COMPUTER APPLICATIONS *in* MANAGEMENT

(A First Approach)

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Preface

It gives me great pleasure in presenting the first edition of the book 'Computer Application in Business Management' to my esteemed readers. It is a unique book that contains valuable information for beginners, intermediate and advance users as knowledge of Computer Fundamentals has now become the need of the Era,for surviving in a professional world. Attention has been paid to include chapters that are required by the students studying courses like MBA, MCA, BCA, BBA of various Universities like GGSIP University, M.D University, Rohtak, Gautama Buddha University and other universities and institutions.

The text provided here in the book elaborates the fundamentals concepts of Information Technology. The language used in the book is lucid, is easy to understand, and facilitates easy grasping of concepts.

The book provides the in-depth knowledge of the basics of computers that govern the usage of Computers in today's world and the explanation is supported by diagrams, pictures and images wherever required.

Though many titles are available in the market today, still there was a need to capture some of the concepts under one cover from there scattered availability. This requirement infused with the idea and is being presented in the form of this text.

Inspite of all efforts, some improvement might be there. I shall be grateful to the readers if the same are brought to my notice. For interacting with the authors or for suggestions and comments on this book please send your emails to the following:

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Contents

CHAPTER 1

Basics Concepts of Computers

Objectives of this chapter

- Learn about the Basic concepts of Computer
- Know the Characteristics of Computer
- Learn about advantages and disadvantages of computer
- Understand the use of computer in various fields
- Understand the classification of computers
- Learn about the Generations of computers

1.1 Introduction

The word "computer" comes from the word "compute" which means to calculate. We all are familiar with calculations in our day to day life. We apply mathematical operations like addition, subtraction, multiplication, etc. and many other formulae for calculations. Complex calculations take much longer time.

We must appreciate the impact of computers in our day to day life. Reservation of tickets in Air Lines and Railways, payment of telephone and electricity bills, deposits and withdrawals of money from banks, business data processing, medical diagnosis, weather forecasting, etc. are some of the areas where computer has become extremely useful

Computer may be defined as a device, which operates data. Basically, data is nothing but unorganized facts and which can be converted into useful information. This process of converting facts to information is processing & the process is called Data Processing. Data processing consists of three sub-activities: capturing the input data, manipulating the data, and managing the output result.

Hence, data is the raw material used as input to data processing, and information is the processed data obtained as output of data processing.

1.2 Characteristics of Computer

Now-a-days computer is playing a main role in everyday life it has become the need of people. The need of a Computer is mainly due to following characteristics:

1.2.1 Speed: The computer was invented as a high-speed calculator. It takes only few seconds for calculations that we take hours to complete. It can perform million of billion of operations on the data in one second. The time used by a computer to perform an operation is called the processing speed. Computer speed is measured in Mega Hertz (MHz).

1.2.2 Accuracy: Accuracy means to provide results without any error. Computers can process large amount of data and generate error-free results. A modern computer performs millions of operations in one second without any error.

1.2.3 Diligence: A computer is free from dullness, tiredness and lack of concentration. It can work for hours without creating any error. If 3 million calculations have to be performed, it will perform the 3 millionth with exactly the same accuracy and speed as the first.

1.2.4 Versatility: Versatility is a most important characteristic of computer. It means the capacity to perform completely different type of work. You may use your computer to prepare payroll slips. Next moment you may use it for inventory management or to prepare electric bills. A computer is capable of performing almost any task, if the task can be reduced to series of logical steps.

1.2.5 Memory (Power of Remembering): Computer has the power of storing any amount of information or data. Any information can be stored and recalled as long as you require it, for any numbers of years. Because of it's secondary storage capability . A data and information can be retrieved as long as desired by the user and can be recalled, as when required. The information recalled would be as accurate as on the day when it was fed to the computer

1.2.6 Storage: A computer has internal storage (memory) as well as external or secondary storage. In secondary storage, a large amount of data can be stored for future use. The stored data and programs are available any time for processing. Similarly information downloaded from the internet can be saved on the storage media.

