the problem. The programmer (i.e. the person writing the program) needs to thoroughly understand what is required of a problem. A complete and precise unambiguous statement of the problem to be solved must be stated. This will entail the detailed specification which lays down the input, processes and output-required.

(ii) Devising the method of solution

The second stage involved is spelling out the detailed algorithm. The use of a computer to solve problems (be it scientific or business data processing problems) requires that a procedure or an algorithm be developed for the computer to follow in solving the problem.

(iii) Developing the method of solution

There are several methods for representing or developing methods used in solving a problem. Examples of such methods are: algorithms, flowcharts, pseudo code, and decision tables.

(iv) Writing the instructions in a programming language

After outlining the method of solving the problem, a proper understanding of the syntax of the programming language to be used is necessary in order to write the series of instructions required to get the problem solved.

(v) Transcribing the instructions into machine sensible form

After the program is coded, it is converted into machine sensible form or machine language. There are some manufacturers written programs that translate users program (source program) into machine language (object code). These are called translators and instructions that machines can execute at a go, while interpreters accept a program and executes it line-by-line.

During translation, the translator carries out syntax check on the source program to detect errors that may arise from wrong use of the programming language. (vi) Program debugging

A program seldomly executes successfully the first time. It normally contains a few errors (bugs). Debugging is the process of locating and correcting errors. There are three classes of errors.

(i) **Syntax errors:** Caused by mistake coding (illegal use of a feature of the programming language).

(ii) **Logic errors:** Caused by faulty logic in the design of the program. The program will work but not as intended.

(iii) **Execution errors:** The program works as intended but illegal input or other circumstances at run-time makes the program stop. There are two basic levels of debugging. The first level called desk checking or dry running is performed after the program has been coded and entered or key punched. Its

purpose is to locate and remove as many logical and clerical errors as possible.

The program is then read (or loaded) into the computer and processed by a language translator. The function of the translator is to convert the program statements into the binary code of the computer called the object code. As part of the translation process, the program statements are examined to verify that they have been coded correctly, if errors are detected, a series of diagnostics referred to as an error message list is generated by the language translator. With this list in the hand of programmer, enters the second level of debugging is reached.

The error message list helps the programmer to find the cause of errors and make the necessary corrections. At this point, the program may contain entering errors, as well as clerical errors or logic errors. The programming language manual will be very useful at this stage of program development.

After corrections have been made, the program is again read into the computer and again processed by the language translator. This is repeated over and over again until the program is error-free.

(vii) Program testing

The purpose of testing is to determine whether a program consistently produces correct or expected results. A program is normally tested by executing it with a given set of input data (called test data), for which correct results are known.

For effective testing of a program, the testing procedure is broken into three segments.

(a) The program is tested with inputs that one would normally expect for an execution of the program.

(b) Valid but slightly abnormal data is injected (used) to determine the capabilities of the program to cope with exceptions. For example, minimum and maximum values allowable for a sales-amount field may be provided as input to verify that the program processed them correctly.

(c) Invalid data is inserted to test the program's error-handling routines. If the result of the testing is not adequate, then minor logic errors still

abound in the program. The programmer can use any of these three alternatives to locate the bugs.

Other methods of testing a program for correctness include:

Manual walk-through: The programmer traces the processing steps manually to find the errors, pretending to be the computer, following the execution of each statement in the program, noting whether or not the expected results are produced.

Use of tracing routines: If this is available for the language, this is similar to (1) above but it is carried out by the computer hence it takes less time and it is not susceptible to human error.

Storage dump: This is the printout of the contents of the computers storage locations. By examining the contents of the various locations, the instruction at which the program is halted can be determined. This is an important clue to finding the error that caused the halt, when a program is halted.

Program documentation: Documentation of the program should be developed at every stage of the programming cycle. The following are documentations that should be done for each program.

(a) Problem Definition Step

- Aclear statement of the problem
- The objectives of the program (what the program is to accomplish)
- Source of request for the program.
- Person/official authorizing the request.

(b) Planning the Solution Step

- Flowchart, pseudocode or decision tables
- Program narrative
- Descriptive of input, and file formats

(c) Program source coding sheet

(d) User's manual to aid persons who are not familiar with the program to apply it correctly. It contains a description of the program and what it is designed to achieve.

(e) Operator's manual to assist the computer operator to successfully run the program. This manual contains:

(i) Instructions about starting, running and terminating the program.

(ii) Message that may be printed on the console or VDU (terminal) and their meanings.

(iii) Setup and take down instruction for files.

Advantages of Program documentation

(i) It provides all necessary information for anyone who comes in contact with the program.

(ii) It helps the supervisor in determining the program's purpose, how long the program will be useful and future revision that may be necessary.

(iii) It simplifies program maintenance (revision or updating)

(iv) It provides information as to the use of the program to those unfamiliar with it.

(v) It provides operating instructions to the computer operator.

4.0 Conclusion

The intelligence of a computer derives to a large extent from the quality of the programs. In this unit, we have attempted to present in some details, the principles and the stages involved in writing a good computer program.

5.0 Summary

In this unit we have discussed the following:

i. Principles of computer programming.

ii. Stages of computer programming.

iii. The interrelationship between different stages of programming.

6.0 Tutor Marked Assignment

i. Differentiate between program debugging and program testing.

ii. What are the differences between syntax errors and logic errors. Give examples of each.

iii. Is it possible to detect logic error during program compilation? Explain the reason for your answer.

7.0 References and Further Reading

Akinyokun, O.C, (1999). *Principles and Practice of Computing Technology*.

International Publishers Limited, Ibadan.

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STUDY UNIT 3: FLOWCHART AND ALGORITHMS

Table of Content

Flowchart

Algorithms

1.0 Introduction

In this unit you are introduced to the principles of flowcharts and algorithms. The importance of these concepts are presented and the detailed steps and activities involved are also presented.

2.0 Objectives

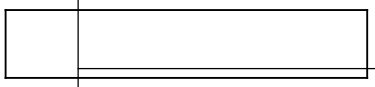
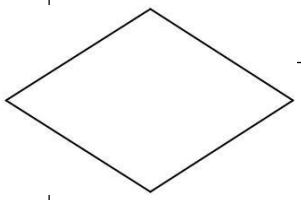
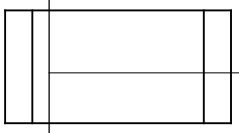
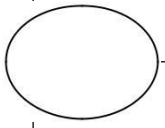
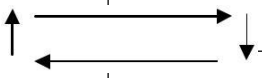
The objective of this unit is to enable the student grasp the principles of good programming ethics through flowcharting and algorithms.

3.0 Flowchart

A Flowchart is a graphical representation of the major steps of work in process. It displays in separate boxes the essential steps of the program and shows by means of arrows the directions of information flow. The boxes most often referred to as illustrative symbols may represent documents, machines or actions taken during the process. The area of concentration is on where or who does what, rather than on how it is done. A flowchart can also be said to be a graphical representation of an algorithm, that is, it is visual picture which gives the steps of an algorithm and also the flow of control between the various steps.

3.1 Flowchart Symbols

Flowcharts are drawn with the help of symbols. The following are the most commonly used flowchart symbols and their functions:

Symbols	Function
Terminator	Used to show the START or STOP point. May show exit to a closed subroutine.
	Used for arithmetic calculations of process. E.g. Sum = X + Y + Z
	Used for Input and Output instructions, PRINT, READ, INPUT AND WRITE.
	Used for decision making. Has two or more lines leaving the box. These lines are labeled with different decision results, that is,' Yes', 'No', 'TRUE' or 'F ALSE' or 'NEGATIVE' or 'ZERO'.
	Used for one or more named operations or program steps specified in a subroutine or another set of flowchart.
	Used for entry to or exit from another part of flowchart. A small circle identifies a junction point of the program
	Used for entry to or exit from a page
	Used to show the direction of travel. They are used in linking symbols. These show operations sequence and data flow directions.

3.2 Guidelines for drawing flowcharts

(i) Each symbol denotes a type of operation Input, Output, Processing, Decision, Transfer or branch or Terminal.

(ii) A note is written inside each symbol to indicate the specific function to be performed.

(iii) Flowcharts are read from top to bottom.

(iv) A sequence of operations is performed until a terminal symbol designates the end of the run or "branch" connector transfers cont rol.

3.3 Flowcharting the Problem

The digital computer does not do any thinking and cannot make unplanned decisions. Every step of the problem has to be taken care of by the program. A problem which can be solved by a digital computer need not be described by an exact mathematical equation, but it does need a certain set of rules that the computer can follow. If a problem needs intuition or guessing, or is so badly defined that it is hard to put into words, the computer cannot solve it. You have to define the problem and set it up for the computer in such a way that every possible alternative is taken care of. A typical flowchart consists of special boxes, in which are written the activities or operations for the solution of the problem. The boxes linked by means of arrows which show the sequence of operations. The flowchart acts as an aid to the Programmer who follows the flowchart design to write his programs.

3.4 Algorithms

Before a computer can be put to any meaningful use, the user must be able to come out with or define a unit sequence of operations or activities (logically ordered) which gives an unambiguous method of solving a problem or finding out that no solution exists. Such a set of operations is known as an ALGORITHM.

Definition: An algorithm, named after the ninth century scholar Abu Jafar Muhammad Ibn Musu Al-Khowarizmi , is defined as follows: Roughly speaking:

- An algorithm is a set of rules for carrying out calculation either by hand or a machine.
- An algorithm is a finite step-by-step procedure to achieve a required result.
- An algorithm is a sequence of computational steps that transform the input into the output.
- An algorithm is a sequence of operations performed on data that have to be organized in data structures.
- An algorithm is an abstraction of a program to be executed on a physical machine (model of computation)

The most famous algorithm in history dates well before the time of the ancient Greeks: this is Euclids algorithm for calculating the greatest common divisor of two integers. Before we go into some otherwise complex algorithms, let us consider one of the simplest but common algorithms that we encounter every day.

The classic multiplication algorithm

For example to multiply 981 by 1234, this can be done using two methods (algorithms) viz:

a. Multiplication the American way:

Multiply the multiplicand one after another by each digit of the multiplier taken from right to left.

```
981
1234
____________________
     3924
    2943
   1962
  981
 1210554
____________________
```

b. Multiplication , the British way:

Multiply the multiplicand one after another by each digit of the multiplier taken from left to right.

```
          981
1234
_________________
 981
 1962
   2943
     3924
 1210554
_________________
```

An algorithm therefore can be characterized by the following:

(i) A finite set or sequence of actions

(ii) This sequence of actions has a unique initial action

(iii) Each action in the sequence has unique successor

(iv) The sequence terminates with either a solution or a statement that the problem is unresolved.

An algorithm can therefore be seen as a step-by-step method of solving a problem.

Examples

1. Write an algorithm to read values for three variables. U, V, and W and find a value for RESULT from the formula: RESULT = U + V^2/W. Draw the flowchart.

Solution:

Algorithm

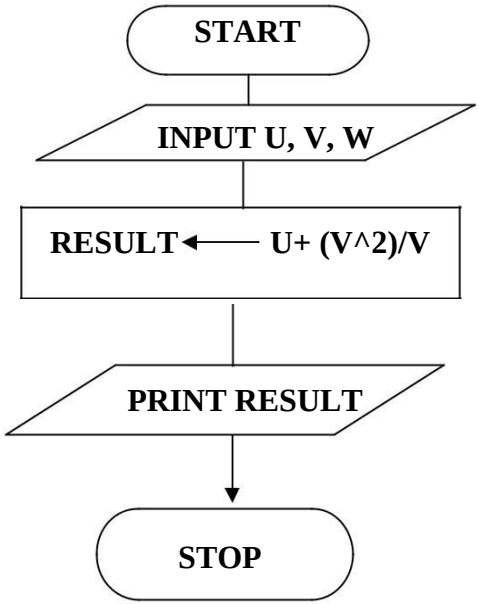
(i) Input values for U, V, and W

(ii) Computer value for result

(iii) Print value of result

(iv) Stop

Flowchart



2. Suppose you are given 20 numbers. Prepare the algorithm that adds up these numbers and find the average. Draw the flowchart.

Solution:

Algorithm

(i) Set up a Counter (1) which counts the number of times the loop is executed. Initialize Counter (1) to 1.

(ii) Initialize sum to Zero

(iii) Input value and add to sum

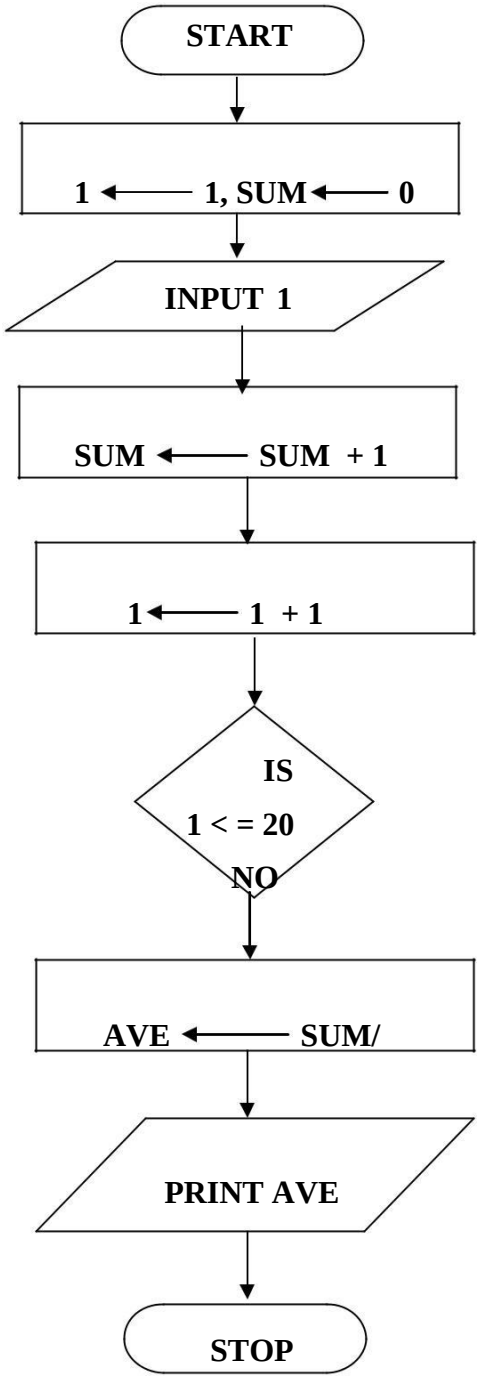
(iv) Increment the Counter (1) by 1

(v) Check how many times you have added up the number (if it is not up to the required number of times, to step (iii).

(vi) Computer the average of the numbers

(vii) Print the average

(viii) Stop.**Flowchart**



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3. Prepare an algorithm that indicates the logic for printing the name and telephone number for each female in a file (Code field is 2 for female). Draw the flowchart.

Solution:

Algorithm

(i) Read a record

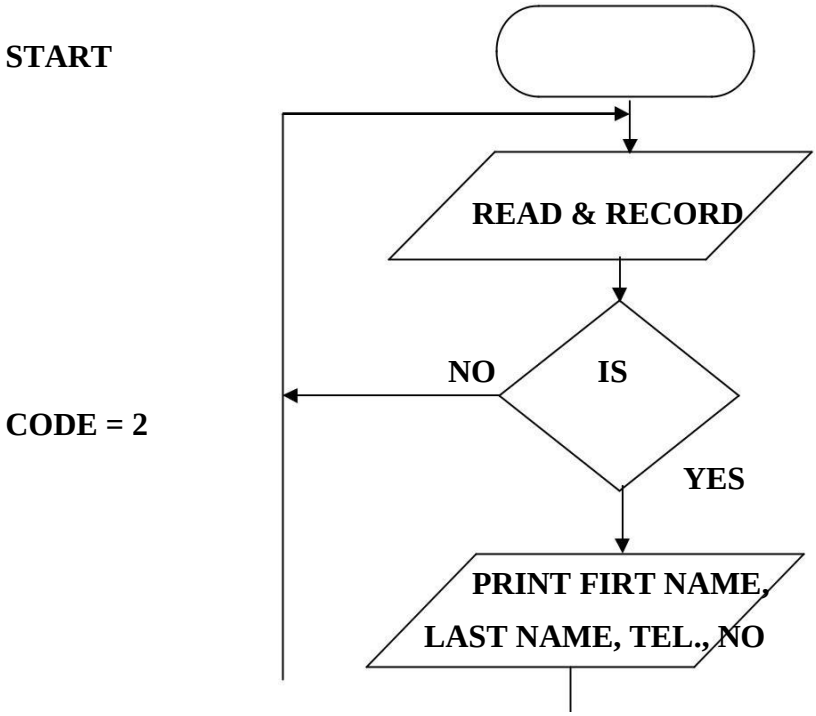
(ii) Determine if the record pertains to a female (that is, determine if the code field is equal to 2).

(iii) If the code field is not equal to 2, then do not process this record any further, since it contains data for a male. Instead, read the next record; that is, go back to step (i).

(iv) If the record contains data for a female (that is, code is equal to 2), then print out the following fields: first name, last name, telephone number

(v) Go back to step (i) to read the next record.

Flowchart



Note: Nothing indicates the end of records processing here.

4. Prepare an algorithm that prints name and weekly wages for each employee out of 10 where name, hours worked, and hourly rate are read in. Draw the flowchart.

Solution:

Algorithm

(i) Initialize Counter (A) to 1

(ii) Read name, hours and rate and number of workers

(iii) Let the wage be assigned the product of hours and rate

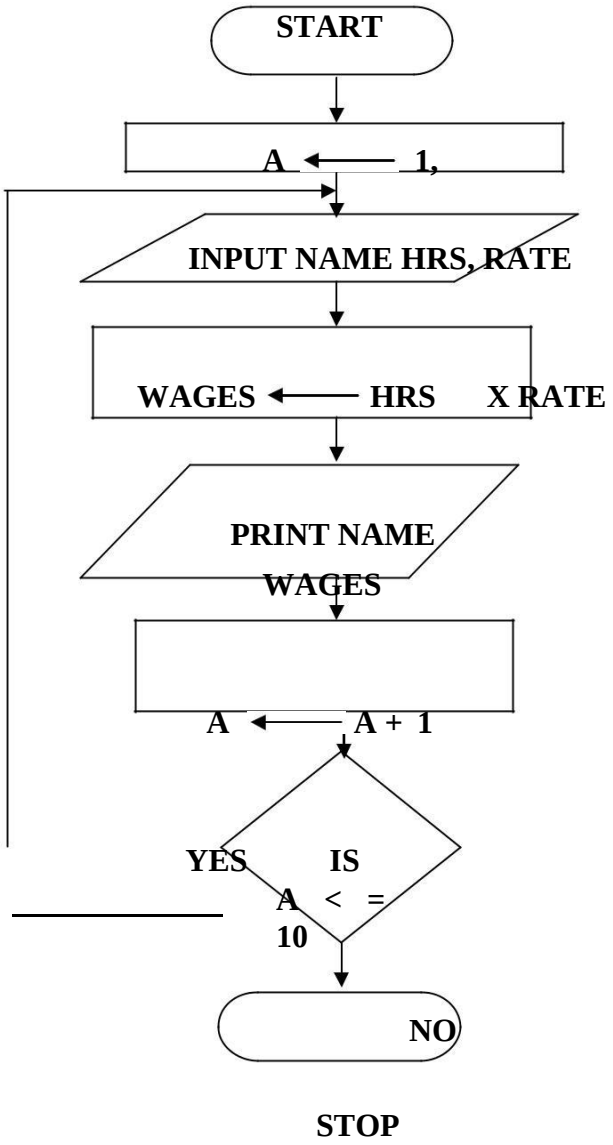
(iv) Print name and wages

(v) Increment the counter (A) by 1

(vi) Make a decision (Check how many times you have calculated the wages)

(vii) Stop processing, if you have done it the required number of times.

Flowchart



3.5 Pseudocode

Pseudocode is a program design aid that serves the function of a flowchart in expressing the detailed logic of a program. Sometimes a program flowchart might be inadequate for expressing the control flow and logic of a program. By using Pseudocode, program algorithm can be expressed as English-language statements. These statements can be used both as a guide when coding the program in specific language and as documentation for review by others. Because there is no rigid rule for constructing pseudocodes, the logic of the program can be expressed in a manner without confronting to any particular programming language. A series of structured words is used to express the major program functions. These structured words are the basis for writing programs using a technical ter called “structure programming ”.

Example:

Construct Pseudocode for the problem in the example above.

```
BEGIN
STORE 0 TO SUM
STORE 1 TO COUNT
            DO WHILE COUNT not greater than 10
            ADD COUNT to SUM
      INCREMENT COUNT by 1
      ENDWILE
      END
```

3.6 Decision Tables

Decision tables are used to analyze a problem. The conditions applying in the problem are set out and the actions to be taken, as a result of any combination of the conditions arising are shown. They are prepared in conjunction with or in place of flowcharts. Decision tables are a simple yet powerful and unambiguous way of showing the actions to be taken when a given set of conditions occur. Moreover, they can be used to verify that all conditions have been properly catered for. In this way they can reduce the possibility that rare or unforeseen combinations of conditions will result in confusion about the actions to be taken.

Decision tables have standardized format and comprise of four sections.

(a) **Conditions Stub:** This section contains a list of all possible conditions which could apply in a particular problem.

(b) **Condition Entry:** This section contains the different combination of the conditions each combination being given a number termed a 'Rule':

(c) **Action Stub:** This section contains a list of the possible actions which could apply for any given combinations of conditions.

Action Entry: This section shows the actions to be taken for each combination of conditions.

Writing the instructions in a programming language (Program coding) The instructions contained in the algorithm must be communicated to the computer in a language it will understand before it can execute them. The first step is writing these instructions in a programming language (Program coding). Program coding is the process of translating the planned solution to the problems, depicted in a flowchart, pseudocode or decision table, into statements of the program. The program flowchart, pseudocode decision table as the case may be is as a guide by the programmer as he describes the logic in the medium of a programming language. The coding is usually done on coding sheets or coding forms.

4.0 Conclusion

Flowcharts, decision tables, pseudocodes and algorithms are essential ingredients to the writing of good programs. If they are done properly they lead to reduction in errors in programs. They help minimize the time spent in debugging. In addition, they make logic errors easier to trace and discovered.

5.0 Summary

In this unit we have learnt that:

i. A Flowchart is a graphical representation of the major steps of work in process. It displays in separate boxes the essential steps of the program and shows by means of arrows the directions of information flow.

ii. Decision tables are used to analyze a problem. The conditions applying in the problem are set out and the actions to be taken, as a result of any combination of the conditions arising are shown.

iii. Pseudocode is a program design aid that serves the function of a flowchart in expressing the detailed logic of a program.

iv. An algorithm is a set of rules for carrying out calculation either by hand or a machine.

6.0 Tutor Marked Assignment

1. Draw the flowchart of the program which prints each two-digit odd number N, its square, and its cube.
2. Draw a flowchart to input the scores of a student in 8 courses and find the average of the scores.

7.0 References and Further Reading

Akinyokun, O.C, (1999). *Principles and Practice of Computing Technology*.

International Publishers Limited, Ibadan.

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Module 4: Computer Application Software

UNIT 1 WORD PROCESSING

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3.1.2 Exiting from Word
3.2 Creating a New Blank Document and the Basics of Entering Text
3.2.1 A New Blank Document
3.2.2 The Text Area
3.2.3 Using the <Enter> Key
3.3.4 Nonprinting Characters
4.0 Conclusion
5.0 Summary
6.0 Tutor-Marked Assignment
7.0 References/Further Reading

1.0 INTRODUCTION

A word processing program allows the user to create, edit, format, store and print text documents.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- use Microsoft Word 2000
- exit the Word 2000 program
- create a new blank document
- enter text
- identify nonprinting characters.

3.0 MAIN CONTENT

3.1 Introduction to Word Processing

Word processing is the use of computers to create, revise, and save documents for printing and future retrieval. You enter information into the computer by using a keyboard. As you type, your words are displayed on a monitor, or screen, and are stored in computer memory rather than on paper.

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Because typing information is a separate task from printing it, word processors enable you to change information easily without retyping entire documents. For example, you can change margins, add and delete text, move paragraphs, and correct spelling errors. All revisions are made within the computer and are then saved on a disk and printed.

3.1.1 Starting Word

To use Word, you must load the program from the hard disk into the computer's memory. You can store your data files (documents) in a folder on the hard drive, or on a floppy disk. In order to use Word, you need to have Microsoft Windows 95, 98, Millennium Edition or NT 4.0 installed on your computer.

To start Word using the Start menu:

1. Turn on your computer
2. In the Taskbar, click on **Start**
3. Choose the **Programs** menu choice.
4. Click on the **Microsoft Word** menu choice to start the program.

If you have a shortcut set up for Word, you can start Word from the shortcut by double-clicking on the Word shortcut icon.

SELF-ASSESSMENT EXERCISE

Starting Word

Before you begin: Ensure that your computer is on and that Word 2000 has been correctly installed.

What you do	**Comments/Prompts**
1. Click on the **Start** button on the displayed.	The **Start** menu is displayed.
2. Click on **Programs** on the **Start** Menu	The **Programs** sub-menu is displayed.
3. In the sub-menu click on **Microsoft Word.**	Microsoft Word is launched.
4. Observe the on-screen Office Assistant. To show the Office Assistant if it is currently hidden choose: **Help, Show theOffice Assistant**	The Office Assistant is an animated online Help system that provides Help topics and tips while you work.
5. Click on the "Paperclip" (or any alternate office assistant symbol that has been set) to close the text.	

6. If necessary, in the Office Registration Wizard dialog box click on **Register Later** and **Exit.**	To register at a later time. 2000
7. To close the Office Assistant Choose: **Help, Hide the Office Assistant**	To close the Office Assistant. You can also hide the Office Assistant by right clicking on it and choosing the Hide command.

3.1.2 Exiting from Word

To exit the Word 2000 program,

1. Click on **File**
2. Click on **Exit**

SELF-ASSESSMENT EXERCISE

Exiting from Word

What you do	Comments/Prompts
1. Click on **File**	The File drop-down menu appears.
2. Click on **Exit**	Microsoft Excel is closed.

Further Practice Exercise

1. Start Word 2000 again.

Hint: If you need help, refer to Exercise 7.

3.2 Creating a New Blank Document and the Basics of Entering Text

Word is a **WYSIWYG** (what-you-see-is-what-you-get) word processor. Depending on which view Word is in, the screen display will show you how the text will look when you print the document.

3.2.1 A New Blank Document

At startup, Word provides you with a new unnamed document. You can begin typing in that document, open an existing document, or create a new one. To create a new document, click on the **New Blank Document** button on the Standard toolbar or press <Ctrl> + N To create a new document by using the menu, choose **File, New** and click on **OK**.

3.2.2 The Text Area

Every document has a text area. As you type, characters are inserted in the text area at the insertion point. To place the insertion point, position the mouse pointer (whenever it appears as an I-beam) and click the mouse button. Alternatively, you may make use of keyboard combinations to move the cursor to the correct position.

3.2.3 Using the <Enter> Key

In word processing, you **must not** press the **<Enter>** key to each line of text. When text does not fit on a line, it automatically flows to the beginning of the next line. This is called word wrap.

However, you do use the **<Enter>** key to:

- end a short line (one that does not extend to the right margin);
- end a paragraph; or
- create a blank line.

3.2.4 Nonprinting Characters

Word can display a number of special symbols on the screen that indicate each time you have pressed **<Enter>**, **<Spacebar>**, and **<Tab>**, among others. These nonprinting characters are especially useful when you are editing documents. To display these special symbols, click on the **Show/Hide** button on the *Standard* toolbar.

¶ ←Show/Hide button

SELF-ASSESSMENT EXERCISE

Creating a New Documents, Entering Text, and Identifying Nonprinting Characters

	What you do	Comments/Prompts
	1. Move the mouse pointer over the first button on the Standard toolbar. Observe the Screen Tip.	 (The Standard toolbar is the leftmost toolbar or the top bar if the Standard and Formatting toolbars are displayed separately) "New Blank Documents" is displayed.
2.	Click on the **New Blank Document** button.	To create a new document.

3. Observe the insertion point	This is the blinking vertical bar that always appears on the first line in the upper-left corner of a new document. Its location determines where text or other items will be entered into the document.
4. Observe the mouse pointer	The mouse pointer is usually an I-beam when it is in the text area. When moved outside the text area, the mouse pointer becomes an arrow.
5. Type: **Interoffice Memo**	To enter the characters at the insertion point.
6. Press: **<Enter>**	To end the line.
7. Press: **<Enter>** again	To create a blank line.
8. Type: **To:**	
9. Observe the screen	Each time you pressed Enter, Word placed a paragraph mark (¶) in the document. Each time you pressed the Spacebar, Word placed a space mark (.)inthedocument. These nonprinting characters appear only on the screen, not on the printed document. If these are not currently visible, then they have been hidden.
10. On the Standard toolbar, click on the Show/Hide button	¶ (This button might be displayed on the standard docked toolbar. Depending on your monitor size and settings, the placement of buttons will vary. If you cannot find a button on the toolbar, it will be the docked toolbar.) To hide the nonprinting characters.
11. Observe the screen	The nonprinting characters do not appear on the screen.
12. Display the nonprinting characters.	(Click on the Show/Hide button).

4.0 CONCLUSION

A word processing program provides facilities to edit documents and define their layout and enable them to be printed.

5.0 SUMMARY

Word processing is the use of computers to create, revise and save documents for printing and future retrieval.

6.0 TUTOR-MARKED ASSIGNMENT

Give examples of at least three tasks in which you would make use of a word processing program.

7.0 REFERENCES/FURTHER READING

French, C. S. (2000). *Computer Science* (5th ed.) Gosport, Hants:

UNIT 1.1 FURTHER WORD PROCESSING PROGRAM FACILITIES

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1.0 Introduction
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1.0 INTRODUCTION

The advantages of word processing include the ability to:

- Store typed documents in the computer
- View the document on screen before printing
- Correct mistakes
- Insert or delete words
- Move sections of text to another part of the documents
- Incorporate other text without having to retype it
- Store documents on backing store for later recall
- Change layout of the document
- Print the document many times.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- use tab key
- use some other facilities of Microsoft Word 2000.

3.0 MAIN CONTENT

3.1 Using the Tab Key

Tabs make it easier to align text precisely. Pressing the Tab key inserts a tab characters, moving the insertion point to the next tab stop. Tab stops are preset at 1.27cm increments.

3.2 Using the Backspace Key

By pressing the Backspace key, you can delete the character or space immediately to the left of the insertion point.

3.3 Autocomplete

As you type certain common words, dates, or names, Word will suggest the complete word or phrase after you type the first few letters. This feature is called AutoComplete. When the suggestion appears, you can press **<Enter>** or **<F3>** to accept the suggestion, or just keep typing to reject. For instance, when you are typing a letter and you do not know exactly who will be reading it, you would normally type "To Whom it May Concern". Using AutoComplete, you can just type "To W' and press **<F3>**. Word will automatically finish the typing for you with type "To Whom it May Concern." You can also add your own AutoComplete entries and delete them as needed.

SELF-ASSESSMENT EXERCISE

Using Tab, Autocomplete, Backspace, and the Word-wrap Feature while Entering Text

Before you begin: The insertion point should be at the end of the "To:" line.

What you do	Comments/Prompts
1. Press: **<Tab>**	To insert a tab character, moving the insertion point to the first default tab stop, 1.27cm from the left margin. Default tab stops are set every 1.27cm
2. Observe the nonprinting mark for **<Tab>**	Each time you press <Tab>, an arrow is placed in the document.
3. Type: **Johanna Burger** Press: <Enter>	To end the line and move the insertion point to the next line.
4. Type: **From:** Press: **<Tab>**	

	5.Type: **Kathleen de Winter.** Press: <Enter>	
	6.Type: **Subj** Observe the text	The first four letters of the word "Subject:" Sub jec t Subj ¶ Just above the text you typed is a box with the word "Subject:" in it. This ScreenTip is displayed because there is an AutoComplete entry for the word "Subject."
	7.Press: **<Enter>**	The word "Subject" is completed
	8.Press: **<Tab>** Observe the tab stop	Because the word "Subject:" extends beyond the 1.27cm mark, pressing <Tab> moves the insertion point to the next default tab stop at 2.54cm
9.	Press:**<Backspace>** nine times.	To remove the tab character and the text "Subject:".
	10.Type: **Re:**	
	11.Press: **<Tab>**	To move the insertion point to the first default tab stop at 1.27cm
12.	Type: **Client Referral**	
13.	Press: **<Enter> twice**	
14.	Type: **I have a client referral for you. The gentleman is looking for a house in your territory. Please see me urgently for more details.** Observe the text	The words automatically flow to the next line.

3.4 Saving a File

Before you save a document, it exists only in computer memory, a temporary storage area. For permanent storage, a document must be saved to some location, such as a hard drive or a floppy disk.

To save a document, you use either the File, Save As… or the F_ile, Save command.

3.4.1 The Save as Command

The **File, Save As**… command enables you to:

- save a document for the first time;
- save a document with a new filename; and
- save a document in a different location (on another disk or in a different folder).

To use the **File, Save As**… command choose **File, Save As**… to display the **Save As** dialog box. In the **Save In** list box, select the appropriate location (disk, drive, or folder). in the **File Name** text box, type the name of the file. Click on **Save**.

When you save a file, Word adds the filename extension. DOC to identify the file as a document file. You should avoid adding filename extensions yourself.

3.4.2 Naming a Document

When you save a file for the first time, Word automatically assigns a filename by using the first words of your document. You can accept this default name or name it something different.

A filename should be descriptive so that you can remember the file's contents. A filename in Word can contain up to 255 characters, spaces, and other punctuation. A file cannot contain any of the following characters: :*?"< >|. For example, a file cannot be A: Drive. (These constraints are determined by the Windows operating system.)

3.4.3 The Save as Dialog Box

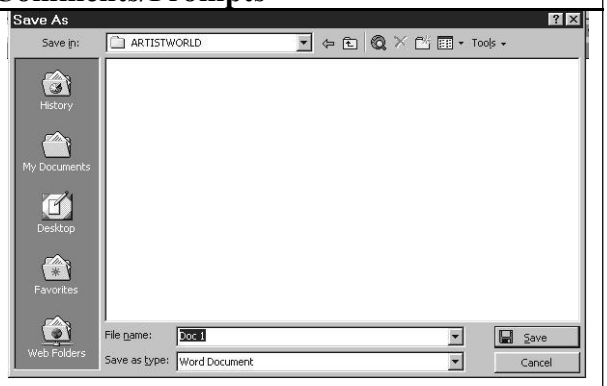
The Save As dialog box displays five folders on the left side of the dialog box: History, My Documents, Desktop, Favorites, and Web Folders. These folders make accessing previous documents and saving new documents easier by enabling you to click on and open a folder directly. To open one of these folders, click on the folder.

3.4.4 Closing a Document

When you have finished with a document, choose **File, Close** to close the document window or double-click on the window's Control-menu icon.

SELF-ASSESSMENT EXERCISE

Saving a Document for the First Time and Closing a Document

What you do	Comments/Prompts
1. Choose: **File, Save As**	 To display the Save As dialog box.
2. The **Save In** list box should be set to drive **A:**	If it is not set to Drive A:, please call your training adviser to assist you.
3. If necessary, select the text in the File name text box. To do this, click and drag the mouse over the text **Interoffice Memo.**	The text interoffice Memo is highlighted.
4. Type: **My Memo**	To name the document My Memo.
5. Click on **Save**	To save the file.
6. Observe the title bar	It has changed to display the document's name, My Memo.
7. Choose: **File, Close**	To close the document and remove it from memory.

4.0 CONCLUSION

Word processing has many advantages over using a typewriter.

5.0 SUMMARY

Here you learned how to use some of the facilities of Microsoft Word 2000. Your knowledge will be useful in the next units.

6.0 TUTOR-MARKED ASSIGNMENT

Please create a new document in Microsoft Word 2000. Type the following text taking care of use capital letters as well as bold, italics and underline formats as found in the example.

" **Word Processing** is the use of computers to create, revise and save documents for printing and future retrieval. You enter information into the computer by using a keyboard. As you type, the words are displayed on a monitor, or screen, and are stored in **computer memory** rather than on paper. Therefore, a **Word Processing** program can be used on a daily basis by school teachers to simplify tedious tasks."

Save the file as **Typing1**. Close the file.

7.0 REFERENCES/FURTHER READING

French, C. S. (2000). *Computer Science* (5th ed.) Gosport, Hants:

UNIT 1.2 WORD PROCESSING CONTINUED

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1.0 INTRODUCTION

Text files can be created and modified with the aid of a special program called an editor. Many documents not requiring anything but a very basic page layout are prepared this way.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- use file and open documents
- edit a text a document

- select a text
- delete a text
- replace a text
- move a text
- copy a text.

3.0 MAIN CONTENT

3.1 Opening and Editing a Document

3.1.1 The File, Open Command

The **File, Open** command places a copy of a file on disk into an active document window. The Open dialog box lists all of the document files on the current disk, in the current folder.

To open a listed file, either click on the filename in the **File name** list box on **Open**, or double-click on the filename. A copy of the file is placed in an active document window.

To make recently used documents more accessible, Word also tracks documents that have been opened and places their names as choices at the bottom of the **File** menu.

To open one of these listed files, choose **File** and click on the document name.

3.1.2 Editing a Document

By default, Word is in insert mode; as you type, text to the right of the insertion point is pushed to the right. To insert text, place the insertion point where you want to add text and begin typing.
To place the insertion point, position the I-beam at the desired location and click the mouse button.

3.2 Using Overtype Mode

Word gives you the option of turning off insert mode and turning on overtype mode. Instead of pushing text to the right as you type, overtype mode replaces existing text one character at a time.

You can turn on overtype mode by double-clicking on **OVR** on the status bar or by pressing the **<Insert>** key on the keyboard. If you accidentally turn on the overtype mode, you can double-click on **OVR** or press the **<Insert>** key to turn it off.

3.3 Selecting Text

Before you can delete, move, copy, or format text, you must select it.
Table 1 below details various techniques for selecting text.

Table 1

Selection method	Technique
Drag	Point at one end of the text to be selected. Press and hold the mouse button. Move the mouse to the other end of the text; this creates a highlight (selection) between the two ends. Then release the mouse button.
Select a word	Point anywhere inside the word and double-click the mouse button. The trailing space is automatically selected along with the word.
Select a sentence	Point anywhere inside the sentence. While pressing <Ctrl>, click the mouse button. End punctuation and trailing spaces are automatically selected along with the sentence

3.4 Deleting Text

- To delete the character immediately to the right of the insertion point, press the **<Delete>** key.
- To delete the character or space immediately to the left of the insertion point, press the **<Backspace>** key.
- To delete selected text, select the text and press **<Delete>**.
- To delete an extra line (paragraph mark), you can place the insertion point at the beginning of the line below the blank line and press the **<Backspace>** key.

3.5 Replacing Text

There may be times you want to replace existing text with new text, when it is just more efficient or retype text than it is to edit it. To do this, select the text you want to replace and begin typing the new text.

SELF-ASSESSMENT EXERCISE

Opening a Document and Inserting Text

What you do	Comments/Prompts
1. Choose: **File, Open**…	To display Open dialog box.
2. The **Look in:** list box should be set to **A:**	If it is not, please ask your training adviser for assistance.
3. From the list of filenames, select **My Memo**	
4. Click on **Open**	To open the document
5. Point to the left of the **h** in **house** located in the second sentence of the body paragraph	The gentleman is looking for a house in
6. Click the mouse button	To place the insertion point before "house." This is where the new text will be inserted.
7. Type: **large**	Existing text is pushed to the right of the new text.
8. Press: **<Spacebar>**	To insert a space between the words "large" and "house"
9. Hold down the **<Ctrl>** key and press the < End> Key.	To move the cursor to the end of the document.
10. Press: **<Enter>** twice	To end the paragraph and to insert a blank line before typing the next paragraph.
11. Type: Joan Brown informs me that you have numerous properties available in your region at the moment	
12. Press: **<Enter>**	

SELF-ASSESSMENT EXERCISE

Deleting Selected Text

What you do	Comments/Prompts
1. Point to the left of the **u** in **urgent** located in the last sentence of the first paragraph	
2. Press and hold the mouse button.	
3. Drag over the world urgent and then release the mouse button.	To select the text.
4. Press the **<Delete>** key	To delete the selected text.

SELF-ASSESSMENT EXERCISE

Replacing Selected Text

What you do	Comments/Prompts
1. Position the mouse point on the Name **Johanna** and double click	The name is selected
2. Type: **Joe**	"Joe" replaces "Johanna."
3. Select the word **House.**	
4. Type: **property**	To replace "house" with "property"

3.6 Moving and Copying Text

After you have edited text, you might want to move or copy that text to another part of the document. The *Clipboard* enables you to do that.

3.6.1 The Clipboard

The Windows environment provides a temporary storage area called the Clipboard for those times when you move or copy text. When you cut or copy selected text, it is placed on the Clipboard. Pasting inserts a copy of the Clipboard contents at the insertion point. Entries remain on the Clipboard until you cut or copy another entry to it or until you exit Windows. If you have placed text or graphics on the Clipboard and you exit Windows, the Clipboard content is erased.

3.6.2 Cutting and Pasting Text

To move text within a document, the following process applies:

1. Select the text to be moved.
2. Click on the **Cut** button (or choose **Edit**, **Cut** or use **<Ctrl + X**)
3. Place the insertion point where you want the text to be placed.
4. Click on the **Paste** button (or choose **Edit**, **Paste** or use **<Ctrl + V**)

SELF-ASSESSMENT EXERCISE

Moving Selected Text

What you do	Comment/Prompts
1. Select the entire paragraph that begins **Joan Brown informs me** and the blank line following it.	

2.On the *standard* docked toolbar, Click on the Cut button Hint: (if you cannot see this button, click on the more buttons button and select it from the list of "more button")	To remove the selected text from the document and place it on the Clipboard.
3.Place the insertion point at the beginning of the paragraph that begins with **I have a client referral**	
4.Click on the **Paste** button	To paste a copy of the Clipboard contents at the insertion point.
5.Save the file	

4.0 CONCLUSION

An editor is a program used to create text files or make changes to existing files.

5.0 SUMMARY

Basically you learned how to open and edit a document. You are now also in a position to select, delete or replace text.

6.0 TUTOR-MARKED ASSIGNMENT

1. In this exercise, you will open the letter that was addressed to Mr. and Mrs. Van Tonder. A similar letter needs to be addressed to Mr. and Mrs. Padget-Brown concerning their son Charles. Rather than retype the entire letter, simply make the necessary changes.

Open the document **Typing 2**. Change the relevant address and greetings as necessary. Print and then save the document as
Typing 3.

2. Please set at exam paper using Microsoft Word. The subject matter of the exam may be any of your choice. However, it is necessary to comply with the following specifications:

- The name of the school should appear in capital letters in font Times New Roman, size 14, centered at the top of the page.
- The subject, grade or form, total marks as well as the duration of the exam should appear just below the heading at the top of the page.

- A minimum of ten questions must appear in the exam paper.
- The value of each question must be indicated.
- Please include at least two multiple choice and two "fill in" questions.

3. Please type the following document exactly as it appears below. The number in brackets shows the font size of the text.

Grade 7 Class List (14)

Name (14)	**Surname**	**House**
Peter (12)	Appleby	Red
Robbert	Archer	Blue
Simon	Bester	Blue
Arnie	Cook	Green
Jason	De Winter	Blue
Scott	Heard	Red
Anash	Naidoo	Red
David	Munroe	Green
Lucas	Marosho	Red

7.0 REFERENCE/FURTHER READING

French, C.S. (2000). *Computer Science* (5th ed.) Gosport, Hants:

UNIT 1.3: COPYING A TEXT, SAVING CHANGES TO A DOCUMENT AND FORMATTING

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3.2 Saving Changes to a Document
3.3 Formatting Text
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6.0 Tutor-Marked Assignment
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1.0 INTRODUCTION

Here we will consider more aspect of word processing.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- copy a text
- save changes to a document
- format a text.

3.0 MAIN CONTENT

3.1 Copying Text

To copy text within a document, the following process applies:

1. Select the text to be copied.
2. Click on the **Copy** button (or choose **Edit**, **Copy** or use **<Ctrl> + C**).
3. Place the insertion point where you want the text to be placed.
4. Click on the Paste button (or choose **Edit**, **Paste** or use **<Ctrl> + V**).

SELF-ASSESSMENT EXERCISE

Copying Selected Text

What you do	Comment/Prompts
1. Select the text **Kathleen de Winter**	Kathleen de Winter
2. From the Standard toolbar, click on the **Copy** button	To place a copy of the selected text on the Clipboard.
3. Press and hold down **<Ctrl>** and press **<End>**	The insertion point will move to the end of the document
4. Press: **<Enter>** three times	
5. Click on the **Paste** button	To paste a copy of the Clipboard contents at the insertion point.

3.2 Saving Changes to a Document

To save a document with its current name, use the **File, Save** command. You can access this command by clicking on the **Save** button on the Standard toolbar, or by choosing **File, Save**. This command does not enable you to rename the document or change its location. The **File, Save** command updates the file on disk, replacing the original file with the document in the active window.

Some general rules for saving are:

- Save at least once every 15 minutes.
- Save before printing
- Save before spell-checking.

SELF-ASSESSMENT EXERCISE

Saving Changes to a Document

What you do	Comment/Prompts
1. Observe the title bar at the top of the window	The document has already been named My Memo.
2. Click on the **Save** button	To save the document with the same name in the same location. (Clicking on the save button is the same as choosing File, Save.)

3.3 Formatting Text

It is possible to change the appearance and position of text by applying various *formatting* options. On this course you will be introduced briefly to two kinds of formatting namely, *character* and *paragraph*.

3.3.1 Character Formatting

Character formats – such as bold, italics, underlin ing, font face and font size — can be used to emphasize text in a document.

The Formatting toolbar, shown in Figure 1 below, has been designed specifically for formatting. The more commonly used formats have been assigned tools on this toolbar. If an option that you wish to set were not available from the toolbar, you would have to make use of the **Format, Font**… dialog box.

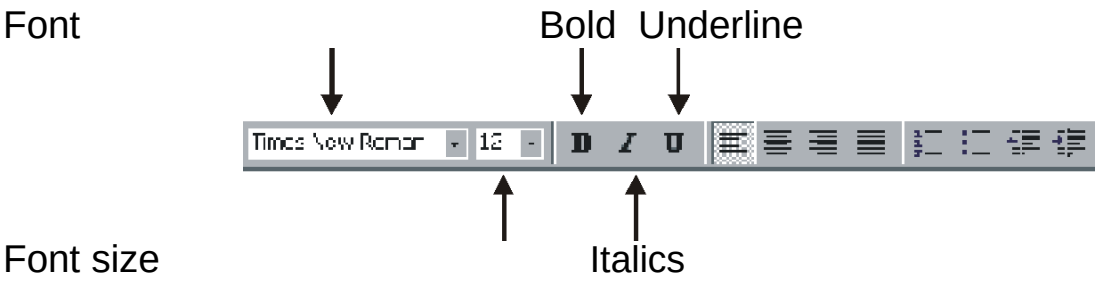

Figure 1: The Formatting Toolbar

You can use buttons on the Formatting toolbar to change the appearance of all or part of a document quickly.

Formatting may be applied to:

1. Existing test

or

2. May be selected *before* entering text.

If you wish to apply formatting to text that has already been typed, select the text the appearance of which you would like to change, and then click on the button of your choice. For example, to apply boldface to existing text, select the text and then click on the **Bold** button.

If you wish to apply formatting *before* typing, simply select the formatting options that you wish to apply and then type the text. When you no longer wish the format to apply, turn the formatting option off, or change it to an alternative, whichever is applicable.

Some Formatting buttons are toggles, that is, the same button is used to turn a formatting feature “on” and “off”. Examples of toggle buttons are bold, italic and underline. To remove the formatting after it has been applied, select the text, the formatting of which you would like to remove, and click on the corresponding button on the *Formatting* toolbar.

Some Formatting features, such as the Font and Font size options, are not toggling buttons. These features require that some selection always be made. In other words, you cannot turn the Font option “off”; you can only change it to a different Font.

To apply formatting on a single word, place the insertion point in the word and apply the formats.

Table 2 below includes a list of shortcut keys that may be used for character formatting. Only the most frequently used formatting options have been assigned shortcut keys. They are worth learning, as typing speed is not compromised when applying formatting using this method.

Table 2

Shortcut key combination	**Formatting result**
<Ctrl> + B	Bold
<Ctrl> + I	Italic
<Ctrl> + U	Underline

SELF-ASSESSMENT EXERCISE

Using the Formatting Toolbar to apply and remove Character Formats

Before you begin: The document **My Memo** should still be open on your screen.

What you do	**Comment/Prompts**
1. Select the word **numerous** in the first paragraph of text.	
2. Using the *Formatting* toolbar, click on the Italic button. If it is not currently visible, look on the formatting docked toolbar.	*I* To apply the italic format to the word “numerous”.
3. Selectthetext**Client Referral** above the first paragraph	

4. Using the **Formatting** toolbar, click on the Underline button. Observe the text	U To apply the underline format to the selected text.
5. Select the name **Kathleen de Winter** at the bottom of the document	
6. Click on the Bold button	B To apply the bold format to the selected text
7. Select the name **Joe Burger**	The text is highlighted
8. On the *Formatting* toolbar, Observe the Font drop-down list	Times New Roman The font "Times New Roman" is selected
9. From the Font drop-down list, select Arial (Remember, to open or "expand" the box, you must click on the down arrow).	To format the selected text with the Arial font
10. Using the *Formatting* toolbar, display the **Font size**drop-down list and observe the current font size	The font size is set to 12.
11. Select: 14	12 8 9 10 11 12 14 16 18 20 22 24 26

The font size is reset to 14.

4.0 CONCLUSION

Copying texts, and saving changes to a document and formatting are important in word processing.

5.0 SUMMARY

Copying a text required four processes. Here you also learned two kinds of formatting: character and paragraph.

6.0 TUTOR-MARKED ASSIGNMENT

Open the file **Typing 1**. Insert the text "around the world" in the last sentence just after the word "teachers". Insert the words "and or repetitive" before the last word of the paragraph. The revised sentence should read as follows: (changes have been underlined).

"Therefore, a ***Word Processing*** program can be used on a daily basis by school teachers around the world to simplify tedious and/or repetitive tasks"
Save and close the file.

7.0 REFERENCE/FURTHER READING

French, C.S. (2000). *Computer Science* (5th ed.). Gosport Hants:

UNIT 1.4: PARAGRAPH FORMATTING: THE SPELLING CHECKER AND INTRODUCTION TO PRINTING A DOCUMENT

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7.0	References/Further Reading

1.0 INTRODUCTION

You need to pay much attention to paragraph formatting and printing of documents.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- select the paragraph
- apply the format
- check selected text
- print a document.

3.0 MAIN CONTENT

3.1 Paragraph Formatting

Paragraph formatting, such as alignment, indents, and tabs can be used to affect the appearance of your document. To apply a paragraph format, you select the paragraph and apply the format. However, you can select the paragraph by just placing the insertion point in the paragraph, or by selecting any amount of text in the paragraph. The formats you apply will affect the entire paragraph.

Paragraph alignment may be applied before typing a paragraph or after the paragraph has been typed. Paragraph alignment determines how text is positioned between the left and right indents. There are four alignment options.

1. Left Alignment

Align Left:

Lines of text are aligned along the left indent. The text along the right side of the paragraph appears ragged. Left aligned is the default paragraph-alignment setting.

2. Center Alignment

Center:

Lines of text are aligned between the indents. Both the left and right sides of the paragraph appear ragged.

3. Right Alignment

Align Right

Lines of text are aligned along the right indent. The left and right indents are even with the left margins by default. If you apply paragraph alignment to a selected paragraph, the text will appear to align (left, center, right and justified) with the margins. The text along the left side of the paragraph appears ragged.

4. Justified

Justify:

Lines of text are aligned along both the left and right indents. Word adjusts the spacing between words so that they stretch from left indent to right indent. When the last line of a justified paragraph is short, however, it will not be stretched out.

Various methods are available by which you can apply paragraph alignment. On this course you will be introduced to one of the most common methods used to apply alignment, namely, selecting one of the alignment buttons on the *Formatting* toolbar. Table 3.1 on page 21 illustrates these buttons.

Table 3.1

Alignment	Button
Justify	
Right	
Left	
Center	

SELF-ASSESSMENT EXERCISE

Using Paragraph Alignments

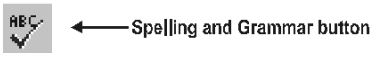
Before you begin: The document **My Memo** should still be open on your screen.

	What you do	Comment/Prompts
	1. Place the insertion point in the last paragraph of the document	"I have a client referral for you…"
	2. On the *Formatting* toolbar, observe the Alignment buttons	
	3. Click on the **Center** alignment button	To center each line of the selected paragraph between the left and right indents.
	4. Click on the **Right** alignment button	To right align the paragraph
	5. Click on the **Left** alignment button	The paragraph is left aligned.
	6. Click on the **Justify** alignment button	The paragraph is justified.
7.	Select the first paragraph of text	The paragraph is once again centered
8.	Click on the **Justify** alignment button	The paragraph is justified
9.	Select **File**, **Save**	
10.	Select **File**, **Close**	

3.2 The Spelling Checker

No matter how carefully you type or proofread a document, errors inevitably creep into documents. Word 2000 has provided certain proofing tools to help eliminate such errors from your final document. One of these is the *Spell Checker*.

Although a spelling checker is no substitute for proofreading, you can use this feature to help you create and edit your documents. Word checks each word in a document against its dictionaries, then highlights those words that it does not recognize. The spelling checker also checks for such common typing mistakes as repeated words ("the the") and, in conjunction with the **AutoCorrect** feature, it checks for irregular capitalization ("tHe").



To check selected text, make the selection and click on the **Spelling and Grammar** button located on the *Standard* toolbar. To check an entire document, deselect any selected text, and place the insertion point at the top of the document before clicking on the **Spelling and Grammar** button.

When the spelling checker highlights a possible error, a list of suggested words may appear in the Suggestions list box, depending on whether the dictionary contains a word that is similarly spelled. The first word in the suggestion list is automatically selected. If Word's dictionaries do not recognize the highlighted word or if it has irregular capitalization, then you can choose from the following spelling options:

- **Correct the spelling**. If the correction that you want is highlighted in the **Suggestions** text box, click on **Change**. If the correction that you want is in the **Suggestions** list box but not highlighted, click on that word and click on **Change**. If the correction that you want is not suggested, type the correction in the top text box and click on **Change**. To automatically change all occurrences of the word throughout the document, click on **Change All**.

- **Leave the word unchanged**. If you want to leave the word as it is and continue the spell check, click on Ignore. To automatically ignore all further occurrences of the word, click on **Ignore All**.
- **Add the word to a dictionary**. If you want to add the word to a custom dictionary, click on **Add**.
- **Stop the spell-check procedure**. If you want to cancel the spell-check procedure at any point, click on **Cancel**. All changes made

up to that point will be preserved. If you used the **Change All** or **Delete All** options, some instances of those words might not be changed or deleted.

• **Add the word to the AutoCorrect list**. You can add a mis-spelled word and its correct spelling to the **AutoCorrect** list by clicking on the **AutoCorrect** button.

If the error is that of repeated words, you can click on **Delete** to delete the second instance of the word.

The **Automatic Spell Check** feature informs you of spelling errors as you type. It can be enabled or disabled by choosing **Tools, Options…** and selecting the **Spelling & Grammar** tab. Then, under **Spelling**, select **Check spelling As You Type**. When you mis-spell a word, it will be underlined in red. To correct the spelling, right-click on the word to display a shortcut menu with alternate spelling suggestions and select the correctly spelled word.

SELF-ASSESSMENT EXERCISE

Checking the Spelling of an Entire Document

What you do	Comments/Prompts
1. Open: Spelling Hint: File, Open	The file **Spelling** appears on your screen
2. Select **Tools, Options…** on the menu bar at the top of the screen	To verify that certain options have been deselected.
3. Please ensurethat the following checkboxes have been deselected (turned off) Check spelling as you type Check grammar as you type Check grammar with spelling	For this particular exercise we do not want these features activated automatically.
4. Click on **OK** 5. Make sure that the insertion point is at the top of the document	
6. Click on the Spelling and Grammar button	The Spelling and Grammar dialog box is displayed.
7.Observe the dialog box	The first unrecognized word in the document, "rright," is automatically highlighted. NB: Always check that the correct

	word has been selected in the Suggestions box before clicking on Change.
8. Click on: **Change**	"rright" is changed to "right". The next unrecognized word in the document "douts" is highlighted.
9. Ensure that "douts" has been selected in the list of suggested words then click on: **Change**	"douts" is changed to "douts The next unrecognized word in the document "confidence" is highlighted.
10. Ensure that "confidence" has been selected in the list of suggested words the click on: **Change**	"confidence" is changed to "confidence". The next unrecognized word in the document "diminished" is highlighted.
11. Ensure that "diminished" has been selected in the list of suggested words then click on: **Change**	"diminished" is changed to "diminished". The next unrecognized word in the document "psychologists" is highlighted.
12. Ensure that "psychologists" has been selected in the list of suggested words then click on: **Change**	"psychologists" is changed to "psychologists". The next possible error in the document "of" is highlighted
13. Observe the dialog box	Although "of" is not mis -spelled, it has been typed twice. (repeated)
14. Click on **Delete**	To delete the second "of" and to have the Spelling and Grammar check continue.
15. Please continue with the spell check until all correction have been made. Please note:The word "Midpower" will be shown as unknown. It is in fact correct. Please select **Ignore** when this word appears in the dialog box.	
16. Click on **OK**	To close the message box that reads, "The spelling check is complete."

3.3 Introduction to Printing a Document

The final step in the production of a document is printing. Learning about finer print details does not lie within the scope of this course and

will be dealt with on program specific course. We will therefore concentrate on the basic principles of printing only.

To print the document in the above window, the following process applies:

1. Choose **File, Print** (or press **<Ctrl> + P**). This display the Print dialog box see figure 3 below.

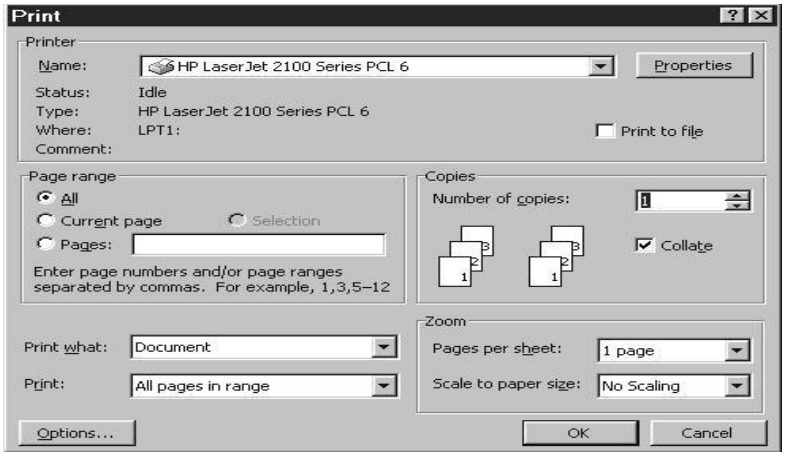


Figure 3: The Print dialog box

2. If you have access to more than one printer from your computer, select the correct printer in the printer **Name** box.
3. Select what you want to print in the **Page range** (By default, the entire document is printed, but you can choose to print the current page, multiple pages, or selected text.)
4. Select how many copies you wish to print.
5. Click on the Options button to locate additional print settings if required.
6. Click on **OK** to start the printing process.

Or

Click on **Cancel** to close the dialog box and return to the document without printing.

The Print button on the Standard docked toolbar sends the document directly to the printer, bypassing the Print dialog box. Therefore, the default settings will be used.

⟵ Print Button

SELF-ASSESSMENT EXERCISE

Printing the Finished Document

What you do	Comments/Prompts
1. Open: **My Memo**	
2. Choose: **File, Print…**	To display the print dialog box
3. Examine the print options in the dialog box	
4. Click on **Cancel**	To cancel the print command and close the print dialog box. (Or click on OK to print the document)
5. Select **File, Exit** to exit Word 2000	

4.0 CONCLUSION

Word adjusts the spacing between words so that they stretch from left indent to right indent.

5.0 SUMMARY

Although a spelling checker is no substitute for proofreading, spelling checker could be used to create and edit documents.

6.0 TUTOR-MARKED ASSIGNMENT

Type a letter to the parents of students of Slugger Van Tonder under the following institutions:

- The letter is to be typed in Times Roman Font at a font size of 12,
- The address of Mr. and Mrs. Van Tonder as well as the current date, should be aligned to the right of the document.
- The greeting is to be followed by a suitable heading, which is to be underlined and centered across the page.
- The body of the letter should assist a minimum of two paragraphs of text. The alignment of this text should be justified.
- Your name at the conclusion of the letter should be typed in capital letters with bold and italics applied.

Spell check the letter, taking care to correct all spelling errors. If you have access to a printer, please print the completed letter. Save the document as Typing. Close the file.

7.0 REFERENCES/FURTHER READING

French, C.S. (2000). *Computer Science* (5th ed.). Gosport Hants: Ashford Colour Press.

UNIT 2 SPREADSHEET

CONTENTS

1.0 Introduction
2.0 Objectives
3.0 Main Content
  3.1 Definition of a Spreadsheet
  3.2 The Paper Spreadsheet
  3.3 The Excel Program
    3.3.1 Starting (Launching) Excel
  3.4 The Workbook Environment
    3.4.1 The Excel Workbook Structure
4.0 Conclusion
5.0 Summary
6.0 Tutor-Marked Assignment
7.0 References/Further Reading

1.0 INTRODUCTION

A spreadsheet comprises a grid of numbered rows and lettered column intersecting in cells. A cell can contain either text or numbered values.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- define a spreadsheet
- discover some of the features and limitations of a paper spreadsheet
- start Excel
- identify the features of a workbook.

3.0 MAIN CONTENT

3.1 Definition of a Spreadsheet

Before we compare the paper spreadsheet to the electronic spreadsheet, it is importance to clarify exactly what is meant by the spreadsheet.