1.2.7 No Feelings: Computer is an electronic machine. It has no feelings. It detects objects on the basis of instructions given to it. Based on our feelings, taste, knowledge and experience we can make certain decisions and judgments in our daily life. On the other hand, computer can not make such judgments on their own. Their judgments are totally based on instructions given to them.

1.2.8 Communication: Today computer is mostly used to exchange messages or data through computer networks all over the world. For example the information can be received or send through the internet with the help of computer. It is most important feature of the modern information technology.

ADVANTAGES AND DISADVANTAGES OF COMPUTER

Advantages of Computer

Computers are very useful to make everyday life easier.

1. Computer allows us to totally automate various systems.
2. The Internet allows people from around the world to share knowledge, ideas and experiences in any field. Communication between users become easy and fast with the use of the internet.
3. Security of data is increased because of the availability of several security techniques.
4. Taking data back up at multiple places becomes easy.
5. A computer allows a person to manipulate data easily and quickly, create text documents, edit them, print them, manipulate images, print them, send text and images over the Internet.
6. A computer helps in establishing a connection with the outside world and a user can download information over the Internet as and when required.
7. Computer helps a person to check online weather conditions, shop online, read e-news paper, plan vacations, make hotel and travel reservations and extract information on particular diseases, its symptoms, causes and cure, seek jobs and learn about any countries custom and religion.
8. Computer helps the children in their education for preparing assignments, referring extra information etc.
9. Computers enable children to learn through creating as they get hands-on knowledge and as a result it increases their understanding level and also increases their skills. So now days it has become the learning tool for children.
10. Besides education computer can be useful in entertainment like watching movies, playing games etc.
11. The tools like spelling and grammar checker, thesaurus and dictionary, installed in the computer can also be used by students.
12. A computer allows the user to create documents, edit, print, and store them so that they can be retrieved later.
13. Computers can also be used for training purposes. Many companies use it as a means to train their employees.
14. Computer also helps the person to give off- site presentation through various projection systems without being physically present there.

Disadvantages of Computer

However there are many advantages attached with the introduction of computers but there are several disadvantages that cannot be ignored. The faults are not inherent to the computer but are the result of improper use of it by humans.

1. Introduction of computer results in the loss of many jobs as several jobs that are being done by people are now done by computer. This led to increase in the number of unemployment.
2. It reduces the physical activity of children as they prefer to play computer games over outdoor games.
3. Children might access internet for some objectionable sites and access pornographic material.
4. Frequent and prolonged computer session may provide harm to health of a person and cause eyes strain, posture and skeletal problems and harmful radiation from screen may lead to some serious diseases.
5. Computer provides easy access to information through Internet and thus has made the children lazy. Therefore the student lack in their exploration and research skills.
6. Identity threat and virus attacks are increasing with the non ethical use of computer.
7. Computer wastes are depleting, hampering our nature and polluting the environment.
8. With the advancement of computer technology Cyber crimes are also increasing.

1.4 Applications of Computer in various fields

Nowadays computer has entered into each and every field, whether it is technology, Profession, education or entertainment. It is rapidly growing in its popularity because of its wide range of functions. We cannot even imagine our life without computers because there is no replacement for them. Beginning from 1948 till date the digital revolution has changed the life of people. The various areas where computer has proved its point are:

1.4.1 Computers in Business: Nowadays it is difficult to survive without computers. Computers help in every aspect of business whether it is Product designing, sales, purchase, communication, advertising, inventory control and management, accounts and payroll management, software development and database management etc. These features influence the use of computers in business. In Business Communication if we use the traditional method to send the correspondence to the customer/ client it will take many days to reach at destination but with the use of Internet it takes less than a minute to communicate with the customer. With the help of Internet one can keep a track of market updates and changing environments. Earlier the designers used to prepare the designs manually which took a long time for final development but now a day's many softwares are available to prepare the designs and thus it has reduced the time gap between the design and development. The final and perfect designs are prepared by computer assisted manufacturing softwares like CAD (computer aided design).With the help of computer advertising through

websites the businesses can display its product details with attractive images to a large mass of people (spectators) which is otherwise not possible. Many Human resource tasks can now be performed by various softwares leading to the reduction of staff in these areas. These softwares keep track of attendance records; maintain time sheets, appraisals, salary and other benefits to the employees. Many office sales and purchase can be done through Internet by computers. The seller prepare their websites and display product and its catalogue on it , the buyer visit the site and do online shopping and book their product for desired date of delivery. The uses of computers in businesses expedite the processing of work.