A spreadsheet consists of information written in tabular form; in other words, rows and/or columns of figures and/or text. A series of data depicted horizontally is called a “row” while a ser ies of data depicted

vertically is called a “column”. These data may con sist of text, “raw” numbers or of calculated results. The primary objective of a spreadsheet is to keep a record of numerical information.

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3.2 The Paper Spreadsheet

In order to appreciate the Excel software program, it is helpful to understand the limitations of a "paper spreadsheet" . By "paper spreadsheet" we mean a non-electronic spreadsheet t hat has either been hand-written or typed.

Working with a paper spreadsheet can be complicated and time consuming. Information that changes must be erased and rewritten, causing computations to be incorrect until they are redone. If any raw number changes, calculations dependent on that number have to be re-calculated. Failure to do so will result in incorrect answers. This causes a domino effect; in other words, if information at the top of the spreadsheet needs to be recalculated, all subsequent calculations which are related to the initial calculation, would need to be recalculated.

For example, an incorrect entry in a chequebook can throw off a running balance; when the error is found, a significant number of computations may need to be redone to arrive at the current balance.

Paper spreadsheets have limited functionality because they are static. In other words their practical application is limited because of inflexibility. Soon you will see that "electronic spreadsheets" do not have this limitation.

Figure 4.1 is an example of a paper statement. In Exercise 11, you will examine the various element of the paper spreadsheet.

Personal Budget for the First Quarter
Monthly income (Net) ..... >
R 1.475.00

	January	**February**	**March**	**Quarter Totals**
Rent	600.00	600.00	600.00	R1.800.00
Telephone	48.25	43.50	42.10	R 133.85
Utilities	67.27	75.92	62.89	R 206.08
Charge Cards	200.00	110.00	70.00	R 380.00
Heating Oil	125.52	150.57	50.32	R 326.41
Auto Insurance	150.00	—	—	R 150.00
Cable TV	30.25	30.25	30.25	9075
Monthly Totals:	R 1,221.29	R 1.010.24	R 855.56	
Balance:	R 253.71	R 464.76	R 619.44	

Figure 1: A sample of paper spreadsheet.

SELF-ASSESSMENT EXERCISE

Examine a Paper Spreadsheet

Objective: To discover some of the features and limitations of a paper spreadsheet.

What you do	Comments/Prompts
1. Look at Figure 4.1	It illustrates a typical paper spreadsheet
2. Observe how the information is arranged	It is laid out in columns and rows.
3. Look at the entries in the spreadsheet	The spreadsheet contain text, straight or "raw" numbers, and numbers that are the result of computations.
4. Look at the calculated values in the Quarter Totals column and the Monthly Totals and Balance rows at the bottom of the spreadsheet.	If you change any of the numbers that contribute to these calculated values, the totals will have to be recalculated. This is one of the limitations of using paper spreadsheet.
5. Notice the appearance of the totals	The computations in Quarter Totals and Monthly Totals include rand signs to signify currency
6. Observe the column widths	Some columns are wider than others are.

Further Practice Exercise

1. In Figure 4.1, cross out the current amount for the January telephone bill and change it to 55.
2. Circle the number that must be recalculated because of this change.

3.3 The Excel Program

Excel is a software application that provides an "e lectronic spreadsheet," or worksheet environment. Excel's worksheet is an electronic replacement for traditional planning tools: the pencil and eraser, the accountant's ledger sheet and the calculator.

An Excel file, called a *workbook*, can contain *worksheets.* Excel can be used to manage numbers and calculations. You may use Excel for purposes such as the setting up of profit and loss statements, cash flow forecasts, sales reports, product lists inventories, budgeting, project planning etc.

Unlike the paper spreadsheet, you can set up an Excel workbook as a responsive and dynamic work environment; you can create formulas in Excel that will get automatically update when you change your data.

3.3.1 Starting (Launching) Excel

To start Excel:

1. Turn on your computer
2. Click on the Windows **Start** button to access the start menu
3. Choose Programs, Microsoft Excel.

SELF-ASSESSMENT EXERCISE

Starting Excel

Before you begin: Ensure that the computer has been turned on, and that the Windows desktop is displayed.

Objective: To Start Excel and to Exit from Excel

What you do	Comments/Prompts
1. Click on the **Start** button on the **Taskbar**	The **Start** menu is displayed.
2. Click on **Programs** on the **Start** menu.	The **Programs** sub-menu is displayed.
3. In the sub-menu click on **Microsoft Excel**	Microsoft Excel is launched. Next you will exit from Excel
4. Click on **File**	The File drop-down menu appears.
5. Click on **Exit**	Microsoft Excel is closed.

Further Practice Exercise

1. Start Excel again. Hint: If you need help, refer to Exercise 12.
2. Exit from Excel. Hint: If you need help, refer to Exercise 12.

3.4 The Workbook Environment

The Excel worksheet consists of various elements. In order for you to be able to capture and manipulate data, it is necessary to be familiar with certain elements found in the worksheet as well as with some of the terminology associated with spreadsheets.

3.4.1 The Excel Workbook Structure

The workbook window displays the workbook – an Exce l file in which you work and store your data. A workbook is made up of worksheets. Different types of sheets may appear in a workbook.
The components of the workbook window are the workbook itself, scroll bars, sheet tabs, and stab crolling buttons.

- **Workbook:** The default Excel workbook contains 3 worksheet names Sheet1 through Sheet3. The sheet names appear on tabs at the bottom of the workbook. A new Excel workbook file can contain up to 255 separate worksheets. The Excel worksheet is a grid of 256 columns by 65,536 rows. *Columns* are designated by letter running down across the top of the worksheet, and *rows* are designated by numbers running down the left border of the worksheet. Column headings begin with letter "A" an d continue through the letter "Z." After the 26th column (Colu mn Z), headings become double letters, From "AA" to "IV". Row headings begin with number 1 and continue through the number 65536.
- **Cells:** the intersection of a column and a row. Cells are typically referred to by their column and row location. For instance, column A, row 1 is cell A1. You enter data (text or numbers) directly into any cell that is active. A thick, dark border distinguishes the active cell.
- **Formula bar:** a bar located near the top of the window that displays the constant value or formula used in the active cell.
- **Scroll bars:** to the right of and below the worksheet grid. Use the scroll bars to display different areas of the active worksheet.
- **Sheet tabs:** at the bottom of the workbook. You can click on the sheet tabs to move from one sheet to another in a workbook.
- **Tab scrolling buttons:** to the left of the sheet tabs. You can click on the tab scrolling buttons to scroll the display of sheet tabs one at a time, or to display the first or last grouping of sheet tabs within a workbook.

The other parts that complete the full Excel screen are the standard elements associated with a "Window", for example, a title bar, a menu bar, a toolbar, etc. You have already been introduced to these elements in Module 2 of this course. Detailed explanations of these elements may be found in Module 2.

SELF-ASSESSMENT EXERCISE

Identifying the Features of a Workbook

What you do	Comments/Prompts
1. Start Excel	
2. Observe the workbook and its tabbed worksheets	It is like a stack of paper spreadsheets. The tabs enable you to move from one worksheet to another. There are 3 sheets in workbook, and you can add more to have as many as 255 sheets in a single workbook.
3. Observe the top portion of the screen.	At the very top of the window is the Excel title bar. Just below it is the menu bar followed by the two toolbars arranged in a single row, and then formula bar.
4. Observe the column headings	Located at the top of the worksheet, column headings label the columns with the letters "A" to "IV". A column extends down through all of the rows.
5. Observe the row headings	Located on the left side of the worksheet, row headings number the rows from 1 to 65536 and extend through all of the columns
6. Examine a cell	A cell is the intersection of a column and a row. Cells are named by their column and row locations; for example, A1, C12, or IV65536.
7. Look for the active cell	A bold border surrounds the active cell. When a new worksheet is created, the active cell is cell A1.
8. Notice the cell reference area in (Hint. The formula bar is located just above the column heading).	On the far-left side of the formula bar, the reference area identifies the current or active cell.

4.0 CONCLUSION

You have examined the various elements of the paper spreadsheet. Moreover, you can start Excel and exit from Excel and identify the features of a workbook.

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5.0 SUMMARY

Spreadsheet packages provide a wide range of facilities for creating and manipulating formulated tables and charts of values.

6.0 TUTOR-MARKED ASSIGNMENT

Please create the spreadsheet below taking special note of the following:

- The label in cell A1 is set to font size 12. All remaining data is set to 10
- Ensure that column A is wide enough to accommodate the label in cell A11 and that column F is set to accommodate the text in cell F4.
- The labels in the range B4: F4 are right aligned
- Ensure that bold is applied where necessary

	A	B	C	D	E	F	G
1	**Year Mark**		**Subject**	**English**		**Year:2000**	
2	**Grade 7**						
3							
4	Surname	Term 1	Term 2	Term 3	Total	Student Average	
5	Appleby	76	74	75			
6	Arch", R	65	83	72			
7	Bester, S	71	78	75			
8	Cock, A	58	63	62			
9	De Winter, J	92	94	97			
10							
11	**Class Average**						
12							

Save the workbook as Spreadsheet1. Close the file.

7.0 REFERENCE/FURTHER READING

Ayo, S.K. (1998). *Computer Literacy Operating System and Application* (2nd ed.). Mckay Consult.

UNIT 2.1 ENTERING AND CORRECTING DATA

CONTENTS

1.0 Introduction
2.0 Objectives
3.0 Main Content
3.1 Entering and Correcting Data
3.1.1 Suggested Steps for Creating a Worksheet
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3.2 Replacing Cell Contents
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1.0 INTRODUCTION

You will learn here how to enter data Excel worksheet.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- create your own workbook in Excel
- replace text in a cell
- correct an entry before entering it
- enter numbers.

3.0 MAIN CONTENT

3.1 Entering and Correcting Data

3.1.1 Suggested Steps for Creating a Worksheet

First, consider your objectives for creating a worksheet and the type of information you want to include. Get some idea of how you want the worksheet to look. For example, do you want the months to appear across a row or down a column?

You might find it helpful to sketch a draft on a piece of paper to create the structure before you begin typing data. When you are entering data in an Excel worksheet, the suggested order is:

1. Type the text information to create a structure.
2. Type the numbers
3. Add the formulas, copying where possible
4. Add a title to the top of the worksheet
5. Format the text, numbers, and formulas.

3.1.2 Entering Data

To create your own workbook in Excel, you will need to enter data. To enter data:

1. Select, or activate, the cell in which you want to display the data; use the mouse pointer to point to a cell and then click to select it or use the arrow movement keys on your keyboard to select a cell.

2. Type the data.
3. Enter the data into the cell by using any of these techniques:
   - press the **<Enter>** key;
   - click on the **<Enter>** button in the formula bar (the boxed checkmark);
   - or press any of the keyboard movement keys, such as **<Right Arrow>** or **<Tab>**.

Worksheet cells can contain constant values (text or numbers) or formulas. In a worksheet, text is used to organize and identify the numerical information. By default, text is left aligned in the cell.

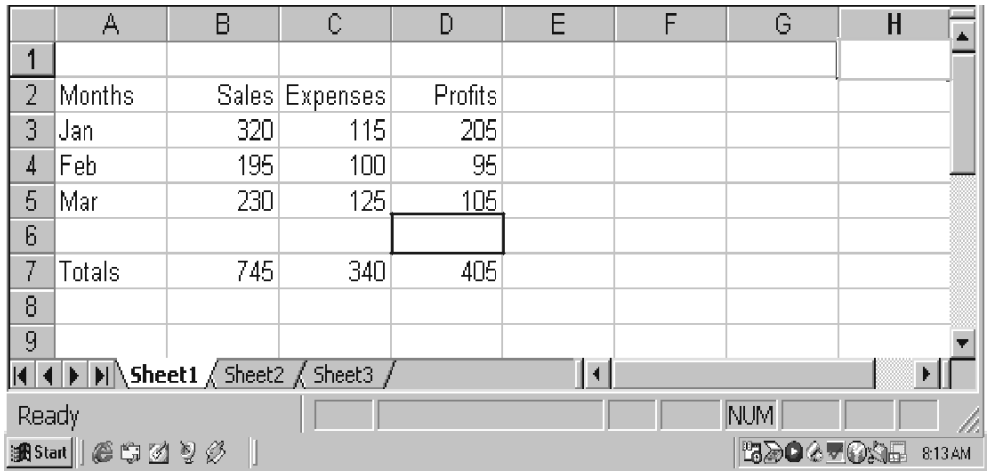


Figure 1: An example of text and number entered in a worksheet

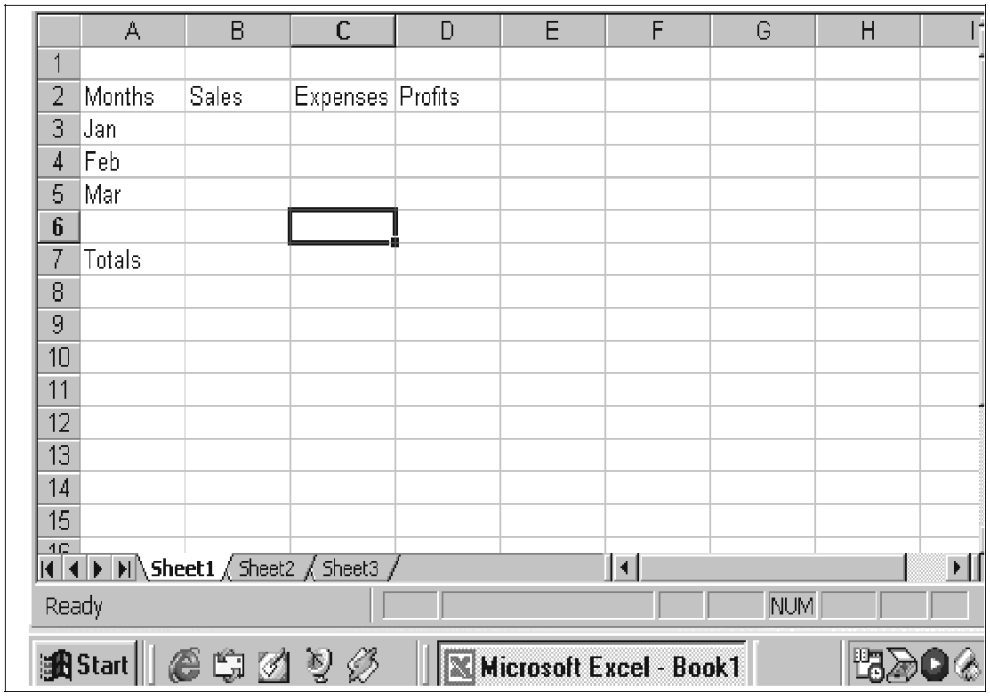
SELF-ASSESSMENT EXERCISE

Entering Text

What you do	Comments/Prompts
1. Look at the mode indicator	(Located in the left corner of the status bar). The mode is Ready.
2. Place the mouse pointer on Cell A2.	The mouse pointer becomes a cross. You click on a cell to select it.
3. Type: **Months** Do *not* press **<Enter>**	The word appears both in the formula bar and in the cell, but it is not yet entered.
4. Note the **Cancel, Enter,** and **Edit Formula** buttons	= Located in the formula bar. They are used for data entry with the mouse.
5. Press: **<Enter>**	To enter the text and move down one cell. Cell A3 is now the active, or selected cell. The mode indicator returns to Ready.
6. Select cell B2	You can either click on the cell or use the Right Arrow and Up Arrow keys on your keyboard to select cell B2.
7. Type: **Sales** Press: **<Enter>**	To enter the text into cell B2

Further Practice Exercise

1. Enter the following information in cell listed:
   In cell C2, enter **Expenses**
   In cell D2, enter **Totals**



3.2 Replacing Cell Contents

One method you can use to correct an item after it is entered into a cell is to retype the entry and press **<Enter>** again. The new entry replaces the old entry.

SELF-ASSESSMENT EXERCISE

Replacing Text in a Cell

What you do	Comments/Prompts
1. Select cell D2	
2. Type: **Profits**	The new text is displayed in the formula bar and in the cell.
3. Press: **<Enter>**	The word "Profit" replaces the word "Total", and the active cell moves to cell D3.

3.3 Changing Entries as you Type

To change an entry before it is entered into a cell:

- Press **<Backspace>** to delete individual characters.
- Press **<Esc>** or click on the Cancel button (the X in the formula bar) to clear the entire entry.

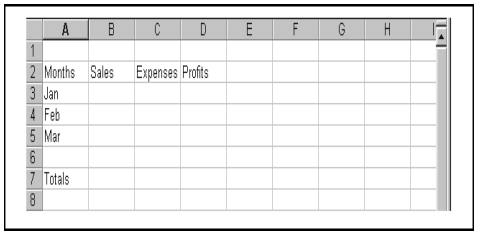
SELF-ASSESSMENT EXERCISE

Correcting an Entry Before Entering it

What you do	Comments/Prompts
1. Select cell A4 Type: **January** Do *not* press **<Enter>**	
2. Press: **<Esc>**	The text in the formula bar and in cell A4 is erased.
3. Select cell A3	
4. Type: **January** Do *not* press **<Enter>**	
5. Press: **<Backspace>** 4 times	To erase the letters "uary."
6. Press: **<Enter>**	The text "Jan" is entered into cell A3 and the active cell is now A4.

Further Practice Exercise

1. Enter the following information in the cells listed:
   In cell A4, enter **Feb** In cell A5, enter **Mar** In cell A7, enter **Totals**



3.4 Entering Numbers

By default, numbers are displayed right aligned as you type them.

SELF-ASSESSMENT EXERCISE

Entering Numbers

What you do	Comments/Prompts
1. Select cell B3	
2. Type: **120** Press: **<Enter>**	The Sales, Expenses, and Profits represent thousands of dollars.
3. Observe the number in the worksheet	Numbers are right aligned in the cell.

Further Practice Exercise

1. Enter the following numbers in the cells listed:
   Cell B4, enter **195**
   Cell B5, enter **230**
   Cell C3, enter **115**
   Cell C4, enter **100**
   Cell C5, enter **125**

	A	B	C	D
1				
2	Months	Sales	Expenses	Profits
3	Jan	320	115	
4	Feb	195	100	
5	Mar	230	125	
6				
7	Totals	745	340	

3.5 Saving a File

3.5.1 The File, Save and the File, Save as… Command s

Until it is saved, a workbook exists only in computer memory, which is a temporary storage place. For permanent storage, a workbook must be saved to a disk. It is important to save your work frequently (every 10 to 15 minutes).

Although it is not necessary, if you select cell A1 before saving the file, the upper-left corner of the active worksheet will be displayed when the file is reopened. This helps you to orientate yourself when you are working with a large worksheet.

Choose **File, Save** to save changes to an existing workbook.

Choose **File, Save As** to save a file for the first time, or to save the changes in a file with a different name (other than the one specified in the title bar), in a different location, or in a different format.

Remember, as you learned in Module 2 Filenames can contain up to 255 characters (letters, numbers, and some symbols), including spaces. You can make the filenames as descriptive as you like.

To choose the correct file location when using the **Save As** dialog box, expand the **Save In** list box and select the appropriate folder.

SELF-ASSESSMENT EXERCISE

Saving the Workbook file

What you do	Comments/Prompts
1. Click on the **File** menu command and observe the available choices without	Not all menu choices are displayed initially.

moving the mouse pointer	
2. Leave the mouse pointer on the **File** command in the menu bar	If you rest the mouse pointer on the **File** command and wait briefly after opening the menu, additional menu choices are listed. Note that the **Save Work- space…** and **Properties** options have now appeared.
3. From the **File** menu, choose **Save As…** The Save In dialog box should be set to A: If it is not, please click on the down arrow of the Save In box and select A:	The Save As command is used to save a file for the first time. When first installing Excel, the default folder is **My Documents**, located on the hard drive. However, on your computer the default folder may been changed to A:
4. Type: **My Sales Report** in the File name box	
5. Click on the **Save** button in the lower corner of the dialog box.	Excel saves a copy of the file in the default folder. This enables you to continue working with same file.
6. Observe the title bar (at the top of the window)	The file's new name, **My Sales Report,** is displayed.

4.0 CONCLUSION

Worksheet cells can contain constant values or formulas.

5.0 SUMMARY

Creating a worksheet involves steps. In fact entering data, entering text, replacing text in a cell etc. also involve steps which you need to follow.

6.0 TUTOR-MARKED ASSIGNMENT

Create the spreadsheet below taking special note of the following using Microsoft Excel.

Open the file Spreadsheet 1

Create a formula in cell E5 to calculate the total marks obtained by Appleby, P. (The correct answer is 225). Enter similar formulas to obtain totals for the remaining pupils.

If F5 enter a formula to calculate the average mark obtained by Appleby, P. (The correct answer is 75). Enter similar formulas to obtain the average mark of each of the remaining pupils.

Enter formulas in the range B11:F11 to complete the set spreadsheet. If you have a printer, please print the spreadsheet. Save and close the file.

7.0 REFERENCE/FURTHER READING

Ayo, S.K. (1998). *Computer Literacy*, *Operating System and Application* (2nd ed.). McKay Consult.

MODULE 2.2

Unit 1 Using Formulas
Unit 2 Spreadsheets: Numeric Formats
Unit 3 Creating Charts
Unit 4 Charts from Non-adjacent Data, Embedded Charts and Chart Links
Unit 5 Chart Types

UNIT 1 USING FORMULAS

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1.0 INTRODUCTION

Here you will learn how to enter formulas, clear contents of a cell and use the UNDO button. You will be able to change text appearance.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- enter formulas
- clear contents in a cell
- close workbooks
- use button to change text appearance
- add borders and colour.

3.0 MAIN CONTENT

3.1 Using Formulas

Formulas are instructions that you enter to perform calculations.

You can create formulas by using numbers (for example, 350+450); however, it is preferable to construct formulas that refer to worksheet cells. This way, the results of the formulas update automatically when you change numbers in your worksheet. In Excel, you create formulas by preceding the expression with an equal sign (=). For example, if you were to enter the number 350 in cell B1, the number 450 in B2 and the formula = B1 + B2 in cell, the value 800 would displayed in cell B3. were you subsequently to change the value in cell B1 or B2, Excel would recalculated the value of cell B3.

When entering a formula, you can type in cell references or click on the desired cells. Clicking on the cells may eliminate typing errors and prevent mistakes as you determine the cell reference by looking at them.

3.1.1 Mathematical Operators

The mathematical operators that are used in an electronic environment differ slightly from those used manually. Table 1 below compares the symbols used.

FUNCTION	MANUAL	COMPUTER
Division	÷	/
Multiplication	X	*
Addition	+	+
Subtraction	–	–

Table 1*:* Mathematical Operators

In the above table the two shaded operators are those that require your special attention. The symbol used to indicate exponentiation (i.e to the power of) is the caret (Ù) symbol.

MANUAL	COMPUTER	RESULT
10^2	10^2	100
10^3	10^3	1000

Table 2: **Exponentiation**

In the next exercise you will practice entering some formulas

SELF-ASSESSMENT EXERCISE

Entering Formulas

Objective: To use cell referencing in formulas.

What you do	Comments/Prompts
1. Selects cell B7	
2. Type: = **b3+b4+b5** Press: **<Enter>**	To add the numbers in cells B3, B4, and B5 and display the sum in the active cell (B7)
3. Look at the current value in cell B7	The value is 545.
4. In cell B3, enter **320** Press: **<Enter>**	The result of the formula in cell B7 reflects this change
5. In cell D3, enter the formula =**b3-c3** Press: **<Enter>**	To calculate January's Profits by subtracting Expenses (C3) from Sales (B3).

Further Practice Exercise

1. Enter following formulas in The cells listed:
   In cell D4, enter = **b4 – C4**
   In cell D5, enter = **b4 – C5**
   In cell C7, enter = **c3 + c4 + c5**
   In cell D7, enter = **d3 + d4 + d5**

	A	B	C	D
1				
2	Months	Sales	Expenses	Profits
3	Jan	320	115	205
4	Feb	195	100	95
5	Mar	230	125	105
6				
7	Totals	745	340	405

3.2 Clearing Cell Contents

To remove the contents of a single cell, select the cell and press **<Delete>.**

3.3 Using Undo

To reverse you last action in Excel, click on the **Undo** button (or choose **Edit, Undo)**. The speed key combination **<Ctrl + Z** will have the same effect.

Note: Not all actions can be undone in Excel. For example, you cannot undo a **File, Save**.

SELF-ASSESSMENT EXERCISE

Clearing the Contents of a Cell; Using the Undo Button

What you do	Comments/Prompts
1. Selects cell A2	This cells contains the text "Months" This text is not needed in the worksheet.
2. Press: <Delete>	To clear the contents of cell A2
3. Click on the Undo button	To undo the deletion of the word Months.

3.4 File Handling Techniques

This section recaps on a few of the basic file handling techniques that you were introduced to in Module 3.

3.4.1 Closing Files

To close a single file, choose **File, Close.**

SELF-ASSESSMENT EXERCISE

Closing Workbooks

What you do	Comments/Prompts
1. Choose: **File, Close**	A message appears asking if you would like to save changes to **My Sales Report.**
2. Click on Yes	To save and close the file

3.4.2 Creating a New Workbook

When you launch Excel, you see a new, blank workbook called Book 1, However, should you require a new workbook at a later stage you do not have to restart Excel to get a new workbook. To create a new workbook without restarting Excel, click on the New button, or choose **File, New**

…. The speed key combination of **<Ctrl> + N** will have the same result.

SELF-ASSESSMENT EXERCISE

Creating a New Workbook

What you do	Comments/Prompts
1. Click on the New button	You can use the New button to create a new workbook either when no other files are open or when you have another file open.
2. Close the file	

3.5 Formatting a Worksheet

Formatting changes the way that numbers and text are displayed in the worksheet. For example, the number ten can appear as 10, 10.00, R10, and so on. Applying a format changes only the appearance of a number, not its value. You can change the appearance of text on a worksheet in a number of ways, for example, you can emphasize certain words by applying boldface or underlining.

Categories of *Formatting* may be summarized as follows:

Number : Changes the way numbers, dates and times are displayed
Alignment : Governs where data is positioned within a particular cell
Font : Controls the style and typeface of data
Border : Applies and controls the style of lines which are drawn around cells
Patterns : Used to add a shaded colour or pattern to the background of a cell

In addition to the above, setting column-widths and row-heights are also considered part of formatting a worksheet. On this course we will investigate some of the font style options as well as number, alignment, border and patterns formatting briefly.

3.5.1 Working with Ranges

A range is a group adjacent cells that forms a rectangular shape. Before you can use a cell or a range of cells in a worksheet, it is necessary to indicate which cell or range of cell you want to work with. This process is known as **selecting**. So far you have only been working with a single

cell at a time. It may be necessary to work with more that one cell at a time, for example when formatting.

Selecting Cells

There are various methods that may be used to select a range of cells. Two of these are as follows:

1. With the mouse pointer, point to the centre of the cell in one corner of the range; press and hold the mouse button while dragging to the opposite corner of the range; and release the mouse button.
2. Select one corner of the range; press and hold the **<Shift>** key; and click on the opposite corner of the range to select all cells in between.

3.5.2 Using Toolbar Buttons to Format a Worksheet

You can use button on the Formatting toolbar to quickly change the appearance of all or part of a worksheet. Select the cell or cells whose appearance you would like to change, and then click on the buttons of your choice. For example, to apply boldface to text in cell B5, select cell B5 and then click on the Bold button.

Some Formatting button are toggles. To remove the formatting after it has been applied, select the cell whose formatting you would like to remove, and click on the corresponding button on the Formatting toolbar.

In Exercise 5 below you will have the opportunity to practice applying bold, italic and underline font styles to cells.

SELF-ASSESSMENT EXERCISE

Using Buttons on the Formatting Toolbar to change Text Appearance

What you do	Comments/Prompts
1. Open **Australian And European Divisions' Report**	
2. Select cell B1	
3. Click on the **Bold** button	**B** (On the Formatting toolbar.) To make the text boldface. The buttons on the Formatting toolbar appear

	"pushed in" when they are selected.
4. Select cell B3	
5. Click on the **Italic** button On the Formatting toolbar, click on the **Italic** button again	 To remove the Italic attribute. The buttons on the Formatting toolbar are toggle buttons.
6. Select the range **C12: G16**	
7. Click on the **Underline** button	 (On the Formatting toolbar.)

3.5.3 Adding Border and Colour to Cells

To emphasize data, you can add borderline or colour to cells. A variety of border types, widths, and colours are available in Excel. To apply borders or colours, select the cells that you want to affect; click on the drop-down arrow next to the Borders or Fill Colour buttons on the Formatting toolbar; and selected an option from the palette.

SELF-ASSESSMENT EXERCISE

Adding Borders and Colour

What you do	**Comments/Prompts**
1. If necessary, select the range	
B12:G16	
2. In the Formatting toolbar, click on the down-pointing arrow beside the Borders button	 If necessary, use the More Buttons button.
3. Click on the Outside Borders button	 (In the third row down, the third column from the left.)
4. With the range B12: G16 still selected, on the Formatting toolbar, click on the down Arrow beside the Fill Colour **button**	 To display the palette of available colours.
5. Select the colour Turquoise	Use Screen Tips to identity each color.
6. Deselect the range (click on any cell)	To view the formatting.

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4.0 CONCLUSION

Formulas are used to perform calculations.

5.0 SUMMARY

You are now in a position that you can enter formulas, clear contents, of a cell, close workers and add borders and colour.

6.0 TUTOR-MARKED ASSIGNMENT

Open the file **Spreadsheet 2**. Apply the following formatting options:

- Apply outside border to the range A3:D8
- Apply a bottom border to the range A7:D7
- Apply a bottom border to the range A3: D3
- Apply the fill colour of your choice to the range A3: D3
- Print, Save and Close the Workbook.

7.0 REFERENCE/FURTHER READING

Ayo, S. K. (1998). *Computer Literacy, Operating Systems and Applications* (2nd ed.). Mckay Consult.

UNIT 2.3 SPREADSHEETS: NUMERIC FORMATS

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3.1.1 Selecting the Entire Worksheet
3.1.2 Categories of Numeric Formats
3.1.3 Details of Numeric Formats
3.2 Text and Number Alignment
3.2.1 Aligning Cell Contents
3.3 Column Widths
3.4 Row Heights
3.5 Printing
3.5.1 Printing the Active Worksheet
4.0 Conclusion
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7.0 References/Further Reading

1.0 INTRODUCTION

In this unit you will be exposed to categories of numeric formats, text and number alignment and printing.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- format a cell
- align text in a cell
- change column widths
- change row heights
- print the active worksheet.

3.0 MAIN CONTENT

3.1 Numeric Formats

3.1.1 Selecting the Entire Worksheet

You can select the entire worksheet by clicking on the Select All button, which is the intersection of the row and column headings in the upper-left corner of the worksheet.

3.1.2 Categories of Numeric Formats

Many number formats can be applied by using the Formatting toolbar. Number formats are divided into several categories, such as Currency, Percentage, Scientific Accounting, and Fraction. The options not available on the toolbar may be selected through the Format Cells dialog box (accessed from either **Format** menu or the shortcut menu).

3.1.3 Details of Numeric Formats

You can use Excel's built-in formats to change the appearance of numbers. In the Format Cells dialog box, select the Number tab and choose the options you would like to use and click on OK. Some of the commonly used numeric formatting options may also be accessed using the formatting toolbar.

Figure 1 below indicate the button available on the Formatting toolbar by default.

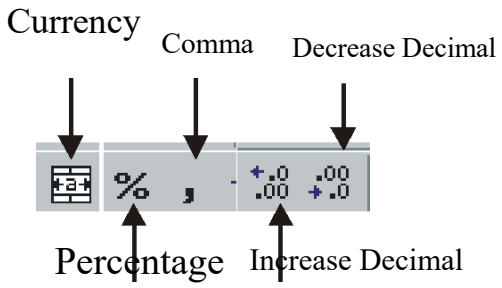

Figure 1: Formatting Tools

The numeric formatting buttons as listed in Figure 1, are used to produce the following formats:

Currency

Applies a currency symbol to a cell or range of cells.

Percentage

Multiplies the cell contents by 100 and place a % symbol to the right of the number

Comma

Enable two formatting features. Firstly, all negatives will be displayed in brackets. Secondly, a comma (or space – depending o n the settings of your computer) will appear as a separator between millions and

thousands. For example, 1000000 will be displayed as 1,000,000 or 1 000 000.

Increase Decimals

Each time you click on the Increase Decimal button, an extra decimal place is displayed to the right of the decimal point.

Decrease Decimals

Each time you click on the Decrease Decimal button, one decimal place fewer is displayed.

SELF-ASSESSMENT EXERCISE

Formatting a Cell

What you do	Comments/Prompts
1. Select cells C12:G12	
2. Click on the Increase Decimal button.	All values in the range are displayed with 2 decimal place.

3.2 Text and Number Alignment

3.2.1 Aligning Cell Contents

You can change the alignment of text or numbers in a cell. Right aligned, left aligned, and centered are the most common alignments. To align the contents of a cell, select the cell and then click on the desired Formatting toolbar button.

By default, text entries are left aligned while numeric entries and calculated results are right aligned. This may lead to data that does not appear neatly aligned within your spreadsheet. When attempting to correct this, the most favourable option would be to re-align the label entries, not the values.

Figure 2 below displays three examples. Example 1 shows the data as originally entered. Example 2 shows the data with the numbers having been re-aligned, while Examples 3 shows the data with the text in cell B1 having been re-aligned. While all three examples display the correct information, Example 3 is visually the most successful.

Example 1

	A	B
1		Jan
2	Model 1	10
3	Model 2	1000
4	Model 3	100
5	Model 4	1
6	Model 5	110
7	Total	1221
8		

Example 2

	A	B
1		Jan
2	Model 1	10
3	Model 2	1000
4	Model 3	100
5	Model 4	1
6	Model 5	110
7	Total	1221
8		

Example 3

	A	B
1		Jan
2	Model 1	10
3	Model 2	1000
4	Model 3	100
5	Model 4	1
6	Model 5	110
7	Total	1221
8		

Figure 2: Data Alignment

SELF-ASSESSMENT EXERCISE

Aligning Text in a Cell

What you do	Comments/Prompts
1. Select the range C5: G5	
2. Click on the **Align Right** button	(On the Formatting toolbar.) To align the text in the selected range along the right edge of the cells.

3.3 Column Widths

If the number in the active cell is too wide for the column, the column width will adjust automatically so that the number is displayed. You can also change the width of worksheet columns manually. There are several ways, including the following:

- Place the mouse pointer on the boundary to the right of a column heading, and drag the divider to the right (to expand the column width) or to the left (to shrink the column width).
- Place the mouse pointer on the boundary to the right of a column heading and double-click the mouse button. The column width is calculated to accommodate the longest entry in the column.

When the total (number of characters of numeric data is greater than the column width, number signs (# # # # #), commonly referred to as “hash” symbols, are displayed in the cell if you have manually changed the column width. To display the number, you can change the formatting or enlarge the width of the column.

3.4 Row Heights

Just as the default column width may not always be suitable, so too you will find that the default row height may not always be to your liking. Although the row height will adjust automatically to accommodate the font size of a particular cell, you may wish to change the height of worksheet rows manually. There are several ways, including the following:

- Place the mouse pointer on the boundary below the row heading, and drag the divider down (to increase the row height) or up (to decrease the row height).
- Place the mouse pointer on the boundary below the row heading and double-click the mouse button. The row height is calculated to accommodate the highest entry in the row.

SELF-ASSESSMENT EXERCISE

Changing Column Widths and Row Heights

What you do	Comments/Prompts
1. Select cell E12	It displays the result of the formula
2. In the column heading, pointer to the boundary between the headings for column E and F.	
3. Drag the boundary to the left until the tip displays 3.57	To decrease the width of Column E
4. Observe cell E12 Observe the formula bar	Number signs (# # #) are displayed in the cell. The formula bar displays the true contents of the cell. The contents are intact.
5. Double-click on the boundary between the headings for columns E and F	Column E is automatically sized to fit the widest number or text in the column. Next you will increase the row height of row 6 so that the spacing between rows 5 and 6 will more acceptable.
6. In the row heading, points to the boundary between the headings for rows 6 and 7	
7. Drag the boundary down until The height of row 6 is increased the tip display 25:50	

3.5 Printing

All default print options are listed in the Print dialog box. If you activate the print process through the Print button, Excel will use the default setting that appear in the print dialog box. Should you wish to change any of these setting, you would have to use the **file, prints** commands to display the Print dialog box. Figure 3 below displays the print dialog box.

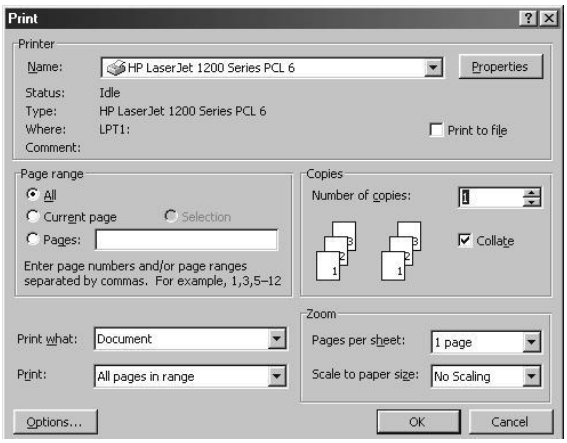

Figure 3:The Print Dialog Box

Options that may be selected in the Print dialog box include the following:

Printer Name Box Use this list box select a printer.

Copies Selects the number of copies you wish to print

Print Range By default all pages of the worksheet will print. However, you can select to print specific pages only.

Print What Selection: Prints Only the area specified by you
Selected Sheet(s): Prints the current worksheet (default setting)
Entire Workbook: Prints all worksheets in a workbook

3.5.1 Printing the Active Worksheet

A quick way to print your whole worksheet is to click on the print button on the standard toolbar. **Warning** When you use this button, the print dialog box does not appear on the screen. For every click of the mouse on this button, your printer will print another copy.

SELF-ASSESSMENT EXERCISE

Printing the Active Worksheet

What you do	Comments/Prompts
1. Click on the Print button	The Active worksheet is printed
2. Save the file and exit from Excel	

4.0 CONCLUSION

A worksheet is a single sheet of the workbook. It contains text, numbers and formulas.

5.0 SUMMARY

A workbook is Excel's name for a file. It contains three sheets. These sheets can be of different types, such as worksheets, macro sheets or chart sheets.

6.0 TUTOR-MARKED ASSIGNMENT

- Apply bold format where necessary
- Ensure that the column-widths of column A and C are adjusted as necessary
- Ensure that the values in cell C4:C8 are displayed with 2 decimal symbols
- Note that the labels in B3: D3 are right aligned.
- Enter the necessary formulas in D4:D7 to calculate the turnover of each individual item.
- Enter a formula in D8 to calculate the total turnover.
- Save the workbook as **Spreadsheet 2**
- Print and close the file.

	A	B	C	D
1	Tuck Shop Sales		Nov-00	
2				
3	Item	**Quantity**	**Price**	**Turnover**
4	Cooldrinks	300	2.50	
5	Chips	220	1.75	
6	Hotdogs	400	5.00	
7	Toasted Cheese	180	5.00	
8	**Total Price**			

7.0 REFERENCES/FURTHER READING

French, C.S. (2000). *Computer Science* (5th ed.). Gosport, Hants:

UNIT 2.4 CREATING CHARTS

CONTENTS

1.0 Introduction
2.0 Objectives
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3.1 Creating Chart
3.1.1 Creating a Basic Chart
3.1.2 Examining the Results and Learning about Chart Terminology
4.0 Conclusion
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1.0 INTRODUCTION

You will learn to create charts and other graphic objects using Excel in this unit.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- create column charts on chart sheets using the <F11> functions key
- apply chart terminology.

3.0 MAIN CONTENT

3.1 Creating Chart

As you learned earlier in this course, Excel 2000 is an integrated worksheet package that runs with the Microsoft Windows 95, Window 98, Windows Millennium Edition and Windows NT 4.0 operating systems. In addition to its worksheet capabilities, Excel enables you to create charts and other graphic objects.

3.1.1 Creating a Basic Chart

After you have created a worksheet, you can graphically represent the worksheet data by creating a chart. Charts often make worksheet data clearer and easier to understand.

What is a chart? It is information presented in the form of a table, graph or diagram. When using the term chart in Excel, we are specifically referring to the graph element of charting. For the duration of this course, these two terms will be used interchangeably.

What exactly is meant by the term graph? A graph is a diagram showing the relation between variable quantities, usually of two, each measured along one of a pair of axes at right angles. Pie, Doughnut and Radar graphs are a few of the exceptions where the axes are either displayed in an unusual format, or not at all.

In summary, a graph is a "pictorial" presentation o f a series of values. It is not possible to plot a graph without values. The Excel spreadsheet provides the values that are to be plotted. In addition to numeric data, cells containing text will also be included in the data that is to be plotted as a graph.

Excel enables you to create charts sheets, which are separate sheets of a workbook file that contain only charts. Excel also you to create embedded charts, which are displayed on the same sheet as the worksheet.

Chart sheets enable you to print a chart that is separate from data. You can use page setup options to control how the chart will print. Creating a chart on a separate sheet is useful when you want to show overhead projections of your charts as part of a presentation or a slide show.

Use an embedded chart when you want to print a worksheet and a chart on a single sheet of paper. Embedded charts enable you to print a chart and its associated data side by side on the same printed page. It is easier to compare actual worksheet data to the graphical representation of that data when you use an embedded chart.

To create a chart on a chart sheet, you can either use the Chart Wizard or press the **<F11>** key. The Chart Wizard feature leads you through a step-by-step process to create a chart.

When you use the **<F11>** key to create a chart, Excel applies the default chart format the new chart. The default chart format is a column chart with a legend displayed and some formatting applied.

To create a chart using the **<F11>** function key, the following process applies:

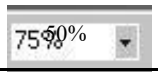
1. Create or Open the file containing the data that is to be plotted
2. Select the range containing the data that is to be included in the chart
3. Press <F11>.

SELF-ASSESSMENT EXERCISE

Creating a Chart Using the <F11> Function Key

Before you begin: Please ensure that Microsoft Windows and Office 2000 have been installed on the hard disk and the computer is on.

Objective: To create a column chart to represent the quarterly sales data entered in the worksheet.

What you do	Comments/Prompts
1. Starts Excel 2000	Excel 2000 is launched
2. If necessary, close the Office Assistant	(Right-click on the Office Assistant, and choose Hide from the shortcut menu.)
3. Choose: **File, Open…**	The Open dialog box is displayed
4. In the Look in: drop-down list box, select drive **A:**	
5. Open: **Charts**	This file contains quarterly sales data for Books and Beyond, Inc.
6. Select the range: **A5:E9**	You will chart the quarterly sales data for each location.
7. Press: **<F11>**	To create the chart.
8. If necessary, choose **Selection** in the **Zoom** drop down list box in order to view the whole graph.	This box is located on the standard toolbar. 
9. Examine the sheet tabs	A new sheet named Chart1 has been inserted before the Chart Data worksheet. This sheet contains only the chart.
10. Examine the Chart toolbar	By default, the Chart toolbar is displayed when a chart is active.
11. If the toolbar is currently displayed over the graph, move or dock the Chart toolbar.	To view the entire chart.

3.1.2 Examining the Results and Learning about Chart Terminology

Figure 3.1 below shows the spreadsheet data from which the graph in Figure 3.2 below has been plotted.

When you create a chart, values from worksheet cells – or data points – create data markers that can be displayed as bars, column, lines, pie slices, or other shapes. A data marker is a chart symbol that represents a single data point.

All of the data points in a column or row on the worksheet combine on the chart to create a data series, which is displayed on the chart as a group of data markers distinguished by the same colour or pattern. For example, all of the entries in the Australia row of the worksheet correspond with the Australia data series of the chart.

	A	B	C	D	E	F
1	**Location**					**Total**
2	Australia	R1 500	R1 500	R3 000	R4 000	R10 000
3	Germany	R 1 500	R1 800	R2 600	R4 900	R10 800
4	Canada	R1 100	R1 800	R1 800	R3 900	R8 600
5	Great Britain	R 700	R1 300	R1 600	R3 400	R7 000
6	Quarter Total	R4 800	R6 400	R9 000	R16 200	R36 400
7						

Figure 1: Spreadsheet data used to plot the graph in Figure 1

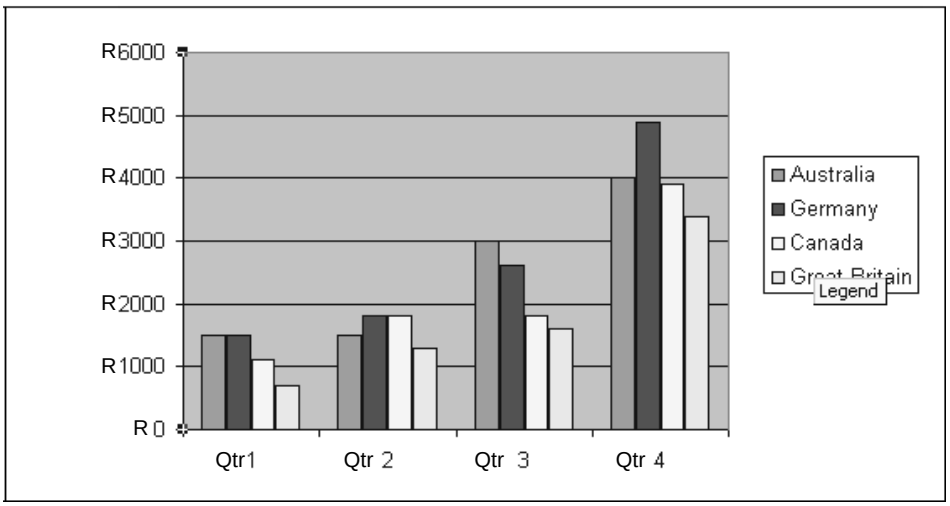


Figure 2: Result of graph based on selected data in Figure 2

A sample of each series' marker colour and pattern is displayed in the legend along with the series name (taken from the column or row of labels in the selected range). The legend enables you to identify the

series on the chart so that you can easily compare the chart with the worksheet data.

The *value axis* is typically the vertical axis on the chart. It is also known as the *y-axis.* Values for data points are plotted against this axis. The *category axis* is typically the horizontal axis on a chart. It is also known as the *x-axis.*

Category labels are plotted along the *x-axis,* and data markers for all series are grouped into these categories. *Gridlines* are lines that are drawn in the plot area, typically for the values axis, so that data marker can easily be compared with an axis value.

SELF-ASSESSMENT EXERCISE

Applying Chart Terminology

Objective: To assign the correct label to each element of the chart shown in Figure 3

What you do	Comments/Prompts
1. Use the terms listed in the Data marker ***Comments/Prompts*** column on Data series the right to label the chart shown in Figure 5.3	Legend Value (Y) axis Category (X) axis Category label Gridline

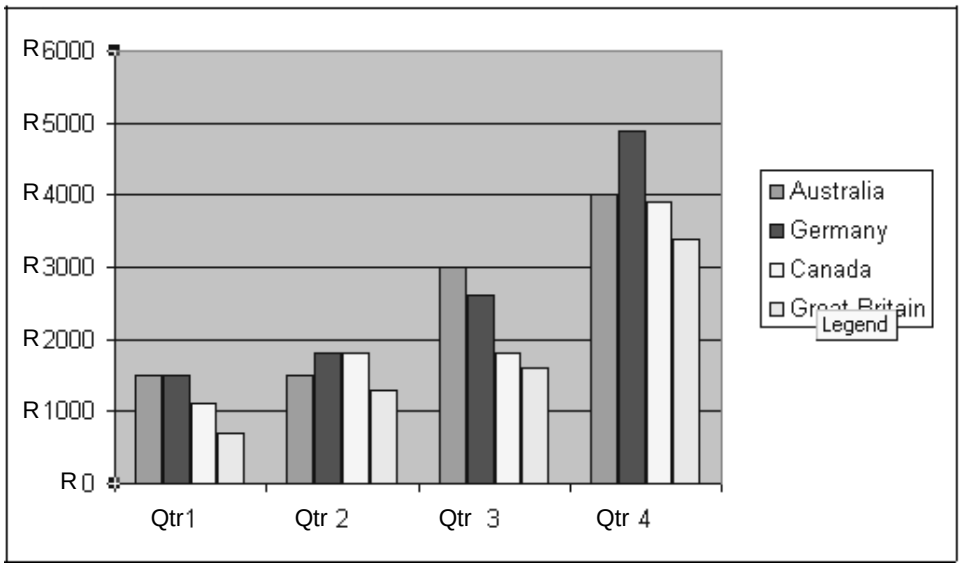


Figure 3: Result of graph based on selected data in Figure 3

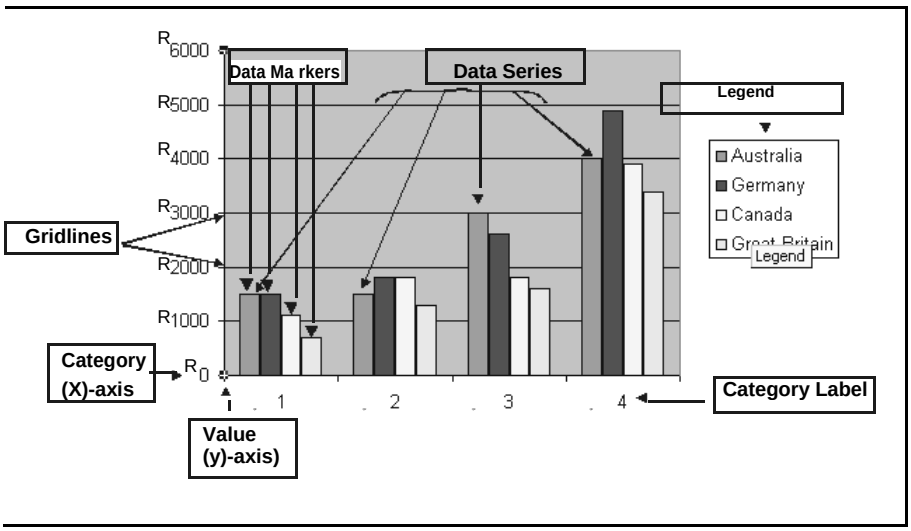


Figure 4: Chart Terminology

4.0 CONCLUSION

Chart sheets enable you to print a chart that is separate from data.

5.0 SUMMARY

Here you learned how to create a chart and chart terminology.

6.0 TUTOR-MARKED ASSIGNMENT

In this exercise you will make use of the spreadsheets that you created previously to generate charts and include a column chart.

Open the file Spreadsheet 1. Using the range A4: D9, please plot a column chart *without* making use of the *Chart Wizard.*

If you have a printer, please print the Chart.

7.0 REFERENCE/FURTHER READING

French, C.S. (2000). *Computer Science* (5th ed.) Gosport, Hants; Ashford Colour Press.

UNIT 2.5 CHARTS FROM NON-ADJACENT DATA, EMBEDDED CHARTS AND CHART LINKS

CONTENTS

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2.0 Objectives
3.0 Main Content
  3.1 Charting Non-adjacent Worksheet Data
  3.2 Embedded Charts
    3.2.1 Creating an Embedded Chart
  3.3 Moving an Embedded Chart
  3.4 Sizing an Embedded Chart
  3.5 Deleting Chart Items
  3.6 Chart Links
4.0 Conclusion
5.0 Summary
6.0 Tutor-Marked Assignment
7.0 References/Further Reading

1.0 INTRODUCTION

Here you will learn how to create a chart from non-adjacent data on the worksheet. You will also learn how to use the Chart Wizard.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- chart non-adjacent worksheet data
- use Chart Wizard
- create a pie chart
- move an embedded chart
- delete chart items
- examine links between Worksheets data and charts.

3.0 MAIN CONTENT

3.1 Charting Non-adjacent Worksheet Data

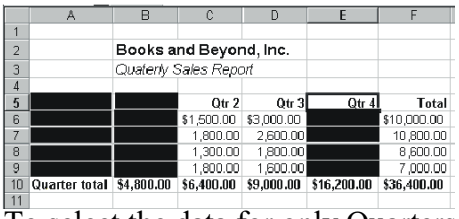
You can create a chart from non-adjacent data on the worksheet. To do so, select the first range of data, and then press the **<Ctrl>** key while you select the second range of data. Press **<F11>** to create the chart from the selected ranges.

Note: The non-adjacent selections must be valid ranges. In some cases, cells might contain text for series and category names, To chart the data correctly, select a blank cell in the upper-left corner of the range.

SELF-ASSESSMENT EXERCISE

Charting Non-adjacent Worksheet Data

Objective: To create a column chart to represent non-adjacent worksheet data.

What you do	Comments/Prompts
1. Select the **Chart data** sheet tab (at the bottom of the screen)	To display the sheet containing the sales report. The range A5: E9 is selected.
2. Select the range: **A5: B9**	
3. While pressing**<Ctrl>**, select the range **E5: E9**	 To select the data for only Quarters 1 and 4
4. Press <F11>	To add a second chart sheet after the first, and to create a column chart representing only the Qtr 1 and Qtr 4 sales data.

3.2 Embedded Charts

The *Chart Wizard* feature leads you through a step-by-step process to create a chart and displays sample views as you build it.

3.2.1 Creating an Embedded Chart

When you use the *Chart Wizard* feature, Excel draws the chart according to the selections you make in the *Chart Wizard* dialog boxes and embeds the chart as an object on the worksheet. Embedding a chart enables you to work with it directly on the worksheet.

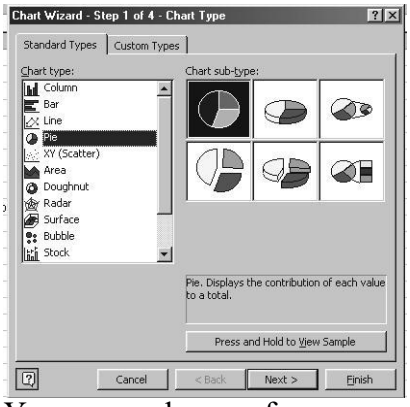
To create a chart using the *Chart Wizard* the following steps apply:

1. Create or open the relevant spreadsheets
2. Select the range containing the data to be plotted
3. Click on the *Chart Wizard* tool located on the Standard toolbar
4. Follows the four steps as prompted by **Chart Wizard.**

SELF-ASSESSMENT EXERCISE

Creating a Pie Chart; Reviewing the Chart Wizard Dialog Boxes

Objective: To create a chart on the same sheet as the worksheet data.

What you do	Comments/Prompts
1. Select the **Chart Data** sheet	
2. Selects the range: **A5:A9**	(The country names and the column label)
3. Whilepressing**<Ctrl>**, select the range F5: F9	(The totals and the column label.)
4. Click on the **Chart Wizard** button	On the Standard toolbar, If necessary, use the More Buttons button to find it. The first of the four Chart Wizard dialog boxes is displayed. You can click on Cancel or get Help from any Chart Wizard dialog box.
5. If necessary, close the **Office Assistant**	By clicking on No, Don't Provide Help Now.
6. In the **Chart Type** list box, select **Pie**	
7. Observe the **Chart Sub-Type** options	 You can choose from several different types of pie charts
8. Press and hold the mouse button on **Press and Hold to View Sample**	To view the chart
9. Release the mouse button	

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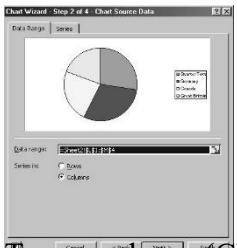
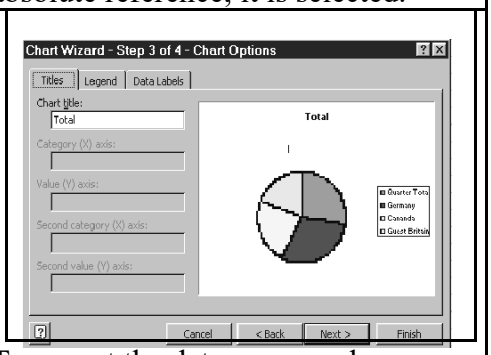
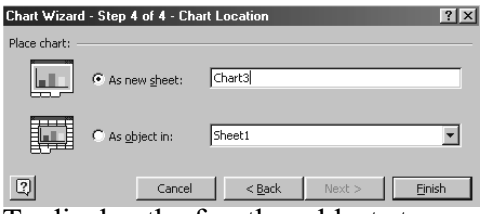
10. Click on **Next>**	 To second step (Chart Source Data) is displayed. The range that you selected before you clicked on the Chart Wizard button is entered in the Data Range text box as an absolute reference; it is selected.
11. Click on **Next**	 To accept the data range and move to the next step (Chart Options), which contains options for the titles, legends, and data labels.
12. Select the **Data Labels tab**	
13. Under data labels, select Show **label** and **percent**	To display the data label and percent value for each section of the pie.
14. Click on **Next>**	 To display the fourth and last step (Chart Location).
15. Click on **Finish**	To accept the default to place the chart as an object in the Chart Data worksheet. You can now move and size the chart.

3.3 Moving an Embedded Chart

Because an embedded chart is an object on the worksheet, you can move it around the worksheet by dragging. To move an embedded chart, select the chart and drag it to another location on the worksheet. As you drag, an outline of the chart area is displayed, so that you can fit and align the chart where you want in on the worksheet.

SELF-ASSESSMENT EXERCISE

Moving an Embedded Chart

What you do	Comments/Prompts
1. Observe the pie chart on the worksheet	Selection handles are displayed. The chart covers some of the worksheet data.
2. Move the mouse pointer over various items of the pie chart	Excel displays the name and value of each item in Screen Tip.
3. Point to a blank area of the chart	To display the Chart Area Screen Tip.
4. Drag the chart to cell **A12**	(So that its upper-left corner is in cell A 12.) The chart is now displayed below the data.
5. Click on cell **G12** to deselect the chart.	
6. Press the down arrow key until you can see the whole chart.	

3.4 Sizing an Embedded Chart

You can size an embedded chart by using the selection handles that are displayed around it when it is selected. When you place the mouse pointer on one of the selection handles the pointer changes to a two-headed arrow. You can then drag in the direction of either arrow to enlarge or reduce the size of the chart. When you size an embedded chart, its dimensions remains proportional.

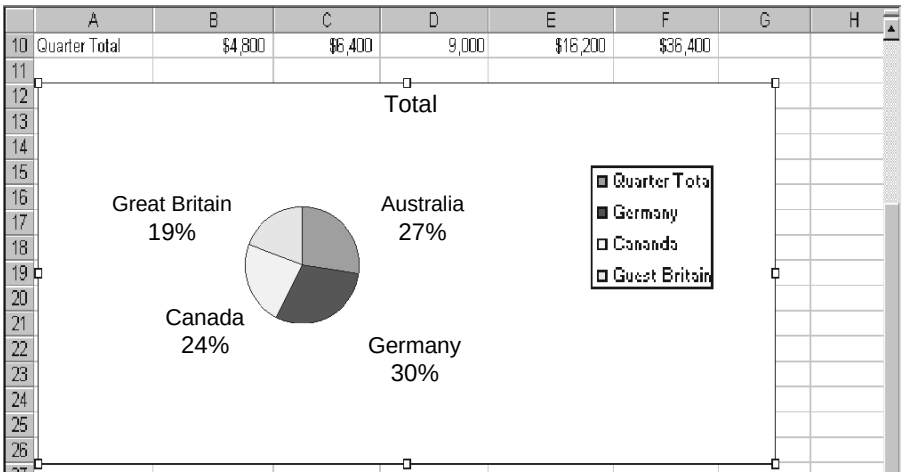


Figure 1: The resized embedded chart.

3.5 Deleting Chart Items

You can delete any chart item that can be selected by selecting it and pressing **<Delete>**. If you should change your mind after you have deleted a chart item, you can immediately click on the **Undo** button to reverse your action.

SELF-ASSESSMENT EXERCISE

Sizing an Embedded Chart; Deleting the Legend

What you do	Comments/Prompts
1. Click on the chart to select it. Place the mouse pointer on the selection handle in the lower-right corner of the chart.	The mouse pointer changes to a two-headed arrow.
2. Press the mouse button down and Drag the selection handle to cell **G26** – release the mouse button.	To enlarge the embedded chart.
3. Click once on the chart legend	To select it
4. Press **<Delete>**	To delete the legend. In this case because the chart and its labels are self-explanatory, the legend is superfluous.
5. Save the file as: **My Charts**	(Choose **File, Save As**)

3.6 Chart Links

When you create a chart worksheet data, Excel creates an active link between the worksheet values and the chart data points. When you change a worksheet value, the chart data point updates. The link to worksheet data is the same whether a chart is embedded or is stored on a chart sheet.

SELF-ASSESSMENT EXERCISE

Examining the Link between Worksheet Data and Charts

What you do	Comments/Prompts
1. Select cell **D6** Observe its current values	(R3,000)
2. Change the value to 20000	
3. Observe the change in the **Australia** section of the pie chart	It increased from 27 percent to 51 percent. The embedded chart data markers are linked to the worksheet data.
4. Select the Chart 1 sheet	
5. Observe the change in the **Qtr 3 Australia** section of thechart	The chart sheets are also linked to the worksheet data from which they were created.
6. Select the **Chart Data** sheet	
7. Click on the **Undo** button	 The Australia section returns to 27 percent.
8. **Save** the file	The embedded chart is part of the worksheet. The worksheet and chart sheets are saved as part of the workbook file.
9. **Close** the file	

4.0 CONCLUSION

Excel draws the chart according to the selections that is made in the Chart Wizard dialog boxes.

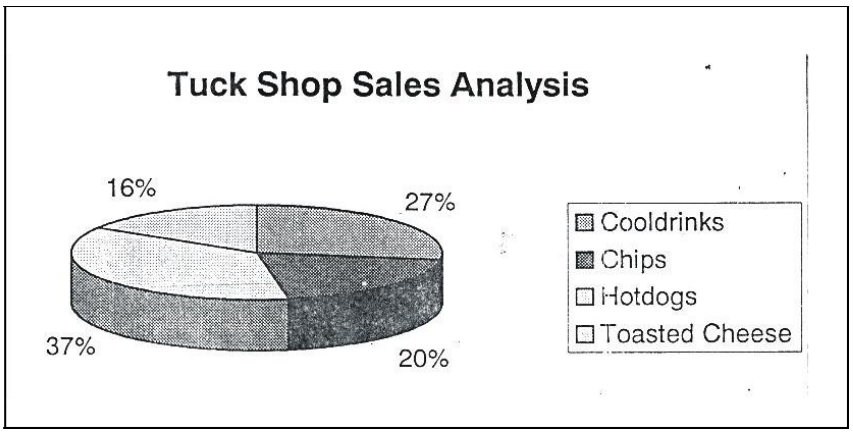
5.0 SUMMARY

Excel could be used to draw charts and Excel creates an active link between the worksheet values and the chart data points.

6.0 TUTOR-MARKED ASSIGNMENT

A pie graph will illustrate the percentage contribution of each food item available in the school tuck shop. You will use the data in Spreadsheet to plot an embedded pie chart.

Open the file Spreadsheet 2. Employing the *Chart Wizard* plot an embedded 3-D Pie chart using the range A4: B7. The end result should be similar to the chart below and should appear in range A10: F23.



7.0 REFERENCE/FURTHER READING

French, C.S. (2000). *Computer Science* (5th ed.). Gosport, Hants: Asford Colour Press.

UNIT2.5 CHART TYPES

CONTENTS

1.0 Introduction
2.0 Objectives
3.0 Main Content
  3.1 Chart Types
    3.1.1 Changing Chart Types
  3.2 Formatting the Chart
    3.2.1 Accessing Format Dialog Boxes
    3.2.2 Formatting the Plot Area
    3.2.3 Formatting Data Markers
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    3.3.1 Print Preview
    3.3.2 Printing a Chart
4.0 Conclusion
5.0 Summary
6.0 Tutor-Marked Assignment
7.0 References/Further Reading

1.0 INTRODUCTION

Excel provides many different chart types to choose from. A chart selection is based on the type of data that you putting in a chart.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- change the chart type
- add a border to the chart title
- format the plot area
- format the data markers
- print the formatted chart.

3.0 MAIN CONTENT

3.1 Chart Types

Excel provides many different chart types to choose from. The type of chart you use depends on the type of data you are charting.

3.1.1 Changing Chart Types

You can change the chart types by clicking on the downward-pointing arrow next to the Chart Type button on the Chart toolbar.

Chart type button

A drop-down menu including buttons for 18 different chart types is displayed. Click on the button that corresponds to the chart type of your choice.

SELF-ASSESSMENT EXERCISE

Changing the Chart Type

What you do	Comments/Prompts
1. Open: Modified Charts.xls	(Located on the disk in drive A:)
2. Select the **Chart – All Qtrs** sheet	
3. Point to the Chart Type button	(On the Chart toolbar.)
4. Click on the drop-down arrow next to the Chart Types button.	To display a menu of chart types
5. Click on the **Bar Chart** button	
6. Observe the chart	The chart has changed from the default column chart to a bar chart.
7. Observe the Chart Type button	It displays the chart type that was last selected.
8. Click on the Chart Type drop-down arrow.	(Next to the Chart Type button.)
9. Click on the 3-D Column Chart button	
10. Observe the chart	The chart has changed from the bar chart to a 3-D column chart. Depending on the size of your monitor, some of the data markers, might not be visible
11.Close the file without saving	

3.2 Formatting the Chart

To make you charts more attractive, you can add formatting to chart items. It is possible to add border around the titles, the legend, and the text boxes. In addition to this, the colour, thickness, and style of the border, as well as the colour of the area within the border can be changed.

3.2.1 Accessing Format Dialog Boxes

Each item on a chart has its own unique formatting dialog box, which contains options specific to that particular item. The easiest method available for accessing the format dialog boxes is simply to double-click on the item.

In Exercise 19, you will be required to add a border to the Chart Title. The Format Chart Title dialog box consists of three page tabs, **Patterns**, **Font**, **Alignment** as shown in *Figure* 1 below.

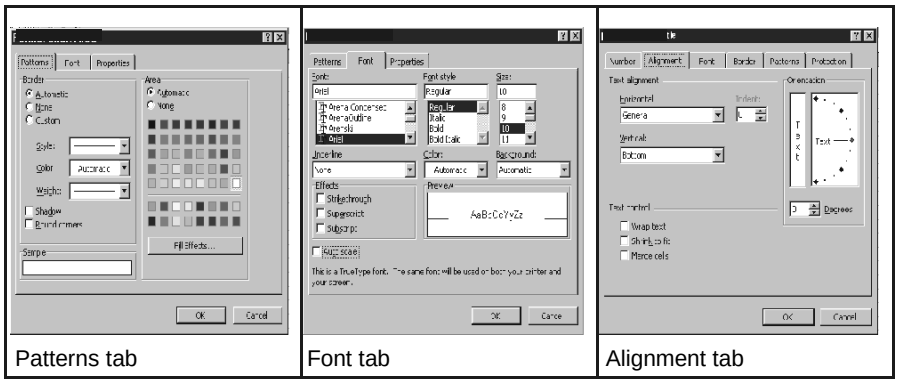


Figure 1: Format Chart Title tabs

SELF-ASSESSMENT EXERCISE

Adding a Border around the Chart Title

What you do	Comments/Prompts
1. Open: **Format. xls**	Remember that you are working on the data disk in drive A:
2. Select the **Chart-All Qtrs** sheet	
3. Right-click on the chart title	(Book and Beyond, Inc.) To select it and display the shortcut menu.
4. Choose: **Format Chart Title…**	To display the Format Chart Title dialog box.

5. Verify that the **Patterns** tab is selected.	
6. Under **Border, select** Custom	
7. From the **style**: drop-down list, Select a style of your choice	The Sample box displays the new border style.
8. From the **Color:** drop-down list, Select a color of your choice	The sample box displays the new border colour.
9. From the **Weight**: drop-down list, Select a weight of your choice	The Sample box displays the new line width.
10. Click on **OK**	
11. Press: **<ESC>**	To deselect the chart title and view the chart.

3.2.2 Formatting the Plot Area

The plot area is the gray background behind the chart. For printing or presentation purposes, you might need to format the plot area to make it easier to view the information it contains. The Format Plot Area dialog box contains a single tab, namely the Pattern tab, only.

To format the plot area:

1. Double-click on the area to display the Format Plot Area dialog box
2. Select a border style, a colour and weight, and area colour, pattern, and border.

SELF-ASSESSMENT EXERCISE

Formatting the Plot Area

Objective: To change the gray background of the plot area to white.

What you do	Comments/Prompts
1. Double-click on the gray chart background.	The Format Plot Area dialog box is displayed
2. Under **Border,** from the **Color** drop-down list, select black.	
3. Under **Area,** from the colour palette, select white	
4. Click on OK	The chart background is white

3.2.3 Formatting Data Markers

To enhance the appearance of a chart, you apply different colours and patterns to the data markers for each series. You might find it useful to format data markers with patterns when you are printing to non-colour printers or when you are printing charts that you plan to use as overheads.

To change the format of a data series:

1. Double-click on one of the markers for the series to display the Format Data Series dialog box
2. Select the appropriate options
3. Click OK

SELF-ASSESSMENT EXERCISE

Formatting the Data Markers

What you do	Comments/Prompts
1. Double-click on any one of the Australia data marker	The Format Data series dialog box is displayed. The patterns tab is selected.
2. Under **Border**, from the Color drop-down list, select a border colour	
3. From the **Weight** drop-down list, select the thickest line	
4. Under **Area**, click on Fill Effects....	The Fill Effect dialog box is displayed
5. Select the Pattern tab	
6. Under **Pattern**, select the pattern of your choice	
7. Select foreground and background colours	Assign the same colour as the border colour to one, and assign a contrasting colour to the other.
8. Click on **OK**	To accept the Fill Effects options. The pattern is displayed in the Sample box.
9. Click on **OK**	

3.3 Previewing and Printing Charts

3.3.1 Print Preview

The Print Preview command enables you to view your printouts on screen before you print them. By using this tool, you can adjust the print settings before you send your print job to printer. To activate the Print Preview command you may

1. Select **File, Print Preview**
2. Click on the Print Preview tool on the Standard toolbar.

3.3.2 Printing a Chart

It is possible to print a chart sheet, an embedded chart separately or the embedded chart as part of the worksheet.

To print a chart sheet:

1. Select the chart sheet
2. Select **File, Print…**
3. Click on **OK**

To print an embedded chart as part of the worksheet:

1. Verify that the embedded chart is not selected
2. Select **File, Print…**
3. Click on **OK**

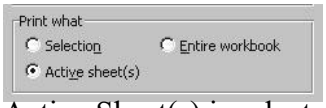
To print an embedded chart by itself:

1. Select the embedded chart
2. Select **File, Print….**
3. Click on **O**

SELF-ASSESSMENT EXERCISE

Previewing and Printing the Formatted Chart

What you do	Comments/Prompts
1. Click on the Print Preview button	
2. Place the mouse pointer over any portion of the previewed chart	The mouse pointer changes to a magnifying glass.
3. Click on any portion of the	That portion of the chart is

chart	magnified.
4. Click on the Chart	To restore the preview to its previous size
5. Click on the **Close** button on the preview toolbar to close Print Preview.	
6. Choose: **File, Print**…	The Print dialog box is displayed.
7. Under **Print what**, observe the options.	 Active Sheet(s) is selected **NB:** If you do not wish to print at this time, please select cancel and omit step 8 below
8. Click on **Ok**	The Chart is printed
9. Save the file	
10. Exit from Excel	

4.0 CONCLUSION

A legend is used to identify each series in a chart. It contains a sample of the marker colour and pattern of each series.

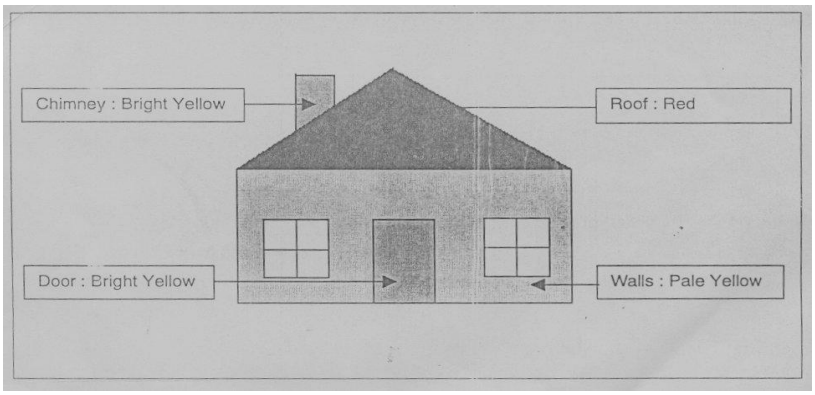
5.0 SUMMARY

The plot area is the gray background behind the chart. The Format plot Area contains a single tab i.e. the patterns tab.

6.0 TUTOR-MARKED ASSIGNMENT

Using the Microsoft Paint program (located on the Accessories sub menu), please create the following picture taking care to comply with the specifications, listed below the picture.

NB: You are not required to include the text boxes or arrows. These have been included to assist you when interpreting the specifications.



Drawing

- Use the rectangle tool to draw the walls (1)
- Use the line tool to draw the roof (1)
- Use the line tool to draw the chimney (1)
- Use the rectangle tool to draw the door (1)
- Use the rectangle tool to draw the outline of the windows (2)
- Use the line tool to draw the "cross bars" in each window (2)

7.0 REFERENCE/FURTHER READING

French, C.S. (2000). *Computer Science* (8th ed.). Gosport, Hants:

UNIT 3 POWERPOINT AND PRESENTATIONS

CONTENTS

1.0 Introduction
2.0 Objective
3.0 Main Content
3.1 Starting PowerPoint and Opening a Presentation
3.1.1 Starting PowerPoint
3.1.2 Opening a Presentation
3.2 Running a Slide Show
4.0 Conclusion
5.0 Summary
6.0 Tutor-Marked Assignment
7.0 References/Further Reading

1.0 INTRODUCTION

In this unit you will learn what a PowerPoint is and what presentations are.

2.0 OBJECTIVE

At the end of this unit, you should be able to:

- open an existing PowerPoint presentation and view a slide show.

3.0 MAIN CONTENT

3.1 Starting PowerPoint and Opening a Presentation

PowerPoint is an application program used to create presentations. Presentations are delivered to an audience using different media such as slides, overhead transparencies, and automated shows viewed on a computer or broadcast over the Web. You create a presentation file,

which combines various objects such as text, graphs, organization charts, clip art, WordArt and templates.

3.1.1 Starting PowerPoint

To use PowerPoint, you must load the program from the hard disk into the computer's memory. You can store your data files (presentations) in a folder on the hard drive, or on a floppy disk. In order to use PowerPoint, you need to have Microsoft Windows 95, 98, Millennium Edition or NT 4.0 installed on your computer.

To start PowerPoint using the **Start** menu:

1. Turn on your computer.
2. In taskbar, click on **Start**.
3. Select **Programs** from the list of menu choices.
4. In the **Programs** sub-menu click on **Microsoft PowerPoint** to start the program.

3.1.2 Opening a Presentation

After you start PowerPoint, a dialog box is displayed that enables you to create a new presentation or open an existing presentation. To open an existing presentation:

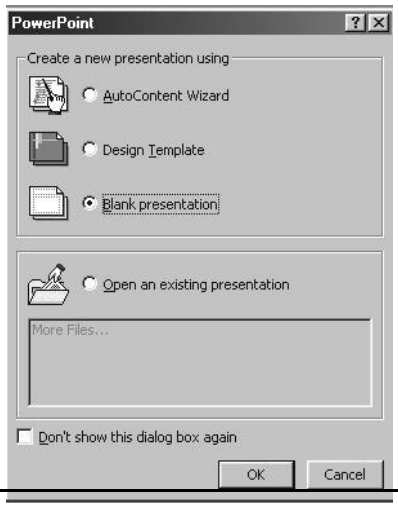
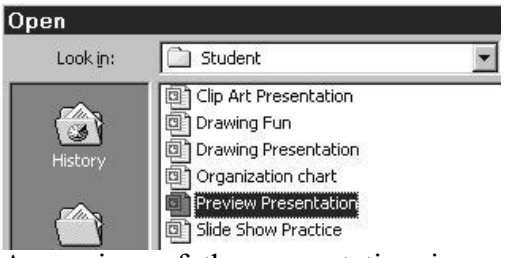
1. Select **Open an existing presentation**
2. Click on **OK**
3. In the Open dialog box that is now displayed, select the folder and filename of the presentation that you want to open.
4. Click on **Open** to open the presentation file.

SELF-ASSESSMENT EXERCISE

Starting PowerPoint and Opening a Presentation

Before you begin: Please ensure that your computer is switched on.

What you do	Comments/Prompts
1. Click on the Start button on the Taskbar	The Start menu is displayed
2. Click on Programs on the Start menu	TheProgramssub-menuis displayed

3. In the Sub-menu click on Microsoft PowerPoint	Microsoft PowerPoint is launched. This is the PowerPoint window. The PowerPoint program automatically displays the Startup dialog box for either creating a new presentation or opening an existing presentation. In addition to the PowerPoint window, the Office Assistant may be displayed. 
4. Click on the Open an existing presentation radio button	
5. Click on OK	To display the Open dialog box
6. Observe the Look In: list box at the top of the dialog box. Expand the list box and click on $3^1/_2$ Floppy (A:)	If you are unable to see a list of file names including Preview Presentation.ppt please call your training advisor for assistance.
7. In the file list box, select Preview Presentation.ppt	 A preview of the presentation is displayed to the right of the file name list box.
8. Click on Open	To open the presentation. The first slide is displayed.

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3.2 Running a Slide Show

You can display a presentation on your computer screen by running a slide show.

To run a slide show, press **<F5>**

Only one slide is displayed at a time. You can advance the slides manually, or you can have PowerPoint advance the slides automatically. To advance slides manually, click the left mouse button to move forward one slide.

To move backward one slide, click the right mouse button and choose Previous from the shortcut menu.

You can also use the **<Page Up>** and **<Page Down>** keys and the **<Up Arrow>** and **<Down Arrow>** keys to navigate through a slide show.
To end a slide show, press **<Esc>**

SELF-ASSESSMENT EXERCISE

Running a Slide Show

Objective: To preview a completed presentation.

Before you begin: Ensure that **Preview Presentation.ppt** is open and the first slide is displayed.

What you do	Comments/Prompts
1. In the menu bar located at the top of the presentation window, click on Slide Show and then on View Show.	To start the slide show.
2. Observe the first slide	The title slide of the presentation fills the screen.
3. Click the left mouse button	To advance to the next slide in the presentation. The bullet slide "Why A Relocation Team?" is displayed.
4. Click the left mouse button	The third slide contains additional bullet text.
5. Click the left mouse button	The fourth slide contains drawing objects.
6. Advance to the next slide	(Click the left mouse button). The fifth slide contains clip art.
7. Advance to the next slide	The seventh slide contains Word Art

8. Advance to the next slide	***The seventh slide contains an organization chart.***
9. Advance to the next slide	***The eight slide contains a bar chart.***
10. Press: <Page Up>	***To return to the previous slide.***
11. Press <Page Down>	***To return to the next slide. You can use the <Up Arrow> and <Down Arrow> keys to navigate through the slide show presentation.***
12. Observe that the current slide is slide number eight	***(The bar chart.) This is the last slide in the presentation.***
13. Click the left mouse button	***The slide show ends. A black screen containing the text "End of slide show, click to exit" may be displayed. If so, please proceed to step 14, else do not.***
14. Click the left mouse button	***To display the first slide in Normal view.***

4.0 CONCLUSION

PowerPoint is an application program used to create presentations.

5.0 SUMMARY

Here you learned how to start PowerPoint and open a presentation. Also you can now run a slide show.

6.0 TUTOR-MARKED ASSIGNMENT

Using Microsoft PowerPoint, create a presentation consisting of a minimum of four slides to be used in a subject that you teach. The following specifications need to be adhered to:

1. Each slide must be appropriated not only to the subject matter portrayed but must be suitable for the age group to whom it will be presented.
2. Assign a Design Template to the Presentation
3. Include a Title slide and at least one bullet list
4. At least one AutoShape and one clip art picture must appear in the presentation
5. Use WordArt on at least one slide.

Save the presentation as **Presentation 1**. Run the slide show. Close the presentation.

7.0 REFERENCE/FURTHER READING

Ayo, S. K. (1988). *Computer Literacy, Operating System and Application* (2nd ed.) McKay Consult.

UNIT 3.2 POWERPOINT PRESENTATION SCREEN

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2.0 Objectives
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1.0 INTRODUCTION

In this unit, you will learn how to use the PowerPoint window.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- move between slides in a presentation
- change views
- close a presentation
- exit from a PowerPoint.

3.0 MAIN CONTENT

3.1 Orientation to the PowerPoint Presentation Screen

The PowerPoint window has many of the more common elements that you have been introduced to in both Excel as well as Word. We will focus on the elements that are unique to PowerPoint.

3.1.1 The PowerPoint Window

View buttons are located above the Drawing toolbar and on the left side of the window. Clicking on one of these buttons displays one of five views: Normal view, Outline view, Slide view, Slide Sorter view, and

Slide show. The PowerPoint window in Normal view is divided into three panes: the Slide pane, Outline pane, and Notes pane. These panes will change depending on which view you are using.

As you know by now, windows are made up of certain elements. The elements that make up a PowerPoint window are labelled in **Figure 2.1** that appears below. This figure shows PowerPoint displaying slide 1 of the presentation **"Preview Presentation.ppt"** . **TABLE 1**, analyses each individual component. You should be familiar with some of the elements.

Further Practice Exercise

1.	Use F*igure 2.1* below in conjunction with Table 1 to identify the different parts and functions of the PowerPoint windows.

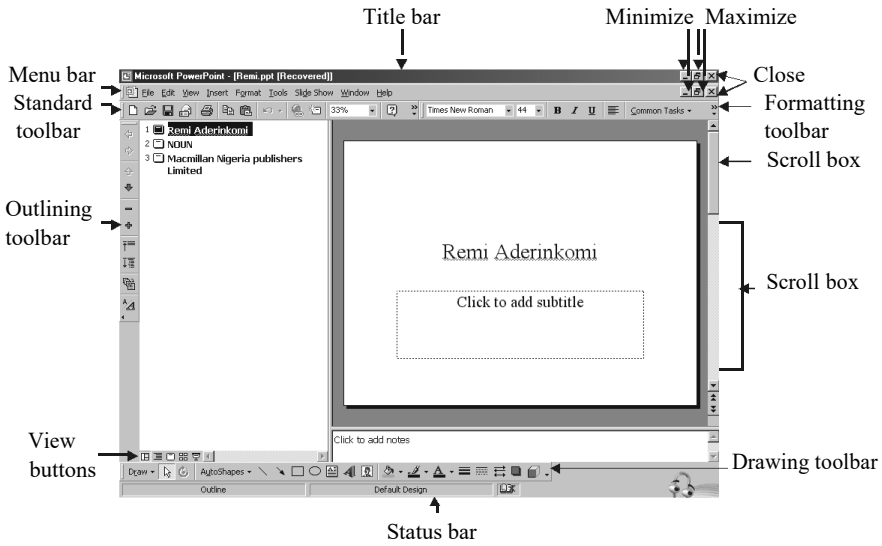

Figure 1: The PowerPoint window displaying Slide 1 of preview Presentation.ppt

Table 1: Elements of the PowerPoint window

Term	Definition
Title bar	Located across the top of the window, it displays the name of the application, and the name of the active presentation file.
Menu bar	Located below the title bar, it lists the PowerPoint menus.

Standard and Formatting Toolbars	Located below the menu bar, they provide quick access to some of the most frequently used commands in PowerPoint.
Drawing toolbar	Located just above the Status bar contains buttons which allow quick access to the commands most frequently used when drawing.
Outlining Toolbar	Located on the left of the screen. Used to access outlining features quickly. **Note:** Please do not be concerned if your screen does not currently display this toolbar. Later in this course you will learn how to switch toolbars on and off.
Scroll bar	Located along the right side of the window, it is used to view different slides in the active presentation.
Status bar	Located across the bottom of the window, it displays information about the active presentation, such as the current slide number and the name of the design template applied to the slide.
View buttons	Located above the status bar, they are used to switch views.

3.1.2 Moving between Slides

You use the vertical scroll bar to move among the slides in a presentation. Drag the scroll box up or down to move to a particular slide. As you drag, the slide-indicator box shows the slide number and slide title. Release the mouse button when the slide-indicator box displays the correct slide number. At the bottom of the scroll bar are the Previous Slide button and the Next Slide button. You can also click on these buttons to move through the presentation one slide at a time.

SELF-ASSESSMENT EXERCISE

Moving between Slides in a Presentation

Before you begin: Ensure that **Preview Presentation.ppt** is open.

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What you do	Comments/Prompts
1. Observe the status bar	Slide 1 of 8 (the current slide) is displayed.
2. Click once on the **Next Slide** button	To move to the next slide.
3. Click once on the **Previous Slide** button	To return to Slide 1.
4. Point to the scroll box on the scroll bar and press and hold the mouse button Drag the scroll box down until the slide-indicator box reads slide: 3 of 8 Release the mouse button	Slide: 1 of 8 Burke Properties Introduces To display the slide-indicator box. Slide: 3 of 8 Client Expectations To display slide 3.
5. Drag the scroll box up to return to Slide 1	

3.1.3 Slide Views

PowerPoint provides five working environments: Normal View, Outline view, Slide sorter view, Slide view, and Slide show. You can change views by using the **View** menu or by clicking on the appropriate View button.

- **In Normal view,** you are presented with the presentation outline, current slide, and current slide notes.
- **In Outline view,** you can create and organize information in a slide as well as in the entire presentation. You can work with slide titles and main text. In Outline view, the Outlining toolbar is displayed; it contains options that are different from those available in Slide view.
- **In Slide view;** you can work with only one slide at a time. You can add title and body text, graphs, organization charts, clip art, and WordArt. You can also draw shapes. You have access to all of the toolbars and the commands on the menu bar.
- **In Slide sorter view;** you can view thumbnails of all of the slides in your presentation. In addition, you can arrange the order of the slides.
- **In Slide show,** you can see your presentation displayed on the full screen of your computer monitor. Any transitions, builds, and timings are visible during the show.

SELF-ASSESSMENT EXERCISE

Changing Views

Objective: To observe the various ways that you can view a presentation

Before you begin: Ensure that **Preview Presentation.ppt** is open and that Slide 1 is displayed.

What you do	Comments/Prompts
1. Click on the **Outline View** button	To change to Outline view.
2. Observe the slide text Observe the Colour preview pane	Outline view provides you with an overview of all of the text in your presentation. In Outline view you can create, edit, and organize slides. A preview of the selected slide is displayed.
3. Observe the Outlining toolbar	The Outlining toolbar is located to the left of the Outline pane. **Note:** If the Outlining toolbar is not displayed, choose **View, Toolbars, Outlining**.
4. Click on the **Slide View** button	Slide view enables you to work on one slide at a time.
5. Click on the **Slide Sorter View** button	Slide Sorter view provides you with a thumbnail sketch of each slide in your presentation. You can use Slide Sorter view to rearrange slides.
6. Point to (Do not click on) the Slide Show button	Clicking on this button is equivalent to choosing Slide Show, View Show.
7. Click on the **Normal View** button	

3.2 Closing a Presentation and Existing PowerPoint

The methods used for closing a file, or as it is known in PowerPoint, a presentation, and existing PowerPoint are similar to those applicable to both Word and Excel.

3.2.1 Closing a Presentation

Each file that you open remains open until you close it. Because having several files open reduces available memory, it is suggested that you

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close presentation files when you have finished working with them. To close a PowerPoint presentation, choose **File, Close**.

3.2.2 Exiting PowerPoint

To exit PowerPoint and return to the Windows environment, choose **File, Exit**. As a safeguard, if you have not saved changes in any open presentation, PowerPoint will prompt you to save those changes.

SELF-ASSESSMENT EXERCISE

Closing a Presentation and Exiting from PowerPoint

Before you begin: Ensure that **Preview Presentation.ppt** is open.

What you do	Comments/Prompts
1. Choose **File, Close**	To close the presentation.
2. Observe the window	The PowerPoint application is still active, but no files are open.
3. Choose **File, Exit**	Remember that you may have to wait a few seconds for the full menu to be displayed in order to select the Exit option. The PowerPoint program is closed and the screen returns to the windows desktop.

4.0 CONCLUSION

Excel, Word and PowerPoint window have common elements but some elements are unique to PowerPoint.

5.0 SUMMARY

Here you learned how use PowerPoint window. In particular you learned five working environments of PowerPoint.

6.0 TUTOR-MARKED ASSIGNMENT

Create a different presentation following the guidelines in 1.6.
Save the presentation as **Presentation 2**. Run the slide show. Close the presentation.

7.0 REFERENCES/FURTHER READING

Ayo, S. K. (1988). *Computer Literacy, Operating System and Application* (2nd ed.) McKay Consult.

UNIT 3.3 CREATING NEW PRESENTATIONS

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1.0 INTRODUCTION

In this unit, you will learn how to choose a presentation and slide type. Furthermore you will be able to create a title slide and enter text on a slide.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- choose a presentation and slide type
- create a title slide
- add a bullet slide.

3.0 MAIN CONTENT

3.1 Creating a New Presentation

When you create a presentation in PowerPoint, you can choose from three tabbed categories in the New Presentation dialog box:

1. **General:** For a blank presentation
2. **Design Templates:** For templates that you can apply to a new PowerPoint presentation to define how it will look.
3. **Presentation:** For pre-designed PowerPoint presentations. Twenty-four pre-designed presentations are supplied with the PowerPoint program; each one contains placeholders for the title-object area and the text-object area.

3.1.1 Presentation Design Tips

Before beginning a new PowerPoint presentation, it is a good idea to review the basic guidelines for creating an effective presentation. The design tips listed in Table 2 below, are only recommendations; they may be modified depending on what type of information you are presenting.

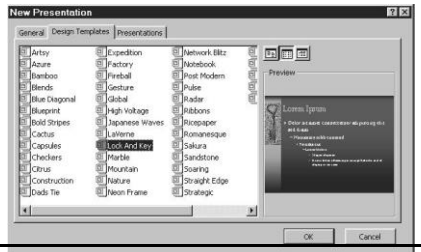
Table 2

Design element	Design guideline
Text	A slide that is in portrait mode (vertical) should be limited to a maximum of: • 8 lines of text • 6 words per line. A slide that is in landscape mode (horizontal) should be limited to a maximum of: • 6 lines of text • 8 words per line
Font size	Titles: 44 points (or larger) Text: 32 points (or larger) Subtext: 28 points (or larger)
Font type	Limit to less than three font types per slide.
Background	For on-screen presentation, use dark, gradated backgrounds with contrasting text. For overhead transparencies, use clear, light backgrounds with contrasting text.
Templates	Use simple templates and limit the number of lines, textures, and other simple effects. Use clip art or graphics to enhance the template.
Text slides	Avoid using more than three in a row. Use tables or charts when appropriate.
Colour	In excess of 10% of the male population is colour blind. Take this into consideration when selecting, greens, reds and blues.
Case	Avoid typing in uppercase only.

SELF-ASSESSMENT EXERCISE

Choosing a Presentation and Slide Type

What you do	Comments/Prompts
1. Start PowerPoint	
2. Choose: **Open an Existing Presentation** and click on **OK**	

3. Double click on **Preview Presentation.ppt**	Next you will close this file, but not exit PowerPoint
4. Select **File, Close**	
5. Select **File, New…**	To display the New Presentation dialog box.
6. Observe the New Presentation dialog box	You can choose from three tabbed categories: General, Design Templates, and Presentations.
7. If necessary, select the general tab	To display the selections in the General category
8. Select the **Design Templates** tab	To display the selection of design templates.
9. Select **Expedition**	
10. Observe the Preview box	(Located to the right of the design templates list.) It displays the template design and colour scheme.
11. Select the **Presentations** tab	To display a selection of pre-designed presentations.
12. Select the **Business Plan**	The template is displayed in the Preview box.
13. Select the **Design Templates** tab	
14. Select **Lock And Key**	
15. Click on OK	To display the New Slide dialog box.
16. In the New Slide dialog box, verify that the first slide is selected.	
17. Observe the lower-right corner of the dialog box	It displays the description "Title Slide."
18. Scroll through and select other AutoLayouts and observe their descriptions.	Twenty-four AutoLayouts are available.
19. Select the **Title Slide** AutoLayout	
20. Click on **OK**	

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21. Observe the slide	The left side of the slide contains a graphic object as well as two text placeholders

3.1.2 Entering Text on a Slide

To type text in a placeholder, select the placeholder by clicking on it, and then start typing.

SELF-ASSESSMENT EXERCISE

Creating a Title Slide

What you do	Comments/Prompts
1. Click once on the title placeholder to select it.	A selection box appears around the title, placeholder, and an insertion points is displayed.
2. Type: **Burke Properties Introduces**	On the Outline pane, the text wraps onto two lines.
3. Click on the subtitle placeholder	To select it.
4. Type: **Our New Relocation Team**	
5. Click in a blank area of the slide	To deselect the subtitle placeholder.

3.1.3 Adding a New Slide

New Slide Button

To insert a new slide into a presentation,

1. Click on the **New Slide** button on the Standard toolbar.

2. The new slide dialog box will appear.

3. Select the AutoLayout of your choice.

3.1.4 Adding a Bullet Slide

The New Slide dialog box contains an AutoLayout for bullet lists. This layout is divided into two areas: the title placeholder and the bullet-list placeholder.

To add text to the bullet-list placeholder:

1. Click on the bullet-list placeholder. The first bullet is displayed.

2. Type the bullet text for the first bullet and press **<Enter>**. A second bullet is displayed.
3. Continue typing bullet items. Press **<Backspace>** to delete an unwanted bullet.
4. Click away from the bullet-list placeholder to deselect it.

SELF-ASSESSMENT EXERCISE

Adding a Bullet Slide

What you do	**Comments/Prompts**
1. Click on the New Slide button	
2. Observe that the **Bulleted List** AutoLayout is selected	(The logical sequence following a title slide.)
3. Click on **OK**	
4. Observe the slide	The slide has a vertical graphic on the left and includes a title placeholder and bullet-list placeholder.
5. Add the title **Why A Relocation Team**	(Select the title placeholder, and then type the text)
6. Select the bullet-list placeholder	The selection box and the first bullet are displayed.
7. Type: **Market trend**	
8. Press: **<Enter>**	A new line and a second bullet are displayed.
9. Type: **Consumer demand**	
10. Press: **<Enter>**	
11. Type: **Competition**	
12. Press **<Enter>**	
13. Press: **<Backspace>**	To delete the new bullet.

4.0 CONCLUSION

PowerPoint has three tabbed categories in the New Presentation dialog box.

5.0 SUMMARY

Here you learned how to choose a presentation and a slide. You can now enter a text on a slide and add a bullet slide.

6.0 TUTOR-MARKED ASSIGNMENT

1. Create a different presentation following the guidelines in 1.6
2. Save the presentation as **Presentations 3.** Run the slide show. Close the presentation.

7.0 REFERENCES/FURTHER READING

Ayo, S. K. (1988). *Computer Literacy, Operating System and Application* (2nd ed.). McKay Consult.

UNIT 3.4 NAMING PRESENTATION, SAVING PRESENTATION AND FORMATTING SLIDES

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1.0 INTRODUCTION

In this unit, you will learn how to store a presentation for permanent usage.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- save a presentation
- name a presentation
- format slides
- work with drawing tools
- create objects.

3.0 MAIN CONTENT

3.1 Saving a Presentation

Before you save a presentation, it exists only in computer memory, a temporary storage area. For permanents storage, a presentation must be saved to some location, such as a hard drive or a floppy disk.

To save a presentation, you either the **File, Save As**… or the **File, Save** command.

3.1.1 The File, Save as Command

The **File**, **Save As**… command enables you to:

- save a presentation for the first time;
- save a presentation with a new filename;
- save a presentation in a different location (on another disk or in a different folder).

To save a presentation with a new name or in a new destination:

1. Choose **File, Save As**… to display the **Save As** dialog box.
2. In the **Save In** list box, select the appropriate location (disk, drive or folder).
3. In the **File Name** text box, type the name of the file.
4. Click on the **Save** button in the lower right corner of the dialog box.

After the presentation has been saved, its filename will be displayed in the title bar while it is open.

When you save a file, PowerPoint adds the filename extension.PPT to identify the file as a PowerPoint file. You should avoid adding filename extensions yourself.

3.1.2 The File, Save Command

The **File**, **Save** command enables you to:

- re-save a presentation that has been saved previously.

When updating the saved version of a presentation using this command, no dialog boxes are displayed. You cannot rename the file or save it in a different location.
To update the saved version of a presentation:

1. Choose **File, Save** or click on the **Save** button on the Standard toolbar.

3.2 Naming a Presentation

When you save a file for the first time, PowerPoint automatically assigns a filename by using the Title line of the first slide in the

presentation. You can accept this default name or name it something different.

A filename should be descriptive so that you can remember the file's contents. A filename in PowerPoint can contain up to **255** characters, spaces, and other punctuations. A file cannot contain any of the following characters: ^ : ; * ? < > |.

SELF-ASSESSMENT EXERCISE

Saving the Presentation

What you do	Comments/Prompts
1. Choose: **File, Save As…**	To display the Save As dialog box.
2. The default folder is listed in the Save in list box	By default, PowerPoint uses the folder **My Documents.** This may have been reset on your computer. For the purposes of this course, you will be saving all documents to the A: drive.
3. Expand the **Save In** list box by clicking on the down arrow	Even if the default has already been set to the **A:** drive, please complete this step so that you can practice how to do so if necessary.
4. Click on 31/2 Floppy (A)	This setting is reflected in the **Save In** list box. Next you will assign a file name.
5. If necessary, select the text in the **File Name** text box (Hint: Position the mouse pointer to the left of the file name. Press and hold down the mouse button and drag it over the text.)	The text **Interoffice Memo** is highlighted.
6. Type: **My Presentation**	To name the presentation, My Presentation
7. Click on the **Save** button in the lower Right corner of the dialog box	To save the file.
8. Observe the title in the title bar	My Presentation is displayed.

3.3 Formatting Slides

"Formatting" refers to the appearance or text, not the text itself. You can change the appearance of text by changing its attributes, indentation and

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line spacing. In order to change the appearance of existing text, the text has to be selected. Various selecting techniques are available in PowerPoint. The most common way of selecting text is to "click and drag" the mouse over the relevant text.

3.3.1 Attributes

Text attributes include the following:

- Font
- Size
- Style
- Colour

You can use the text-formatting buttons to apply certain text attributes, such as font, font size, bold, italics, underline, shadow, and colour, quickly. The text-editing buttons work like toggle switches: click once to turn an option on, and click again to turn the option off.

3.3.2 The Edit, Undo Command

You can use the **Edit, Undo** command or the **Undo** button to reverse changes that you make in your presentation. For example, if you can accidentally delete text, you restore the text by using the **Undo** command.

The speed key combination of **<Ctrl> + Z** may be used in the place of the menu commands.

SELF-ASSESSMENT EXERCISE

Formatting Text

What you do	Comments/Prompts
1. On Slide 2, click on the title	The title place holder will be selected and the I-beam will be flashing.
2. Double-click on the word **Relocation**	To select just the word.
3. Click on the **Bold** button	**B** To bold the text.
4. Click on the **Italic** button	
5. Double-click on the word **Market**	
6. **Bold** the text	(Click on the Bold button)
7. Press: **<Ctrl> + Z**	The Bold attribute is removed

	(undone). The word "Market" is still selected.
8. Bold the text	(Click on the Bold button)
9. Select: Consumer	(Double-click to select the word)
10. Bold the text	
11. Select: Competition	
12. Bold the text	
13. Save and close the presentation	

3.4 Working with Drawing Tools

PowerPoint enables you to create drawn objects using a set of tools located on the Drawing toolbar. The drawing tools include buttons that enable you to automatically draw circles, rectangles, lines, and other geometric shapes. Drawn objects can be edited like PowerPoint objects. It is possible to duplicate, resize, move, colour, cut, and paste drawn objects. You can also add attributes such as borders, fills, and shadows, to drawn objects. In addition to this, drawn objects can be aligned and rotated. Text may be added to drawn objects.

3.4.1 The Drawing Toolbar

The Drawing toolbar is one of the default toolbars displayed when you start PowerPoint. It contains various tools to draw boxes, lines, and circles, as well as tools to alter those objects.

Two of the buttons that are found on the Drawing toolbar are **Draw** and **AutoShapes**. If you click on the **Draw** button, a pop-up menu is displayed. The commands on this menu enable you to group and ungroup, rotate and flip, and move objects in front of or behind each other, to name but a few. The AutoShapes button is firstly used to select from over 150 shapes and secondly to draw that shape on the PowerPoint slide.

You can move any toolbar by pointing between buttons and dragging or by dragging its title bar.

SELF-ASSESSMENT EXERCISE

The Drawing Toolbar

What you do	Comments/Prompts
1. Open: **Drawing Presentation** and move to Slide 3	
2. Add a new slide	(Click on the New Slide button.)

3. In the New Slide dialog box, double-click on the **Blank** AutoLayout	The Slide is blank, but it still contains the background including the vertical graphic. (Key on the left)

3.5 Creating an Object

To create an object using the drawing toolbar, the following steps apply:

1. From the *Drawing* toolbar, click on the drawing tool that you want to use.
2. Move the mouse pointer to where you want to begin drawing the object. The mouse pointer changes to a crosshair.
3. Drag the crosshair until the object is the desired shape and size.
4. Release the mouse button. The object is completed and is automatically selected.

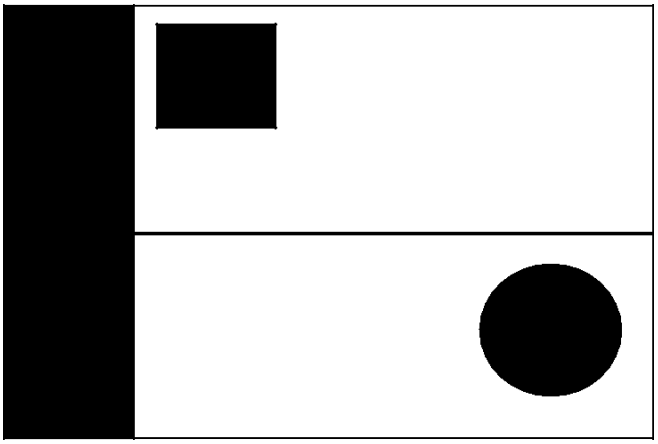


Figure 1: Drawn objects

SELF-ASSESSMENT EXERCISE

Creating Objects

What you do	**Comments/Prompts**
1. From the Drawing toolbar, select the **Rectangle** tool	
2. Place the mouse pointer in the upper-left portion of the blank slide	The mouse pointer changes to a crosshair. You will use the crosshair to draw a rectangle.
3. Using Figure 4.1 as a guide,	As you drag, an outline of the

drag diagonally to create a rectangle displayed. Release the mouse button	rectangle is shown. The rectangle is completed and filled.
4. Select the **Line** tool	 Selecting a tool deselects the object. Clicking anywhere outside of the object also deselects the object.
5. Please the crosshair below the rectangle	The mouse pointer changes to a crosshair whenever a drawing tool is selected.
6. Press: **<Shift>**	To constrain the angle as you draw.
7. Drag across the slide to draw a horizontal line	
8. Release the mouse button	
9. Release **<Shift>**	The rectangle is deselected and the new drawn object is selected. The line is complete.
10. Select the **Oval** tool. Place the mouse pointer on the bottom right the slide below the line	
11. While pressing **<Shift>**, drag diagonally to draw a circle. Release the mouse button, and then release **<Shift>**	The circle is completed and filled.

4.0 CONCLUSION

For permanent storage, a presentation must be saved to some location, such as hard drive or a floppy disk.

5.0 SUMMARY

You learned here how to save a presentation and also name a presentation using PowerPoint.

6.0 TUTOR-MARKED ASSIGNMENT

Create a different presentation following the guidelines in 1.6.
Save the presentation as **Presentation 4**. Run the slide show. Close the presentation.

7.0 REFERENCES/FURTHER READING

Ayo, S. K. (1988). *Computer Literacy, Operating System and Application* (2nd ed.). McKay Consult.

UNIT 2.5 USING AUTOSHAPES

CONTENTS

1.0 Introduction
2.0 Objectives
3.0 Main Content
  3.1 Using AutoShapes
  3.2 Using Clip Art
    3.2.1 Adding a Clip Art Graphic to a Slide
  3.3 Using WordArt
    3.3.1 Selecting a Style and Adding Text
    3.3.2 The WordArt Toolbar
4.0 Conclusion
5.0 Summary
6.0 Tutor-Marked Assignment
7.0 References/Further Reading

1.0 INTRODUCTION

You will learn in this unit that AutoShapes button provides access to over 150 shapes. You will learn how to use AutoShapes button in this unit.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- use AutoShapes
- select a clip art Autolayout
- select a WordArt “Style Type” and add text.

3.0 MAIN CONTENT

3.1 Using AutoShapes

The **AutoShapes** button provides access to over 150 shapes. When you click on the **AutoShapes** button, a pop-up menu is displayed with nine choices. If you choose a submenu choice and a shape, the mouse pointer shape changes into a crosshair, enabling you to draw that particular shape.

To draw an AutoShape

1. Click on the **AutoShape** button.
2. Choose a submenu choice and a shape.

3. Press and hold the mouse button and drag the crosshair to create the **AutoShape**.
4. Release the mouse button.

SELF-ASSESSMENT EXERCISE

Using Autoshapes

What you do	Comments/Prompts
1. Click on the **AutoShapes** button	AutoShapes To display the AutoShapes pop-up menu. The mouse pointer changes to a crosshair.
2. Choose: **Stars And Banners**	(Located on the extended menu.)
3. Select: **16-Point Star**	
4. Position the mouse pointer to the left of the circle below the centre line.	
5. Draw a 16-point star	The 16-point star contains a solid fill colour.
6. Save the file as **My Drawing Presentation**	

3.2 Using Clip Art

Graphic images called *clip art* are supplied with PowerPoint. These images are stored in the Clip Art folder, which is shared with other Microsoft Office applications.

3.2.1 Adding a Clip Art Graphic to a Slide

To add a clip graphic to a slide:

1. On the Drawing toolbar, click on the **Insert Clip Art** button
2. Select a category from the **Categories** list box.
3. Click on the clip art image that you want to add.
4. Click on the Insert Clip button, located on the "pop-up" menu.
5. Close the **Insert Clip Art** dialog box.

The fastest way to do many tasks in **Clip Gallery** is to use the Pop-up menu, which appears when you click on any clip. Figure 2 depicts an illustration of the pop-up menu.

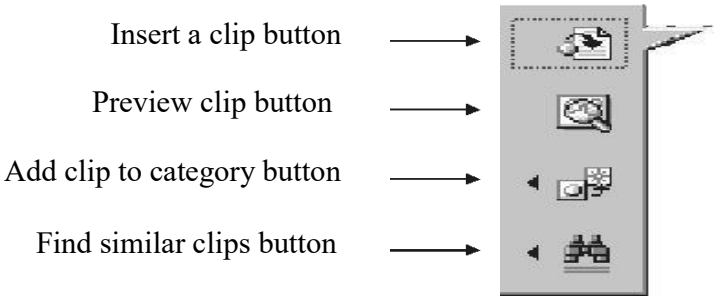
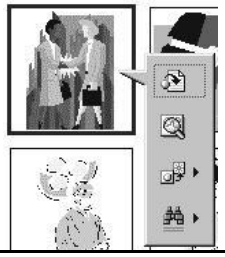


Figure 2: The Clip Art Pop-Up Menu

SELF-ASSESSMENT EXERCISE

Selecting a Clip Art AutoLayout: Viewing and Inserting a Clip art Picture

Before you begin: Ensure that PowerPoint is open and that **My Drawing Presentation** is open.

What you do	Comments/Prompts
1. Move to Slide 4	
2. Add a new slide	
3. Double-click on the **Clip Art & Text** AutoLayout	
4. Add the title **Relocation Team**	
5. Double-click on the **"Double click to add clip art"** placeholder	To display the Microsoft Clip Gallery dialog box.
6. If necessary, select the Pictures tab	To view the available clip art categories.
7. In the **Search For Clips** text box, select the existing text and type: **work**	To search for clip art relating to work.
8. Press: **<Enter>**	To display work-related clip art.
9. Scroll through the clip art and locate the image of two people shaking hands	
10. Click on the picture	

	To display the pop-up menu
11. Click on the **Insert Clip** button	To insert the selected picture into the slide, the picture toolbar is displayed.
12. Save the presentation	

3.3 Using WordArt

The *WordArt* toolbar lets you add special effects to the text in your presentations. For example, you can have your text on shapes, such as circular, slanted and curved. Text can also be sized, stretched, and rotated. The spacing between characters can be adjusted, and formatting options (such as font size, bold, and italics) and shading can be applied.

3.3.1 Selecting a Style and Adding Text

To add text by using the WordArt toolbar:

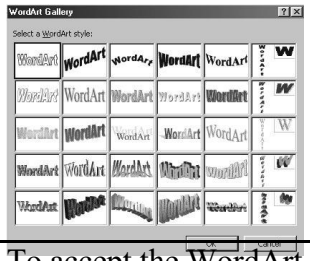
1. Click on the **Insert WordArt** button on the Drawing toolbar to display the WordArt Gallery dialog box.
2. Select a **WordArt** style and click on **OK**.
3. In the **Edit WordArt Text** dialog box, type the text you want to format.
4. Click on **OK** to view the text and display the *WordArt* toolbar.
5. Select text-effect options from the *WordArt* toolbar.
6. Deselect the placeholder.

SELF-ASSESSMENT EXERCISE

Selecting a WordArt "Style Type" and Adding Text

Before you begin: Ensure that **My Drawing Presentation** is open and that Slide 5 is currently displayed on the screen.

What you do	Comments/Prompts
1. Add a new slide	
2. Select the **Title Only** AutoLayout	
3. Add the title **Our New Logo**	It is not necessary to deselect the Title object area before continuing with the next step.

4. Click on the Insert WordArt button	To display the WordArt Gallery dialog box.
5. Observe the WordArt Gallery dialog box	You can select one of the 30 WordArt styles.
6. Select the WordArt style of your choice	
7. Click on OK	To accept the WordArt style and display the Edit WordArt Text dialog box.
8. Type: **Relocation Team**	The text is displayed in the Edit WordArt Text dialog box.
9. Click on **OK**	To display the text inside the slide placeholder. The WordArt toolbar is displayed.
10. Deselect the WordArt placeholder	To view the slide. The WordArt toolbar is no longer visible. longer visible.
11. Observe the slide	The WordArt text is centred on the slide, but is not very large. not very large.
12. Click on Relocation Team	To select the object. The WordArt toolbar is displayed.

3.3.2 The WordArt Toolbar

The WordArt toolbar enables you to create and edit text effects by using the available options. Tools on the Drawing toolbar may also be used to change the effect. Figure 3 below, is a picture of the WordArt toolbar. The buttons used in this section have been labelled.

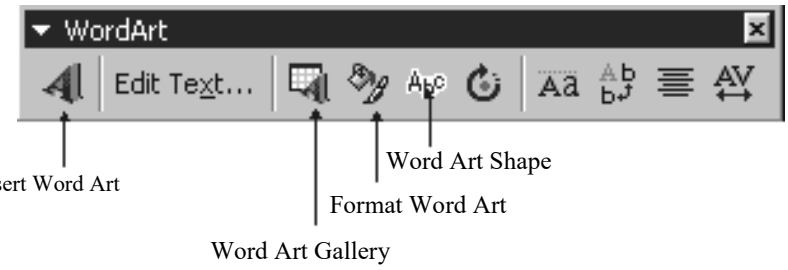


Figure 3: The WordArt Toolbar

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What you do	Comments/Prompts
1. Verify that the WordArt text is selected	
2. Use the corner resize handles to enlarge the object proportionally	(Place the mouse pointer over a corner resize handle and drag away from the object to enlarge it.)
3. On the Word Art toolbar, click on the WordArt Gallery button	To display the *WordArt* Gallery dialog box.
4. Select the style of your choice	
5. Click on **OK**	To apply a new Word Art style
6. If necessary, move the object to the centre of the slide	
7. On the Word Art toolbar, click on the Word Art Shape button	To display a palette of shapes.
8. Select a shape	To apply the new Word Art shape.

SELF-ASSESSMENT EXERCISE

Running your Slide Show

What you do	Comments/Prompts
1. Select Slide 1	
2. Press: **<F5>**	When you have finished running the slide show, close the presentation.
3. Click on the left mouse button to move to the next slide	
4. Repeat step 3 above until the slide show comes to an end	
5. Exit PowerPoint	

4.0 CONCLUSION

Graphic images, called clip art, which are supplied with PowerPoint are stored in the Clip Art folder.

5.0 SUMMARY

You can now use AutoShapes and run slide shows.

6.0 TUTOR-MARKED ASSIGNMENT

1. Create a different presentation following the guidelines in 1.6.
2. Save the presentation as **Presentation 5**. Run the slide show. Close the presentation.

7.0 REFERENCES/FURTHER READING

Ayo, S. K. (1988). *Computer Literacy, Operating System and Application* (2nd ed.). McKay Consult.

MODULE 5: NETWORKING, INTERNET AND E-MAIL

UNIT 1

CONTENTS

1.0 Introduction
2.0 Objectives
3.0 Main Content
  3.1 Terminology
    3.1.1 Networks
  3.2 Local Area Network (LAN's)
    3.2.1 Network Components
  3.3 Wide Area Networks (WAN's)
  3.4 Overview of the Internet and the World Wide Web
    3.4.1 What is the Internet?
    3.4.2 What is the World Wide Web?
  3.5 Browser
  3.6 Hyperlinks
  3.7 Home Pages
4.0 Conclusion
5.0 Summary
6.0 Tutor-Marked Assignment
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1.0 INTRODUCTION

An interconnected set of two or more computers with data communication devices may be called a computer network. The wired arrangement consists of a communication software (Network Operating System), computer systems (Nodes), Network interface cards (connectors) and network cable (medium).

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- state the principles of Networking
- explain Local Area Network

- explain Wide Area Network
- explain what internet is
- explain what is World Wide Web.

The objective of this section of Module 6 is to give you a brief overview of the principles of Networking.

3.0 MAIN CONTENT

3.1 Terminology

You will hear talk of LAN, MAN, WAN and WWW. This is often confusing, but let's attempt to define the terms:

LAN Stands for Local Area Network and refers to a network set up in one building.

MAN is a Metropolitan Area Network and refers to two LANs linked between two buildings in the same metropolis.

WAN is a Wide Area Network and refers to LANs or MANs that are connected between cities.

WWW is a World Wide Web and refers to the linking up the world's LANs, MANs and WANs to form a web of networks that cover the earth.

3.1.1 Networks

When two or more computers are interconnected this is generally referred to as a network. Networks have become increasingly popular over the last decade. There are a various reasons for this phenomenon. The two main reasons are firstly convenience, and secondly cost savings.

Networks can be used to transfer information between computers, even if they use different operating systems. A network can also be used to send data to remote storage devices and printers, without having to send all of the signals through an expensive mainframe computer. Generally networks provide an inexpensive way to interconnect any number of systems and make communication and sharing of data quick and easy.

There are two main categories of networks used in the industry, which are LAN's (Local Area Network) and WAN's (Wide Area Network).

3.2 Local Area Network (LAN's)

A LAN is a network in which all signals run on a single set of cables, which is fully administered by the owner. There are three typical network topologies (layouts). These are star, ring and bus shapes.

The star shape is the most common. Here outlying stations communicate through a central hub device.

In a ring network, messages circulate the loop, passing from station to station like an old fashioned bucket brigade of fire fighters.

Stations on a bus network send data to a transmitter at one end of the bus. This transmitter rebroadcasts the information back along the bus so that other stations can receive it.

Star network **Token-ring network**

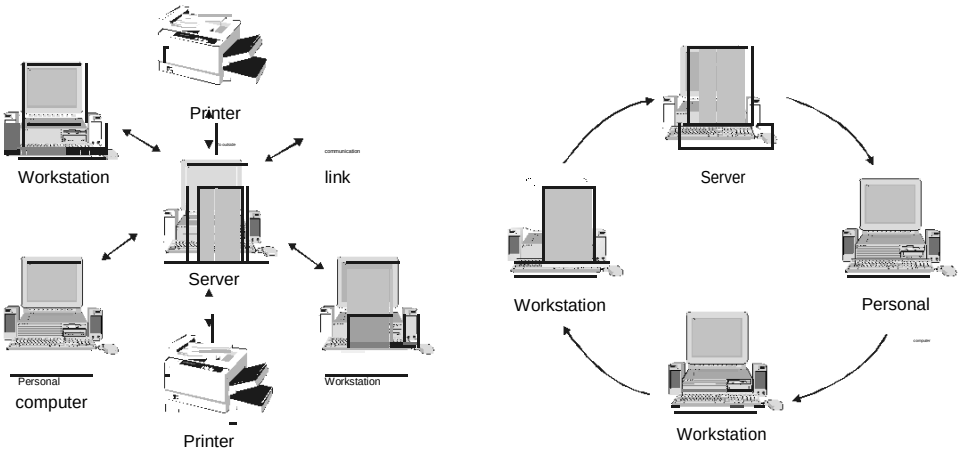


Figure 1

Source: Microsoft Encarta 98 Encyclopedia Deluxe Edition.

3.2.1 Network Components

Besides the cables linking the computers there are three components that are present in most networks. These are:

The File server This is usually a high performance computer with a very large hard disk. The file server is a mass storage device that all users can share. It is used to store all shared programs and data on the network.

Workstations These are the computers on a network that users work on. Each computer has a network card installed in it, which allows the machine to receive and transmit messages on the network cable.

Shared equipment All users attached to a network can also make use of certain shared equipment.

It doesn't just end with a single LAN of course. Some companies prefer to keep separate workgroups (departments), which is accomplished by giving each workgroup their own LAN.

3.3 Wide Area Networks (WAN's)

LANs or MANs that are connected between cities are known as WAN's. Why do we need WAN's?

A LAN only has a range of approximately one-kilometre. Even if it could reach further, the cost of laying several hundred kilometres of coaxial cable from one city to another is prohibitively expensive. A better way to link remote computers together is to use a cable network that is already in place and has been carrying long distance messages for years – the telephone system.

To use the telephone system you first need to convert your electronic signal into something more suitable for the phone lines. Telephone transmits sounds, not the radio frequency signals that pulse around a LAN. To do the conversion a device called a Modem is used. The name is a contraction of Modulator-Demodulator. All that means is that the device takes a series of electronic signals and converts them into pulses of sound, which can be sent along the telephone lines.

A prime example of WAN is the Internet. The Internet could be regarded as the largest of all WAN's. It's a global network of LAN's all connected together using the international telephone system. So you can now send messages and data to people in Finland, China or any other country that you can phone.

3.4 Overview of the Internet and the World Wide Web

3.4.1 What is the Internet?

The Internet is a global network of computers that are able to communicate with one another, using a common language called HTML (Hypertext Mark-up Language). These computers are connected

worldwide and can be accessed from anywhere in the world. All you need is a modem and the software to be able to get onto the internet.

The internet is similar to the international telephone system – no one owns or controls the whole system, but it is connected in a way that makes it function as a single big network.

3.4.2 What is the World Wide Web?

Millions of people have Internet access today. The World Wide Web (the web or www) gives you a graphical, easy-to-navigate interface for looking at documents on the Internet. These documents, as well as the links between them, comprise a "web" of information .

The web lets you jump or "hyperlink" from one web p age to other pages on the web. You can think of the web as a big library. Web sites are like the books, and web "pages" are like specific pages in the books. Pages can contain news, images, movies, sounds, and 3D worlds – just about anything.

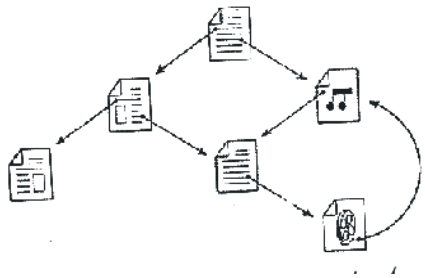


Figure 2: Hyperlinks

These pages can be located on computers anywhere in the world. When you are connected to the web, you have equal access to information worldwide; there are no additional long-distance charges or restrictions.

Over the last few years, the web has grown to include a vast array of information – everything from stock quotes to job o pportunities, bulletin boards to news, previews of movies, literary reviews, and games.

People often talk about "surfing" the web and visit ing new sites. "Surfing" means following hyperlinks to pages and s ubjects you may never have heard about, meeting new people, visiting new places, and learning about things from all over the world.

Remember that the Internet is not just about corporate information. Because it is very easy to publish on the web, many individuals have set up personal "home pages," pages about themselves an d their interests,

pictures of themselves and more. Some even have pointers to what they are wearing in the office that day, or their pet.

As mentioned earlier you can think of the World Wide Web as a big library on the Internet. Web "sites" are like the b ooks in the library and web "pages" are like specific pages in the books. A collection of web pages is known as a web site. You start your journey through the web from a particular web site.

3.5 Browser

A "browser" is a software tool that you use to look at web pages. As you learned, pages on the web are interconnected. You connect to other pages by clicking text or graphics that are called hyperlinks.

3.6 Hyperlinks

Hyperlinks are underlined or bordered words and graphics that have web addresses (also know as URL – Universal Resource Lo cator) embedded in them. By clicking a hyperlink, you jump to a particular page in a particular web site. You can easily identify a hyperlink. Hyperlink text is a different colour from the rest of the text in a web site.

Surfing the web means following hyperlinks to different web pages. As you surf around the web, you may find pages you have read about or seen mentioned on television. Have fun surfing the web to learn about subjects you are interested in and visiting new sites all over the world.

3.7 Home Pages

A "home page" is the starting point for a web site. It is something like the cover page or the Table of Contents of a book.

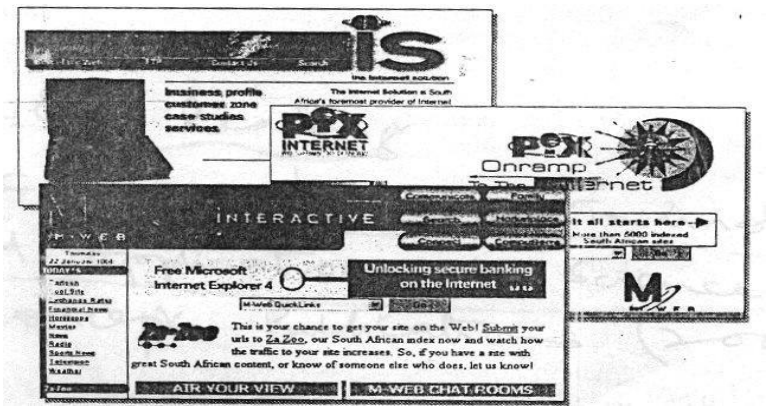


Figure 3: Examples of Home Pages

4.0 CONCLUSION

Computer Network can be categorised into two: wired network and wireless network. The wireless network makes use of radio waves to transmit data or information from one node to another.

5.0 SUMMARY

Here you learned important terms like LAN, MAN and WWW. You will learn more about them in this module.

6.0 TUTOR-MARKED ASSIGNMENT

Briefly discuss the benefits of LAN and WAN.

7.0 REFERENCES/FURTHER READING

Ayo, C. K. (2001). *Information Technology: Trends and Applications in Science and Business*. Concept Publications.

UNIT 2 INTERNET

CONTENTS

1.0 Introduction
2.0 Objective
3.0 Main Content
  3.1 Internet Addresses
  3.2 Internet Service Providers (ISP)
  3.3 Internet Terminology
  3.4 Exercise 1: Examining the Start Page of Academy of Learning
4.0 Conclusion
5.0 Summary
6.0 Tutor-Marked Assignment
7.0 References/Further Reading

1.0 INTRODUCTION

There are local, national and international networks and most major networks are interconnected. The Internet is a global network of interconnected computer networks.

2.0 OBJECTIVE

At the end of this unit, you should be able to:

- work on the internet.

3.0 MAIN CONTENT

3.1 Internet Addresses

All home pages have what is called an Internet Address. It looks like this: http://www.ananzi.com. You can go to this page directly if you use this address in the address box.

The address box shows the address, or technically speaking, the URL of the page that you are currently viewing in your browser. URL stands for Universal Resource Locator, which is simply another word for address.

In our example home page, the address used is:

Figure 1: URL Address

3.2 Internet Service Providers (ISP)

These are the people who control the access to the web. A person has to sign on with an ISP before you can get onto the Internet. Normally a monthly fee is payable but there are also contracts which reduce the monthly costs.

There are many ISP available to you, you need to investigate them and decide with which one you wish to subscribe. Once you have subscribed they help you set up your Internet. They give you a POP address from which you can receive e-mail and get connected to the web. Once you are set up you can then get onto the Internet.

3.3 Internet Terminology

When working with the Internet, certain terms and terminologies are used to describe processes and concepts. A vast list of such terminology is available. Table 1 below describes a few of the more commonly used of these terms and terminologies.

Table 1

Terminology	Definition
Access Privileges	The privilege to access and make changes to folders.
Address	The unique code assigned to the location of a file in storage, a device in a system or network, or any other data source on a network.
Attachments	Multimedia files that are 'attached' to an E-mail; can be text, graphics, sound, video, spreadsheet, database or even an entire application.
Baud	The number of signalling elements that can be transmitted per second on a circuit. Older term being replaced by bps-bits per second
Bit	The smallest amount of information that can be transmitted. A combination of bits can indicate an alphabetic character, a numeric digit, or perform signalling, switching or other functions.
Browser	Application software that gives you a graphical interactive interface for searching, finding, viewing and managing information over a network.
BBS (Bulleting board system)	An electronic bulleting board where users can leave messages. Many BBS's are on a membership basis.

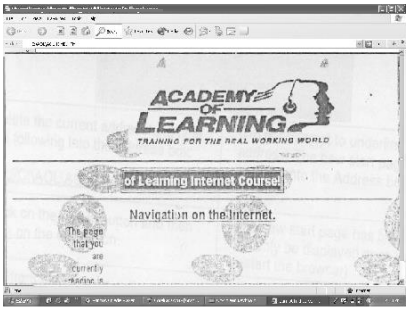
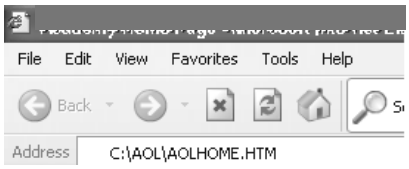
Terminology	Definition
Chat	"Chat" is a term used to describe real-time conferencing. For example, IRC, "WebChat", prodigy and aol chat rooms are all examples of "chat".
Client	A computer that uses the services of another computer (a server or host). If you have a PC on your desk and you retrieve information from the World Wide Web, your PC is a client of the Web server to which it is connected.
Cybercafe	A café or bar allowing customers to explore the World Wide Web whilst having a drink or snack, usually charged per half-hour of usage.
Cyberspace	Originally used in "Neuromancer," William Gibson's novel of direct brain-computer networking referring to the collective realms of computer-aided communication.
Database	A multi-user collection of information. Often supports random access selectivity and multiple "views" or levels of abstraction of the underlying data.
Dedicated Line	A private line leased from a telecommunications carrier.
Download	To transfer programs or data from a computer to a connected device, usually from a server to a personal computer.
e-mail (Electronic Mail)	Messages sent on the Internet to a particular individual.
File Server	A computer that provides access to files for remote users (clients).
Firewall	A firewall sits at the gateway of a private network and only lets certain types of information in from and out to the network.
Freeware	Software allowed to be distributed free by the author, but often with certain conditions applying (i.e. the software cannot be modified etc).
Home Page	On the World Wide Web, this is the main navigation page owned by a company, organisation, university, individual etc, from which hyperlinks are made to other pages on the site (or other sites).

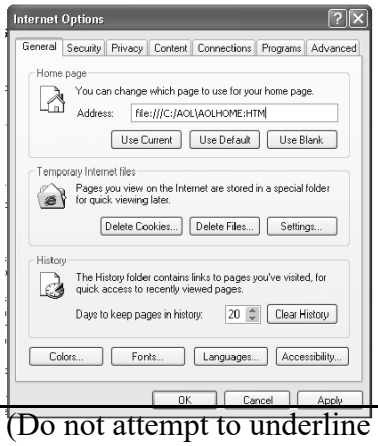
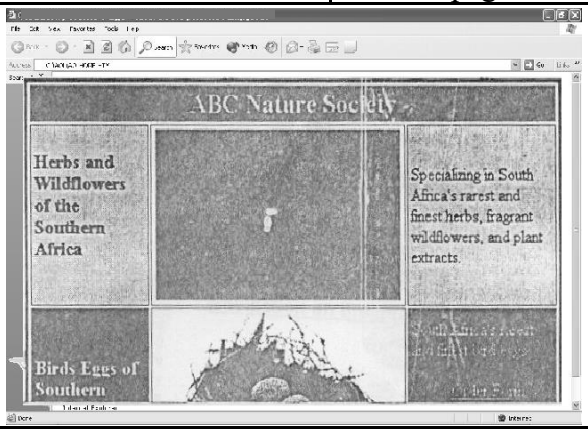
Terminology	Definition
HTML (Hyper Text Markup Language)	A "tag" language in which web pages are formattedandwebinformationis distributed.
HTTP (Hypertext Transfer Protocol)	The method by which documents are transferred from the host computer or server to browsers and individual users.
Hyperlink	In World Wide Web pages, hyperlinks are highlighted text or images which, when selected (usually by clicking the mouse button), follow a link to another page. Hyperlinkscanalsobeusedto automatically download other files as well as sounds and video clips.
MoDem (MODulator-DEModulator)	End of user computer interface that enables digital data to be transmitted over analog transmission facilities like phone lines.
Multimedia	Computer systems that integrate audio, video and data.
Network	A system of inter-related elements that are interconnected in a dedicated or switched linkage to provide local or remote communication (of voice, video, data, etc.) and to facilitate the exchange of information between users with common interests.
Newsgroup	A distributed bulletin board system about a particular topic. Usenet news is a system that distributes thousands of newsgroups to all parts of the Internet.
Page	A hypermedia document on the web.
PKZIP	PKZIP is a shareware compression utility for PCs. A program called PKUNZIP is used to decompress.
"POP" (point of presence)	A "pop" is an Internet service provider's dial-up connection for modem users, used particularly to describe local connections so modem users don't have to dial long distance. For example, a particular ISP might be based in Johannesburg, but have "POP's" in Cape Town and Durban.
Server	In a network, a host data station that provides facilities to other stations.
Site	Address location of a server on the Internet.
Terminology	**Definition**
UNZIP	To unzip a file means to decompress, or

	expand a file that has been made smaller using a compression utility.
URL (Uniform Resource Locator)	The form of the site address that reveals the name of the server where the site's files are stored, the file's directory path, and its file name.
WWW (World Wide Web)	Internet system for world-wide hypertext linking of multimedia documents, making the relationship of information that is commonbetween documentseasily accessible and completely independent of physical location.
ZIP	When one "compresses" (i.e. makes a smaller but equal copy) a file using "pkzip", the resulting file is called a "zip" file. It usually ends with the file extension "zip".

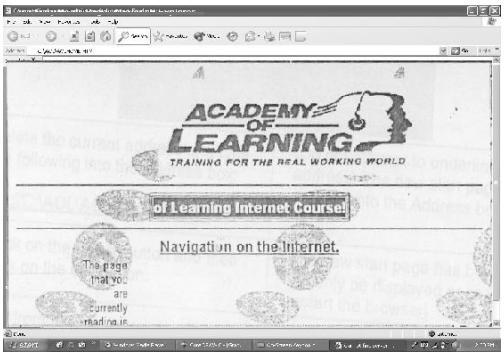
3.4 Exercise 1: Examining the Start Page of Academy of Learning

Objective: To open the Explorer, examine and change the start page
Before you begin: Ensure that you have the Windows desktop displayed on your screen.

What you do	Comments/Prompts
1. Locate and double-click on The browser icon, which is and the start found on the desktop	Internet Explorer is launched your page is displayed as shown below. 
2. You will now examine the **URL Address** of the current page The address should be: **C:\AOL\AOLHOME.HTM**	 You will now change the current start page.
3. Click on the **Tools, Internet Options** commands	The Internet Options dialog box is opened.

4. Ensure that the **General** panel is selected	Note the Address of the Home Page: File://C:/AOL/AOLHOME.HTM 
5. Delete the current address and type the following into the Address box: File://C:/AOL/AOLHOME.HTM	(Do not attempt to underline the address) The new start page is entered into the Address box.
6. Click on the **Apply** button and then click on the **OK** button	The new start page has been set. (It will only be displayed once you restart the browser).
7. Exit from the browser	You are returned to the Windows desktop.
8. Launch the browser	The new start page will be displayedonyourscreen. (Maximize if necessary). Your screen should now appear similar to the example shown on the next page.
	

9.Click on the **Tools, Internet Options** command.	The Internet Options dialog is opened
10. Ensure that the **General** panel is selected	Note the Address of the Home page: file:///C:/AOL/AOLHOME1.HTM Next you will change the start page back to the original home page.
11. Delete the current address and type the following into the Address box: **file://C:\AOLHOME.HTM**	The new start page is entered into the Address box
12. Click on the **Apply** button and then click on the **OK** button	The new start page has been set.
13. Exit from the browser	You are returned to the Windows desktop.
14. Launch the browser	The new start page will be displayed on your screen. Your screen should now appear similar to the example shown on the next page.
15. Exit from the browser	You are returned to the Windows desktop.



4.0 CONCLUSION

The Internet is used for

- Information browsing
- electronic mail (e-mail)
- Newsgroups
- File transfer
- Access to and use of other computers.

5.0 SUMMARY

The advantages and terminology of global network (Internet) were outlined.

6.0 TUTOR-MARKED ASSIGNMENT

Discuss briefly what benefits Internet offers the Nigerian society.

7.0 REFERENCES/FURTHER READING

French, C. S. (2000). *Computer Science* (5th ed.). Gosport, Hants:

UNIT 2.1 FURTHER PRACTICAL WORK ON THE INTERNET

CONTENTS

1.0 Introduction
2.0 Objectives
3.0 Main Content
  3.1 Exercise 2: Navigating the Start Page
  3.2 Exercise 3: Links
  3.3 Exercise 4: Using the Address Box
  3.4 Newsgroups
4.0 Conclusion
5.0 Summary
6.0 Tutor-Marked Assignment
7.0 References/Further Reading

1.0 INTRODUCTION

In this unit you open the Explorer and navigate around the start page. You will also use some of the links that are located in the start page before you conclude the unit you will navigate using the address box.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

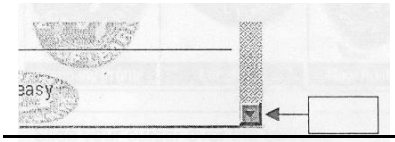
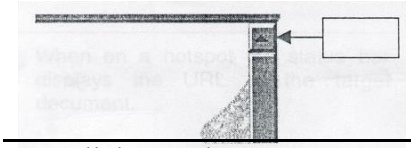
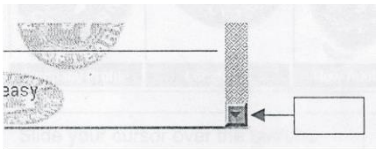
- open the Explorer and navigate around the start page
- use some of the links located in the start page
- navigate using the address box.

3.0 MAIN CONTENT

3.1 Exercise 2: Navigating the Start Page

Objective: To open the Explorer and navigate around the start page
Before you begin: Ensure that you have the Windows desktop displayed on your screen.

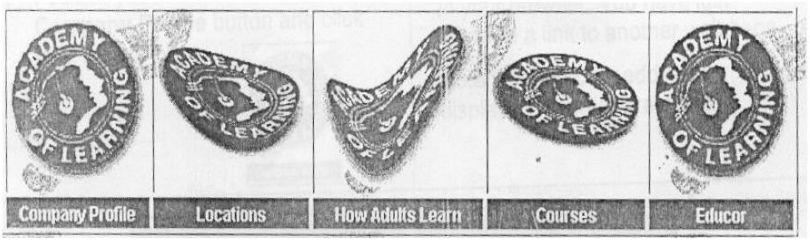
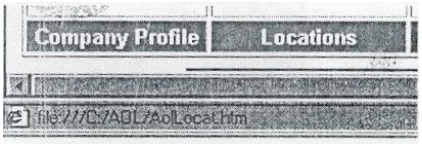
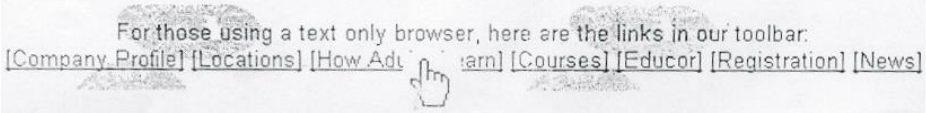
What you do	Comments/Prompts
1. Locate and double-click on your browser icon, which is found on the desktop Internet Explorer	

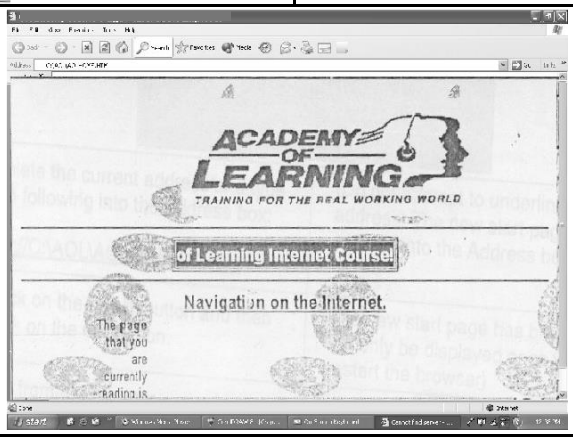
2. Press the down arrow↓ key on your keyboard Using the up arrow scroll to the top of the document.	The down arrow key scrolls you down the current documents, one line at a time. You can use the up and down arrow keys to scroll the current page within your browser window.
3. Press the **<Page Down>** key on your keyboard.	The current document moves down one screen (page) at a time. The <Page Up> key moves you up one screen at a time.
4. Press the **<Page Up>** key on your keyboard.	The current document moves up to the top or start of the current page.
5. Press the **<Ctrl>** + **<End>** keys on your keyboard.	The current document moves down to the bottom or end of the current page.
6. Press the **<Ctrl>** + **<Home>** keys on your keyboard.	The current document moves up to the top or start the current page. Now you will use your mouse to navigate in the current page.
7. Click on the scroll bar down arrow at the bottom of the vertical scroll bar. 	The current document moves down towards the bottom or end of the current page.
8. Click on the scroll bar up arrow at the top of the vertical scroll bar. 	The current document moves up towards the top or start of the current page.
9. Click on the grey area of the scroll bar. (Between the scroll bar down arrow and the grey scroll box) 	The current document moves down one screen (page) at a time. Repeat the process to move back to the top of the current page. (Click between the scroll bar up arrow and the grey scroll box).
10. Exit your browser.	You are returned to the desktop.

3.2 Exercise 3: Links

Objective: To open the Explorer and use some of the links located in the Start Page.

Before you begin: Ensure that you have the Windows desktop displayed on your screen.

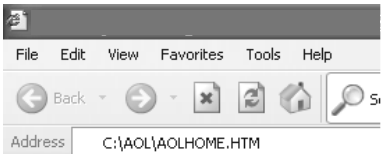
What you do	Comments/Prompts
1. Locate and double-click on your browser icon, which is found on the desktop.	The Internet Explorer is launched and the start page is displayed as shown below.
2. Scroll down the Start Page The following buttons are visible.	The following buttons on the Start until the Page are displayed. 
3. Slide your cursor over the buttons.	As your cursor passes over a hotspot the cursor changes shape:
4. When on a hotspot the status bar displays the URL of the target document.	The URL (similar to the following example) is displayed in the status bar: 
5. Scroll to the bottom of the Start Page.	The following text links are visible:
	

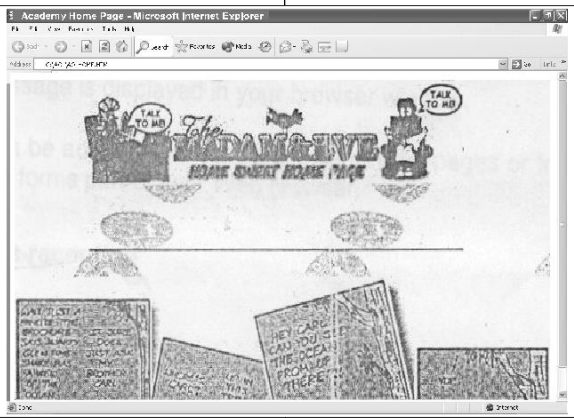
What you do	Comments/Prompts
6. Slide your cursor over the buttons.	As your cursor passes over a text hotspot the cursor changes shape as shown above. To activate a link, simply position your cursor on the desired hotspot and click your primary mouse button. We will activate the Company Profile link.
7. Position your cursor over the **Company Profile** button and click your mouse once. 	The following page will be displayed in your browser. You have just followed a link to another web page. Note the new URL address displayed in the Address box.
 	

3.3 Exercise 4: Using the Address Box

Objective: To navigate using the address box

Before you begin: Ensure that your Internet Browser is open and that the Start Page is displayed on the screen.

What you do	Comments/Prompts
1. Click on the text entry in the URL address box	The entry is selected.
 	
2. Type: file://c:\aol\cartoon.htm	The following age is loaded

Press: **<Enter>**	
	
3. Click on the text entry in the address box	The entry is selected URL
4. Type: file://c:\aol\aolhome.htm Press: **<Enter>**	The Home Page is loaded
5. Close Internet Explorer	

3.4 Newsgroups

The next area of the Internet that we will look at in this course, is that of Newsgroups. The area on the Internet that comprises thousands of newsgroups is known as the Usenet.

A Newsgroup is basically an electronic bulletin board where messages are left (similar to e-mail – about which you will learn more in the second part of this course) for others to see and respond to if necessary. It is here that we have two-way communication. For example, you may have a question regarding your PC that nobody (that you know) can help you resolve. By using a newsgroup you can post the question and receive replies from anywhere in the world.

Newsgroup messages are stored on Internet servers, called News Servers, which are located throughout the world. Each Internet Service Provider (ISP) supplies a news server for use by all of its subscribers. The news server is divided into categories with each category being a newsgroup and each newsgroup having links to other servers on the Internet that contains the same category or newsgroup.

When you post a message to a newsgroup, it is posed onto your ISP's news server. When you view the messages in a newsgroup, the server automatically activates the links and scans the other servers for messages in the requested category. When you look at a list of articles in a newsgroup you can see each message header, when the relevant header is activated (double-clicked on) a connection with the appropriate server is made and the message is displayed in your browser window.

The newsgroups can be accessed either from links in the Web pages or from an integrated news browser which forms part of your Web browser.

4.0 CONCLUSION

Here you opened the Explorer and carried out stipulated exercises.

5.0 SUMMARY

An important area of internet is the Newsgroups.

6.0 TUTOR-MARKED ASSIGNMENT

You wish to send an e-Mail message to a fellow teacher in the same school where you teach. Attached to this e-mail is a draft copy of an exam paper that you have set. Explain how you would go about creating the e-mail, attaching the document containing the exam paper and finally sending the e-Mail.

7.0 REFERENCES/FURTHER READING

French, C. S. (1998). *Data Processing and Information Technology.* Gosport, Hants: Ashford Colour Press.

UNIT 3 ELECTRONIC MAIL

CONTENTS

1.0 Introduction
2.0 Objective
3.0 Main Content
3.1 Electronic Mail
3.1.1 Microsoft Outlook – Inbox
3.2 Creating an E-Mail Message
3.3 Exercise 5: Creating and Sending E-mail
4.0 Conclusion
5.0 Summary
6.0 Tutor-Marked Assignment
7.0 References/Further Reading

1.0 INTRODUCTION

Each main user has a "mailbox" which is accessed vi a a computer terminal within the system by entering a password. Messages are drawn to user's attention when they enter the system.

2.0 OBJECTIVE

At the end of this unit, you should be able to:

- use the electronic mail (e-mail).

3.0 MAIN CONTENT

3.1 Electronic Mail

Electronic mail is a network feature that has no equivalent in standalone computing. It is one of the most useful features of networking. Electronic mail (or e-mail) allows users to send messages and files to selected users or groups of users, while preserving the privacy of sensitive information.

Another advantage of e-mail is that the person to whom a message is addressed does not have to be attached to the network, when a message is sent, to receive it. If a person, who is not attached to the network, is sent a message, that message will be stored in the e-mail database until that person attaches to the network.

Electronic mail can also be sent to remote locations via the telephone system, provided the network software supports this feature. This makes

it easy to communicate with people anywhere in the world quickly and cheaply. An e-mail message from South Africa to the UK costs about half of what a fax containing the same message would cost.

On this course you will use the program Microsoft Outlook to learn how to send mail.

3.1.1 Microsoft Outlook – Inbox

Microsoft Outlook provides an electronic mail tool called the Outlook Inbox. As you work through this section you will be exposed to the two basic Outlook operations, that of sending and receiving e-mail from others in your workgroup.

By default, when Outlook is launched it will display your **Inbox**, listing all received electronic mail. Should the **Inbox** not be the current folder, simply click on the **Inbox** shortcut, located in the Outlook Shortcuts group. The following Inbox folder will be displayed.

Figure 1: The Inbox Folder

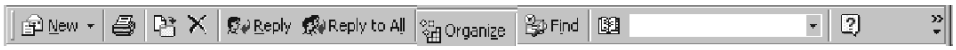


Figure 2: Standard Toolbar options available for the Inbox Folder

Table 1: below: summarises the functions of the available tools.

Tool	Function
New Mail Message	Activates the New Message dialog box; used to create a new mail message.
Print	Prints the active folder or selected items. Please note that this method of activating print does not call up the print dialog box. To set print options, you would need to select **File, Print**…
Move to Folder	Enables you to move the selected item or items to a specific folder.
Delete	Used to delete items in a folder or the entire folder
Reply	Click on this button if you wish to reply to the sender only. The **Message Reply** window will be displayed.
Reply to All	Click on this button if you wish to reply to the sender and all recipients of the message. The **Message Reply** window will be displayed.
Send/Receive	This button may be used to check for mail waiting in your postbox or to send outgoing mail.
Organize	This feature allows you to organise the Inbox. You can create rules through which future information will automatically be organised, change view and manage junk e-mail messages. this is a new feature in Outlook 2000.
Address Book	Used to look up e-mail and fax information when you address messages.
Find a Contact	Used to find information about a contact stored in the Contacts folder.
Microsoft Outlook Help	Activates Microsoft Outlook Help.

3.2 Creating an E-Mail Message

The procedure to create an electronic e-mail is as follows:

- The first step is to click on the New Mail Message button located on the standard toolbar (click on the picture, not the drop-down arrow).

New Mail Message button

- Outlook will display the following Message window with a label of "Untitled".

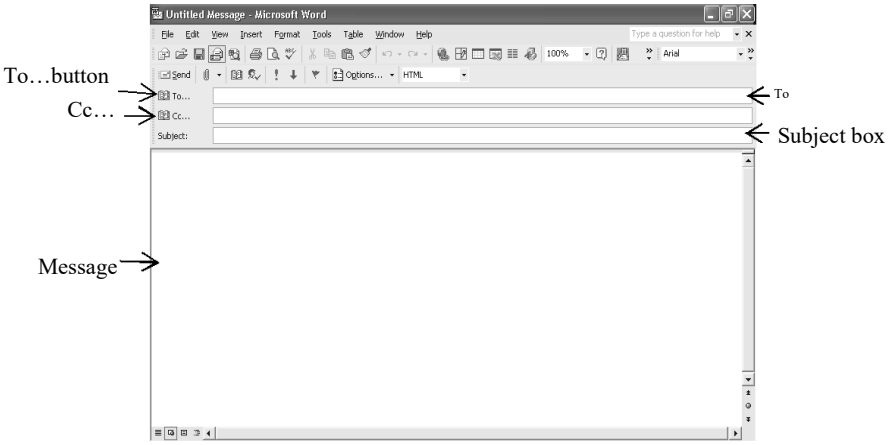


Figure 3: The New Message Window

Study Figure 3 carefully.

The cursor automatically goes to the **To…** box. This is where the e-mail address/addresses of the recipient/recipients is/are typed.

The **Cc…** box is used if you want to send the same message to another person.

The **Subject**: box is for you to give your message a subject heading.

The box underneath subject is the **Message** detail box and is used to write the contents of your message.

- The next step is to address the message. To do this we will select the name of a recipient from the Post Office list. Click your primary mouse button on the **To** button to display the following **Select Names** dialog box:

Figure 4: Select Names dialog box

- Change the **Address** list to display the **Post Office Address List** as shown above. When the **Address List** is changed, all available Select the name(s) of the individual(s) to receive your message by double clicking on the name(s) displayed in the list of recipients. (In Exercise 5 later in this module, you will send the first message to **Student2.**)
- The name(s) of the chosen recipient(s) will display in the **Message Recipients** window. Next click on the **OK** button. This will close the **Select Names** dialog box and place the recipient name(s) in the window of the new message.
- Type a subject heading in the Subject window. you will notice that the **Subject** is used as the message title in the title bar.
- Enter the message details into the message window. The message window will appear similar to *Figure 4.5* below:

Figure 5: Completed message

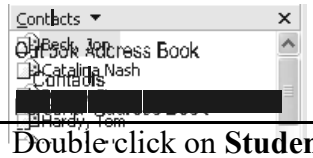
- To send the message, click on the **Send** button located in the message window

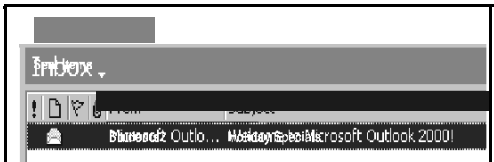
Send button

3.3 Exercise 5: Creating and Sending E-mail

Objective: To create and send an e-mail message
Before you begin: Launch Outlook 2000. (In the first few steps of the exercise you will be guided to select the user profile, Student1 and to Logon as Student1)

What you do	Comments/Prompts
1. Whenpromptedselectthe Profile Name: **Student1** Click on **OK**	
2. In the Microsoft Mail logon dialog box logon as: Mailbox: **Student** Password: **Password** Click on the **OK** button.	The Inbox folder for Student1 will be displayed. (If it is not, click on the Inbox shortcut.
3. Click on the **New Message** button.	The following message window will appear.
4. Click on the To… button	The following Select Names dialog box will be displayed.
5. Click on **Show Names** from the: drop-down arrow and click on the **Post Office Address List** Option if Necessary.	The Post Office Address List is selected and all available recipients should appear in the Recipient List window.

	
6. Double click on **Student.**	Student2 is selected and the name appears in the Message Recipients window.
7. Click on the **OK** button.	You are returned to the message window. You will notice that the name **Student2** appears in the To… box
8. Click in the Subject box. Type: **Holiday Specials**	
9. Press: **<TAB>**	The subject of the message is entered, and the insertion point moves to the Message box.
10. Type: **Hi there,**	
11. Press: **<Enter> <Enter>**	
12. Type: The following message details some of the outstanding holiday specials on offer from Sunshine Tours cc!	The text of the message is entered. You are now ready to send it.
13. Click on the **Send** button 	The message is sent, and the Message window is closed.
14. In the Outlook Bar, click on the **My Shortcuts** group button.	
15. Click on the **Sent Items** shortcut. 	The contents of the Send Items folder are displayed. Notice that the message you have just sent appears in the list.

	
16. **Create** and **Send** the following message: Recipient: **Student 3** Subject: **Overseas Travel** Message: **The cost details due today but have not as yet been received. Please advise me as to the status of your proposal.**	The message is sent.
17. **Create** and **Send** the following message: Recipients: **Student2 & 3** Subject: **Golf Date** Message: **This month's golf name will be held next Friday at the Riverside Country Club, Tee-off 07:30 a.m. See you there!**	The messages are sent.
18. Select the **My Shortcuts** group in the Outlook bar.	
19. Select the **Sent Items** shortcut	The content of the Sent Items folder is displayed.
20. Select File, Exit and **L**og Off	You are returned to the Windows desktop.

4.0 CONCLUSION

The mailing system provides computerized ways of preparing, entering and editing text.

5.0 SUMMARY

The mailing system provides means of filing and retrieving messages.

6.0 TUTOR-MARKED ASSIGNMENT

Create an e-mail and send it to the Co-ordinator of National Open University.

7.0 REFERENCES/FURTHER READING

French, C. S. (1998). *Data Processing and Information Technology.* Gosport, Hants: Ashford Colour Press.

UNIT 3.1 READING AND RESPONDING TO AN E-MAIL MESSAGE

CONTENTS

1.0 Introduction
2.0 Objectives
3.0 Main Content
  3.1 Reading and Responding to an E-Mail Message
  3.2 Placing an Attachment to an E-Mail Message
  3.3 Reading a Message Attachment
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5.0 Summary
6.0 Tutor-Marked Assignment
7.0 References/Further Reading

1.0 INTRODUCTION

Here you will send more e-mail messages

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- reply to an e-mail message
- place an attachment to an e-mail message
- read a message attachment.

3.0 MAIN CONTENT

3.1 Reading and Responding to an E-Mail Message

As mentioned earlier, all incoming mail messages are stored in the **Inbox.**

The procedure to display an electronic mail message is detailed as follows:

- Double click on the relevant message in the **Inbox** listing. The message will open and be displayed in a message window.
- Whilst working in the message window, if you wish to view either the next or the previous message, simply click on the up or the down arrow.

Previous Item button **Next Item button**

The procedure to respond to an electronic e-mail message is detailed as follows:

- In the message window, if you wish to reply only to the sender, click on the **Reply** button.

Reply button

- If you wish to reply to the sender and all of the recipients of the message, click on the **Reply to All** button.

Reply to All button

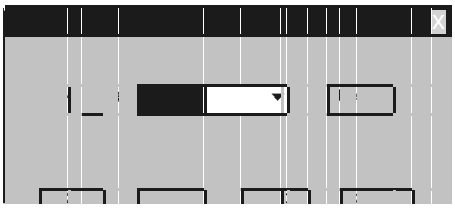
When clicking on either of the above buttons the **Message Reply** window will be displayed. By default the recipient name is automatically entered together with the original message. Scroll to the end of the original message and type your reply before clicking on the send button.

SELF-ASSESSMENT EXERCISE

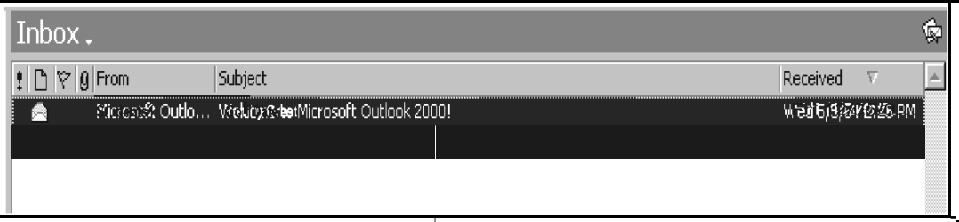
Replying to a Message

Objective: To reply to an e-mail message.

Before you begin: Launch Outlook 2000. (NB: In the first step of the Exercise you will be prompted to logon as Student2.

What you do	Comments/Prompts
1. When prompted select the Profile Name: **Student2** Click on **OK** 	
2. In the Microsoft Mail logon	

dialog box logon as: Mailbox: **Student2**	
3. Password: **Password** Click on **OK**	The Inbox folder for Student2 will be displayed. Next you will check the mailbox for new mail.
4. Press your **<F5>** key to check for new mail.	The Delivering Messages dialog box is displayed.
5. The **Inbox** will be refreshed and any new messages will be displayed.	The messages will be displayed in the message list as follows:



6. Double click on the **Golf Date** message	The message will be opened, and displayed in the message window.
7. Read the message. Then click on the **Close button** Message window.	The Message window is closed. You will now respond to a message.
8. Double-click on the **Holiday Specials** message	The message is re-displayed.
9. Click on the **Reply** button 	The Message Reply window is displayed.
10. Make sure that the insertion point is located in the message area (immediately above the original message). Type: **Thank you for your message.** **I will submit a detailed reply** **by noon today.**	The reply is entered.
11. Click on the **Send** button. 	The reply is sent, and the original message is redisplayed.
12. Click on the **Close** button	The Message window is closed.

on the Title bar of the Message window.	
13. Update the Inbox listing if necessary by pressing **<F5>**.	
14. Select: **File, Exit and Log off**	You are returned to the Windows desktop.
15. Launch Outlook again. Select the **Student1** profile name and logon as Student1. Press **<F5>**. Read your Messages	The message is displayed.
16. **Exit** and **Log off** the Outlook program	You are returned to the Windows desktop.

3.2 Placing an Attachment to an E-Mail Message

So far, we have looked at sending and receiving standard e-mail messages using Outlook. If you wish, include items such as graphics, sounds, text and other information by attaching the relevant file to your e-mail message.

The procedure to attach a file to an electronic e-mail message is detailed as follows:

- Ensure that you are in the Message window, the click on the **Insert File** button.

Insert File Button

- In the **Insert File** dialog box that is displayed, select the relevant the name and click on the **OK** button. the message window will now display a file icon in the message as per the following example:

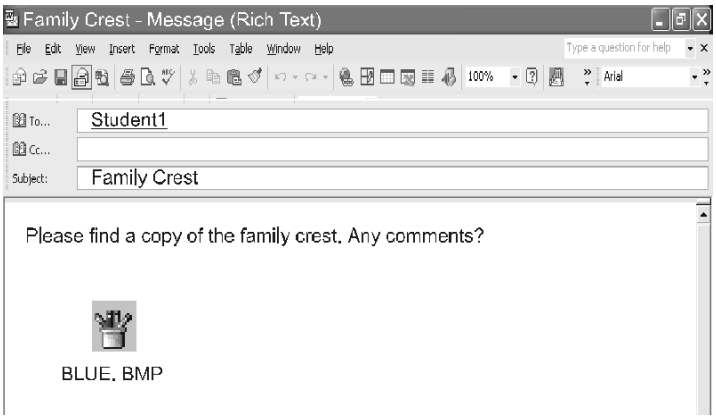


Figure 1: Message with a File Attachments

Click on the **Send** button.

5.3 Reading a Message Attachment

It is possible to read an attachment without saving it first. Remember that you must have the application that the attachment is written in, in order to read it. To identify whether a message has an attachment, you will see a paperclip next to the message.

To read the attachment the mouse must be placed on the message. Click the right hand button on the mouse. Select view and the attachment will open.

SELF-ASSESSMENT EXERCISE

Objective: To send a new e-mail message which contains an attachment.

Before you begin: Launch Outlook 2000. (NB: In the first step of the Exercise you will be prompted to logon as Student2.)

What you do	Comments/Prompts
1. When logging onto **Outlook**, use Profile Name: **Student2** In the Microsoft Mail logon dialog box, logon as: Mailbox: **Student2** Password: **Password**	The Inbox, folder for Student2 will be displayed.
2. Click on **OK**	Next you will check the mailbox

	for new mail using **<F5>.**
3. In the Inbox folder click on the **New Mail Message** button	The Message window is displayed.
4. Click on the **To…button.**	The select Names dialog box is displayed.
5. In the list of users, double click on the name **Student 1**, then click on the **Ok** button	The recipient is selected, and the Message windows is redisplayed.
6. Click in the **Subject** box. Type: **Family Crest** Press: **<TAB>**	The subject of the message is entered, and the insertion point moves to the Message box.
7. Type: Attached please find a copy of the family crest. Any comments?	
8. Press: **<Enter>** twice	The text of the message is entered. You will now attach an external graphic file.
9. Click on the **Insert File** button.	The Insert File dialog box is displayed.
10. Switch to folder **A:**	The files from your data folder are displayed
11. In the list of filenames, click on **Blue.bmp.**	The filename is selected.
12. Click on the **Insert** button	The dialog box is closed, and the file is attached to the message. Notice that an icon representing the attached file appears below the message.
13. Click on the **Send button**	The message is sent, and the Message window is closed.
14. **File, Exit** and **Log off** Outlook	
15. Launch Outlook using Profile	

Name: **Student 1**	
16. Logon as: Mailbox: **Student 1** Password: **Password**	
17. Open your **Inbox**	The Inbox is displayed.
18. Update the **Inbox** listing if necessary <F5>	The inbox listing is refreshed and displays any new mail received.
19. Notice that the new message has an paper clip icon next to the sender's name, indicating that this message has an attachment. Double click on the Family Crest message.	The message is opened. Next you will view the attachment.
20. In the newly displayed message there is an icon labeled **Blue.BMP** Double click on this icon.	The attached file is opened and displayed in Paint.
21. Exit **Paint** and Exit and Logoff **Outlook.**	You are returned to the Windows desktops.

4.0 CONCLUSION

You are now in a position to read and respond to e-mail messages.

5.0 SUMMARY

E-mail addresses have standard format.

6.0 TUTOR-MARKED ASSIGNMENT

Send another E-Mail message to the co-ordinator, National Open University.

7.0 REFERENCE/FURTHER READING

French, C. S. (1998). *Data Processing and Information Technology.* Gosport, Hants: Ashford Colour Press

MODULE 6: COMPUTER APPLICATION IN VARIOUS FIELDS

In this module we shall discuss the application of computers in the following areas:

- Education
- Science and Engineering
- Health Care
- Business and Industry
- Transport and Communications
- Recreation
- Government
- The Military etc.

STUDY UNIT 1: APPLICATION OF COMPUTERS IN EDUCATION

Table of Contents

Application of computer in the field of education.

1.0 Introduction

Computer has become a universal tool of any modern man (or woman). Literacy, today is not defined only in terms of the ability to read and/or write but in addition, it includes the ability to use and communicate with the aid of computer. In the education sector, computers are being used to promote teaching and learning.

2.0 Objective

The main objective of this unit is to identify some areas of application of computer in the in the field of education.

3.0 Application of Computers in Education

The field of education provides the most fascinating application of computing system. This has consequently attracted considerable attention from educationist and policy makers since the late 1960s, when computers were introduced into the classroom. The entry of the computer into the classroom has now offered opportunities and possibilities for students to develop their potentials with computer-aided instructions packages. A considerable number of fascinating and entertaining educational computer software packages are now available in almost every subject. These self-tutor instruction packages are well designed to enable the user to learn on his or her own time, speed and convenience. The role of the teacher here is that of a guide so that the student can think more logically and can gain meaningful experience in such structured situations, role playing and other well programmed exercise so that the student can have a better understanding of the interrelationships of variables to real life situations.

Apart from the use of computer as an instructional aid, it is also used in the execution of routine and administrative tasks such as the keeping of academic and administrative records on admissions, examinations, staffing and other routine functions.

The computer has also revolutionized the services rendered by libraries to readers. A computer based on-line public access catalogue system manages a search for materials using indices such as author's name, book title, subject and classmark. Readers using public terminals can go through a menu-driven programme to find specific books or periodicals, recall books on loans and also make requisition for short loan items.

Furthermore, optical character reading devices are used to scan the bar codes on readers library cards to offer a computer based issuing of books to readers. A computer based security system is used to maintain security services in libraries as well. In educational institutions such as nursery schools, primary schools, secondary schools, polytechnics, colleges of education and universities, computer can be used for the following:

- Computer aided self-tutored application packages.
- Computer instructional aids e.g. digital projectors.
- Microsoft PowerPoint application software for preparing slide shows, speeches, seminars, workshop, lectures etc.
- Computer simulated graded exercises, group work.
- Computer-aided laboratory experiments and investigations.
- Computer-aided software packages for special students e.g. the mentally/physically disable (the blinds, deaf etc), adults, KGs, teenagers etc.
- Distant learning programmes e.g. sandwich programmes, through the Virtual Library Technology.
- Teleconferencing technology.
- Placing and sourcing of educational materials/resources e.g. papers, journals, newsletters, magazines, textbooks, films, on the internet.
- Computerization of Library Services to make cataloguing indexing, retrieval, borrowing, return and other library services easier and faster.
- Keeping the records of students, teachers and teaching facilities.
- Estimating the teachers-student ratio with a view to assessing the adequacy of teaching and learning.
- Estimating the ratio of students to teachers and teachers to teaching facilities with a view to assessing the adequacy of teaching and learning.

- Timely generation of students examination results.
- Automatic generation of lecture and examination time tables.
- Aiding students to learn basic theoretical concepts. There are currently, some computer aided learning software packages and hardware devices that are readily available in the market.

4.0 Conclusion

Computers have been applied in virtually all fields of human endeavour. This unit presents an overview of some of the key areas of its application. The application of computers in education are discussed in details.

5.0 Summary

In this unit we have learnt that computer could, among others, be applied in the following fields of human endeavour:

- Education
- Science and Engineering
- Health Care
- Business and Industry
- Transport and Communications
- Recreation
- Government
- The Military

We also learnt in greater details the application of the computer to education.

6.0 Tutor Marked Assignment

You have just been appointed as the principal of a model secondary school. Write a proposal to the school governing council on the areas of application of computers to the operations of the school.

7.0 References and Further Reading

Akinyokun, O.C, (1999). *Principles and Practice of Computing Technology*. International Publishers Limited, Ibadan.

Balogun, V.F., Daramola, O.A., Obe, O.O., Ojokoh, B.A., and Oluwadare S.A., (2006). *Introduction to Computing: A Practical Approach*. Tom-Ray Publications, Akure.

Oliver E.C. and Chapman R.J. (1986). *Data Processing*, Seventh Edition. ELBS/DP Publications.

STUDY UNIT 2: COMPUTER APPLICATIONS IN MICRO, SMALL MEDIUM AND LARGE ORGANISATIONS

Table of Content

Application of computer in business and industry.

1.0 Introduction

In the early days of computing, computers were originally meant to assist in scientific and engineering applications. Today, computers are widely used to perform wide ranging tasks from routine accounting operations to management decision making. Corporate operations are becoming more complex and competitive thus increasing the need to produce and process more accurate and timely data both in quantity and quality. More accurate, reliable and timely data are needed for corporate planning, policy formulation and decision making

2.0 Objectives

The objective of this unit is to highlight the areas of application of computer in business and industry.

3.0 Business and Industry

. The following areas of application of computer technology in business will be discussed in details:

(i) Payroll.

(ii) Inventory Control.

(iii) Auditing Operations.

(iv) Personnel Record Keeping.

(v) Preparation of Customer Utility Bills and Payment Orders.

(vi) Management Information System.

(vii) High Quality Production Controls.

(viii) Point of Sale Service.

(ix) Financial Market Transactions.

(x) Publishing Industry.

(i) Payroll

Payroll preparation is essentially a repetitive and a routine task which has to be done periodically for every single employee in an organization at particular points in time either weekly, fortnightly or monthly. Payroll preparation is a work schedule which demands speed, accuracy, carefulness and honesty. It involves making references to a number of source documents which by their nature also require constant and periodic updating.

These attributes obviously lend themselves to the use of computers which have the capabilities to meet the challenging demands in payroll preparation. These include the capability of the computer to:

(a) Handle the enormous amount of information required in payroll preparation.

(b) Store information and make the information available as at when it is needed.

(c) Handled repetitive recurring tasks and check on its own work as a way of controlling human errors.

(d) Provide a much better and reliable procedure for the necessary security checks to monitor and detect fraud and other malpractices.

Computer application in payroll preparation involves a number of procedures which include the following:

(a) Updating the personal records of employees whenever new appointments, resignations, terminations, dismissals and other changes are made within a period of time.

(b) Computing wages and salaries for each individual workers based on regular and overtime hours worked.

(c) Making deductions for income tax and for other payments such as union dues and repayment of loans.

(d) Preparation of pay advice slips and cheques to employees and banks.

(e) Updating the master payroll file based on the records received from the personnel department.

(f) Preparation of summary report and analysis for management.

In addition to payroll preparation, the computer is also used for other routine and repetitive book keeping and accounting operations involving recording, classifying and summarizing accounting data. This may involve preparing and updating ledger and journal accounts, invoicing, accounts receivable and payable. Other operations may also include updating and preparing accounts on sales, purchases and inventory. The computer is also used for the preparation and evaluation of the balance sheet and statements of accounts, preparation of dividends and summary accounts for shareholders and management.

(ii) Inventory Control

An equally important business application of the computer is seen in the execution of the important business function involved in maintaining a desirable level of inventory in a business organisation. This is to ensure that working capital is not unduly tied in stocks while at the same time available stocks can meet the demands of continued production

process. In this direction, the computer is used as a tool in updating records of inventory and also in the preparation of forecasts and demand predictions based on economic order quantity analysis and other forecasting techniques.

(iii) Auditing Operations

The computer is used as a tool by auditors to report accurately on the transaction register which constitutes the most crucial aspect in the audit trail. With the aid of the computer, it is easier for auditors, in their examination of the accounting records of a business, to trace routine business operations so that variances can be detected and verified accurately using various computer audit packages.

(iv) Management Information System

An equally challenging and revolutionary application of the computer in business is the important role the computer-based Management Information System (MIS) is playing in management decision making. The computer is used as a tool for the online storage, retrieval, processing and maintenance of corporate data meant to be shared by all the users' departments.

A management Information System involves a computerized system of data processing procedures which are integrated in an organisation to provide accurate, complete, concise, timely and effective data which management can use at various level of decision making for planning, organizing, directing, controlling and monitoring procedures.

Included in Management Information System to be used for the various decision making procedures are a number of systems comprising.

(a) Controlling and operational planning support systems to deal with day-to-day decisions involving routine processing and transaction procedures.

(b) Tactical support systems to deal with short-run and middle level management decisions.

(c) Strategic support systems to deal with corporate strategic and top level management decisions.

With the aid of these support systems, data can be retrieved and analyzed on a continuous and timely basis to aid management decision making and other management functions about sales, finances, purchases, acquisition of plant and equipment, research, market analysis and so on.

(v) Personnel Record Keeping

One of the important functions of the personnel department is to maintain and continually update a master file and other records in the personnel department in an organisation. The computer facilitates the effective keeping of a comprehensive and up-to-date record of each employee by providing a comprehensive database involving names, addresses, ages, qualifications, marital status, salaries, dates of promotion and so on.

By keeping such an up-to-date record, a steady flow of various reports can be prepared at the appropriate time to provide the necessary data to aid management decision making in areas such as appointments, promotions, awards of incremental credits, leave periods, staff training, staff development and so on. Furthermore, management can provide the necessary accurate and up-to-date reports on a timely and continual basis to facilitate payroll preparation and also to satisfy other mandatory data requirements from data users such as governments, trade unions, banks, credit unions and tax collectors.

(vi) Preparation of Customers Utility Bills

The routine and periodic preparation of customers utility bills particularly those based on meter readings for such utility services as water, electricity, telephone, gas, demands accuracy and speed in which the computer has proved very effective and efficient. With the aid of the computer, accurate and up-to-date customer's bills can be sent to them periodically and in good time to enable settlement to be made. Computers can be used to generate notices of defaulters. Equally important is the use of the computer to calculate dividend, pension and other periodic payments as and when they become due.

(vii) High Quality Production Controls

Another important application of the computer which has proved very beneficial in the world of business is the monitoring of production processes so that high quality products and services are provided to customers. Computer Aided Designs (CAD) devices are used in the design of products while computer monitored quality control procedures are used in production process to detect items that fail to meet the approved quality standards and specifications. Such automated devices are used in car assembly plants, oil refineries, manufacturing of drugs and so on. Computer aided quality control devices are also used to monitor weight, size, quantity, contents and other standard specifications in the course of a manufacturing process.

(viii) Point of Sale Services

Check-out points in supermarkets and departmental stores are now highly computerized to detect the prices of items. Magnetic Character Readers are used to scan Universal Product Codes on items to provide fast, efficient and satisfactory services to customers in commercial transaction in retail outlets, departmental stores, libraries and other point of sale service.

(ix) Financial Market Transactions

Computer application in the financial market is manifested in its use to monitor financial market operations and to disseminate timely and up-to-date information which are announced daily on the radio, television or consumers magazines. Stock exchange centres are highly computerized to provide accurate and up-to-date prices of stock and shares and also to execute the buying and selling transactions that take place in the markets. The computer has long been used to assess, evaluate and monitor stock market prices. With the aid of the computer, market trends are predicted with accuracy and inventors are provided with the appropriate and up-to-date data to enable them make intelligent decisions and also to guide them to manage their portfolios effectively.

Furthermore, the computer is used to calculate the foreign exchange rates of major currencies as well as the prices of major commodities such as gold, crude oil, cocoa, coffee, and other commodities that enter into international trade. Computer is also used to provide accurate and up-to-date information on interest rates, gilts and bonds to reflect market trends. The computer application in business is further seen in its use in discounting bills and bonds and other financial market instruments to their present values. Closely related to this is the use of the computer to carefully monitor the movement of a basket of goods and services which measures the rate of inflation in an economy and which further provides a barometer of the standard of living in a country.

Most banking operations are now highly computerized as a move to provide fast, effective and efficient services to customers. These include the use of Magnetic Ink Character Readers to process cheques and the provision of Magnetic Credit Cards to customers to have access to funds twenty-four hours a day at an unattended automatic teller machines. Customers also use their credit cards to open doors to some banking houses to transact business. There are other Electronic Funds Transfer terminals to

perform automatic financial transactions at check out counters in hotels, stores, airlines, railways and other terminals.

In the banking industry, computer can also be used to:

(a) Keep the records of customers or clients accounts.

(b) Monitor, control and evaluate the transactions of the customers and clients on their accounts.

(c) Reconcile accounts and assist in producing cashbook balance.

(d) Monitor, control and evaluate the bank or insurance company's revenue and expenditure.

(e) Automate the production of statement of accounts and assist in generating the accurate the correct addresses to which the statement of account should be sent.

(x) Publishing industry

In the publishing industry, computer is used in the following ways:

(a) Creative writing

(b) Typesetting manuscript

(c) Drawing illustrations.

(d) Generating the table of contents and the index of a book automatically.

(e) Generating the page size of a book and cut and paste illustrations automatically.

(f) Processing images such as the scanning of pictures and recording them automatically in the computer store for future retrieval or printing.

(g) Verification and validation of spellings.

(h) Assisting the writer of an article to identify the words that have similar meaning.

4.0 Conclusion

Computer technology has changed the face of business and industry through its various applications. Information and knowledge replace capital and energy as the primary wealth-creating assets. Information technology transforms the way that business is conducted, and the way the commodities of trade are transformed. Discussions presented in this unit has brought to the fore some of the areas of application of computer in business and industry.

5.0 Summary

In this unit, the following areas of application of computer technology in business will be were discussed in details:

(a) Payroll.

(b) Inventory Control.

(c) Auditing Operations.

(d) Personnel Record Keeping.

(e) Preparation of Customer Utility Bills and Payment Orders.

(f) Management Information System.

(g) High Quality Production Controls.

(h) Point of Sale Service.

(i) Financial Market Transactions.

(j) Publishing Industry.

6.0 Tutor Marked Assignment

The banking industry in Nigeria has benefited immensely from computer and Information Technology. Briefly discuss the various applications of computer technology to Nigeria's banking industry.

7.0 References and Further Reading

Akinyokun, O.C, (1999). *Principles and Practice of Computing Technology.* International Publishers Limited, Ibadan.

Balogun, V.F., Daramola, O.A., Obe, O.O., Ojokoh, B.A., and Oluwadare S.A., (2006). *Introduction to Computing: A Practical Approach*. Tom-Ray Publications, Akure.

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MODULE 6: COMPUTER APPLICATIONS IN VARIOUS FIELDS

Table of contents

Application of computers in:

(a) Science and Engineering

(b) Health Care

(c) Transport and Communications

(d) Recreation

(e) Government

(f) The Military

1.0 Introduction

This unit discusses in greater details the application of computers in the following fields: science and engineering, health care, transport and communication, recreation, government and the military.

2.0 Objectives

The objective of this unit is to further introduce students to the application of computers in more areas of the society.

3.0 Science and Engineering

Computer is commonly used to find the accurate solutions to both scientific and engineering problems. Weather forecasting has now become a daily activity to which the computer has proved very useful in providing information on the kind of weather we are likely to expect over a period of time. Such accurate predictions help the farmers, airline

operators, navigators and other activities which depend on the weather for their operations. Computer aided critical path study is used to monitor the optimum and efficient use to time, money, material and human resource in the execution and implementation of projects. Such critical path study is used successfully on various projects, for example, the construction of roads, bridges, buildings, manufacturing, the conduct of election and sales campaigns.

Another scientific application of the computer is the monitoring, simulation modeling techniques to provide indicators as to how systems such as the human body, economy, weather, demographic variables and so on react to changes in situations. The application of simulation techniques helps in taking decision and precautions in advance should in case such repercussions happen when the desired changes are introduced in practical situations. Computers are also to design buildings, roads, bridges, vehicles, aero planes, ships and complex architectural, ships and complex works and so on. Prototyping is increasingly being used to minimize the financial commitment to the real life construction of these systems.

The computer is used to find solution to very complex mathematical and statistical computations at incredible speed and accuracy. Furthermore, various software packages are now increasingly being developed to analyse surveyed data, construct life tables, perform mortality demographic and other multivariate data analysis designed to revolutionize scientific research and to find practical solutions to complex, challenging and everyday life situations. We now outline the use of computer in the following specific areas among others.

(i) Research Institutions

(a) Evaluating, monitoring and controlling laboratory experiments.

(b) Storing the readings obtained in laboratory experiments.

(c) Standardizing the reading obtained in laboratory experiments.

(d) Tabulating or plotting the graph of the results obtained from laboratory experiments.

(e) Interpreting the results obtained from laboratory experiments.

(f) Modeling and simulating systems.

(g) Developing the prototypes of systems.

(ii) Engineering and Architecture

(a) Designing and drawing with very high precision, accuracy and at minimum cost.

(b) Modeling and simulating the behaviour of engineering or architectural systems.

(c) Developing the prototype of say, an aircraft, a motor car, assembly plant and so on. It is possible to test and monitor the performance of these systems without serious financial commitments.

(d) Fabricating, constructing and assembling the component parts of machines such as motor car, aircraft and engineering plants without any hazards.

3.1 Marketing Department

(a) Comparative analysis of products of two or more companies with a view to predicting some areas of improvement.

(b) Market survey, statistical analysis of proportional market gains and prediction of new market areas.

(c) Creation of the awareness and appreciation of products.

3.2 Agriculture

(a) Keep records of soil, rainfall, weather conditions, land size, crops, chemicals and ultimately process the records to estimate the soil fertility and yield per hectare over a number of years.

(b) Keep records, of poultry and animal husbandry farm with a view to estimating the feed mix, environmental condition desirable for optimal yield.

(c) Assess the behaviour patterns of farmers in a cooperative venture and assist in matching the farmers that have identical behaviour with a view to optimizing their productivity.

3.3 Law and Justice

(a) Modeling and simulating legislative procedures.

(b) Indexing, storage and retrieval of law reports.

(c) Indexing, storage and retrieval of court proceedings.

(d) Assisting the human experts in crime investigation.

(e) Statistical analysis of criminal and civil cases in the law court and estimating the rate of growth.

(f) Assisting the court registrar in the allocation of cases to courts.

(g) Monitoring and evaluating congestion in police custody and prisons.

(h) Identifying the causes of crime and assisting with the provision of preventive and curative measures.

3.4 Health Care

The delivery of health care facilities has been one of the notable areas in which computer applications have proved most beneficial to mankind. The computer is used to conduct fast and accurate laboratory tests for blood, urine, stool and so on. The computer is used

in the diagnosis and physiological monitoring of patients life during surgical operation and intensive care programme. There is also a wide range of application packages for the scientific preparation and administration of drugs, x-ray techniques, blood bank management and so on. An equally important application of the computer is the computer simulation provided in the training of medical and paramedical staff and students.

Computers are being used to perform routine clerical functions in hospitals such as keeping records of hospital admission and discharges, administration of drugs and prescriptions and other hospital administrative functions. Furthermore, the computer is used to provide a data bank of medical history to meet the data needs of health insurance schemes and vital health care statistical reports.

The summary that can be drawn about the use of computers in the hospitals are as follows:

(a) Keeping and reviewing in a timely, effective and efficient manner the records of patients, staff, drugs and equipment.

(b) Monitoring the temperature, blood pressure, heart beat and a host of other parameters of patients and raising an alarm when abnormal situation is about to occur.

(c) Assisting medical practitioners in the diagnosis of patient disease.

(d) Assisting the medical practitioners in the prescription of drugs to patients and ultimately the treatment of patients.

(e) Assisting the medical practioners in the monitoring, controlling and reviewing basic health services, birth rate, death rate, outbreak of disease and a host of others.

3.5 Transport and Communications

The most dramatic computer application is witnessed in the transport and communications sectors with increased sophistication but geared towards making life easier and safer for mankind. Today, mankind world-wide is linked by computer controlled orbiting communications satellite. Telecommunications and computing are today electronically linked together. As a result, information can now be transmitted around the globe on the radio, television, telex, facsimile and so on through microwave communication satellites

Man's advancement in information technology has led to the development of the popular computer controlled electronic mail service which provides a more effective and efficient method of disseminating information to users in a computer network environment. The electronic mail service now provides faster, more convenient and cheaper electronic flow of information than the telephone, fax and telex transmission.

Computer application in communications has led to the use of computer terminals at home. This development enable viewers to read electronic newspapers on the television while the teletext provides computerized information to viewers on events around the globe in the field of politics, business, transport, sports, airline, hotel reservations and many others. the Cabled Network News (CNN) is a practical example.

Computer application is now felt in traffic control and vehicle maintenance. Traffic congestion is cities are monitored by computer controlled traffic switching system which controls traffic flows. Computer aided input devices in a form of railcards

or tickets are used to operate automatic gates in underground railway lines. When a ticket coated with magnetic stripes is slotted down wards into a device, the gate automatically opens for you to enter while you take your ticket. The device will return your ticket if it is valid for another journey; if not, it will keep the ticket and allow you to go. A passenger with an invalid ticket is given a red message and there is no way he or she can enter through the gate.

In the delivery of postal services, the computer is used to sort letters according to post codes. In the field of aeronautics, computer simulations are used to train pilots while air traffic movements are monitored by computer controlled radars. The scheduling of trains, subways, and by real-time sophisticated computer systems. Another important computer application is the introduction of computer devices to improve personal safety on aircrafts and vehicles and also to detect engine faults and help in the maintenance of aircrafts and vehicles.

3.6 Government

The business of governance is a serious business. In a multi-cultural, multilingual, multi-ethnic, setting such as Nigeria, a lot of complex and often conflicting variable interplay or are taken into consideration before a broad-based decision can be taken. Computers can assist government business in the following ways:

(a) Planning

(b) Decision marking

(c) Policy formulating

(d) Monitoring and control of operations

The availability of data, timely access to the data and timely reporting on the data are very crucial to the above listed business of government. Computers can be used to:

(a) Keep accurate records of government assets and periodically estimates the market value and insurance value.

(b) Keep accurate records of the population, behaviour patterns, consumption patterns of utilities and estimates the distribution of basic needs such as electricity, water, telephone and postal services.

(c) Keep records of government revenue and expenditure and assist government in monitoring, controlling and evaluating the revenue and expenditure

(d) Keep records of government employees with a view to:

    (i) Preventing ghost workers

    (ii) Estimating the strength of the human resources of government

    (iii) Producing statistical data on employees

(e) Computers can be used in the issuance of identity cards to the citizens.

(f) Compilation of a broad-based and accurate voters register. This will check the incidence of ghost voting, multiple voting and other electoral malpractices which has bedeviled the electoral processes and stable polity in the third world countries.

(g) Computers are used to keep track of crime in the society thereby helping the government security agencies to check crime in the society.

(h) Computers can be used to build and to main the database of the mineral resources and other resources of the nation.

3.7 The Military

One of the areas in which computer has been applied intensively and extensively is the military. The first generation of the modern computers were designed and used during the first and the second world wars. The use of computer for processing data became more popular during these periods due to the need to procure, store and process large volume of data. Over the years, the use of computer have transcend the traditional role of "crunching numbers" to sophisticated applications. Specifically, computers are being used in the following ways, in the military operations:

(a) Training the personnel through the use of simulated war situations.

(b) Reconnaissance surveys.

(c) Automatic detection of mines.

(d) Monitoring and tracking of planes with a view to crash landing any un-authorised plane flying in the nations airspace.

(e) Monitoring operations in the military base.

(f) Launching of missiles from distant military base to the enemy territory. Such missiles are programmed to ensure that only the desired targets are hit.

(g) Manufacture of state-of-the-art military hardware and consumables.

(h) Communications and transmission of highly coded classified military information.

(i) Military games, adventures and expeditions.

(j) Keeping records of military personnel and logistics.

(k) Keeping records of military assets – hardware

(l) Management of military stock with a view to maintaining war-ready stock of materials, ammunitions and assets at any point in time.

(m) Monitoring the environmental and storage conditions of lethel weapons in order to prevent accidents like sudden explosions caused by improper storage.

(n) Generation and maintenance of necessary data that would enhance planning, policy formulation, decision making and forecast.

3.8 Recreation, Amusement and Gaming

One of the major areas in which computer has affected the society positively is in the area of recreation, amusement and gaming. "Work and no play make Jack a dull boy". With increasing civilization and urbanization, there is the need for people to relax and keep their mind off the tension that is associated with daily activities, some of which are tension soaked.

Computer games helps one to learn in the private (even in the comfort of your own room or office), keeps you off the streets and arcades, reduces tension and boredom, engages the mind on constructive things and teaches you new skills.

There are different kinds of games such as adventure games, business games, war games, traditional games, and simulation games.

4.0 Conclusion

Computer as a universal machine is being applied to almost every area of human society.

The discussions in this unit clearly demonstrate this fact.

5.0 Summary

In this unit, we have discussed in details the application of computers in the following fields:

(a) Science and Engineering

(b) Health Care

(c) Business and Industry

(d) Transport and Communications

(e) Recreation

(f) Government

(g) The Military

6.0 Tutor Marked Assignment

Discuss the roles of computer in ensuring food security in Nigeria.

7.0 References and Further Reading

Akinyokun, O.C, (1999*). Principles and Practice of Computing Technology*.

International Publishers Limited, Ibadan.

Balogun, V.F., Daramola, O.A., Obe, O.O., Ojokoh, B.A., and Oluwadare S.A., (2006). *Introduction to Computing: A Practical Approach*. Tom-Ray Publications, Akure. Richard H. Austing and Lillian Cassel (1986). *Computers in Focus*. Books/Cole Publication Company. Monterey, California

Tunji and Dokun (1993). *Data Processing, Principles and Concepts*. Informatics Books, Lagos.

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