1.4.2 Banks: Computers are used in banks to help the bank employees in efficient and effective manner. Without computers it would be very difficult for a bank to provide good quality service to its customers. Computer saves time and effort and thus helps in making profits. Bank needs to maintain the customer information like name, addresses, contact details, date of birth, signatures, employment details and social security number, account numbers etc. This information can be used to provide update to a customer in case of any change in bank policy and send bank statements after every month, to check the number of services entitled to a customer or eligible for. With the help of computers the bank can keep record of the transactions for a day i.e. deposits, withdrawals, new account openings and closing, applications for loans etc. This daily record enables the manager to generate report and analyze the gain and losses of the bank. Therefore we can say that the automation has revolutionized the banking industry.

1.4.3 Automatic teller Machines: ATM is a computer based system and has all elements of a computer- input, processing, storage, output and software. It helps to collect, maintain and dispense cash. It is simple to operate as you can simply insert your ATM card (debit card) and you are prompted for various options like withdrawal, generate statement, and inquire about account status. This computerized bank Interface allows you to access the bank services regardless of day and night and whether the bank is open or not.

1.4.4 Engineering: Engineering cannot be considered as a separate field from computers. Computers have become an integral part of engineering. It requires the extensive (widespread) knowledge of computers. The engineering problems can be solved with the assistance of computer graphics and engineering softwares. It requires the knowledge to design and build the machines, structures, systems etc. computer engineering is concerned with the designing and creating parts of the system that can be embedded into different machines or systems, creating networks for data transfer, using computer to increase the speed and making computers more mobile. For software engineering CASE tools are used as helping aids which provides compilers, debuggers, design editors, data dictionaries and system building tools.

1.4.5 Government: Computer plays an important role in government's daily tasks. It is used for data processing for efficient and effective delivery of services. It also helps in crime prevention. Government has to maintain a record of entire population of the country and for this various systems has been developed and is in use, for example public records systems – for storing census information, revenue collection system and electronic voting or e-voting system.

1.4.6 Hospital: Computers are proven extremely advantageous in medical field. It has become an essential commodity for every hospital. In today's scenario computers are being used in open heart surgeries, X-rays, clinical tests, CAT and MRI scans etc. Apart from administrative billing, appointment and accounting work, computers are used by doctors in conducting operations and surgeries. All the surgical instruments and machines are embedded with computer systems. The clinical tests are also performed using computers which are used for properly diagnosing the problem. The heart beats, pulse rate, brain readings, blood pressure are recorded, monitored and observed with computer systems. The computer also helps in recording the movement of internal organs which without computer is not possible. Various research activities are carried out with the help of various computer applications. By preparing a presentation on certain diseases and its treatment or recording the real time scenario and presenting it to the concerned persons also help them to better understand the issues and ways to deal with. Computer also helps the handicapped people to live a better life with the use of various computerized tools. The life support system used for patients who are critical is an example for complete computerized system and proves its importance in hospital and medical field.

1.4.7 At home: Home is a target for intruders, so in order to protect it, various safeguard systems are used that are automated machines based on computers. The computers at home may be used for different purposes like gaming, education, entertainment, chatting, various personnel activities like word processing, a person can do his/her work from home, business etc. Latest electronic devices used at home like washing machines, DVDs, Food Processors etc are examples of computer based intelligent machines. The computer based system is also used to control temperature and lightening in the house. The internet at homes is used for browsing, new, information; connect to social network sites etc. The digital media is used for music, video and games. The school assignments can be prepared with the help of computer.

1.4.8 Manufacturing: Computer Aided manufacturing refers to the use of computers to assist the various operations of manufacturing. Computer Integrated manufacturing is concerned with the use of computers in controlling the whole process of production. With this integration independent processes exchange information with each other. In manufacturing all the functions i.e. design, development, production, marketing, sales, field and

support functions, material handling, inventory control are automated and simulated with the use of computers. These systems provide fast and easy implementation of designs and any changes can be incorporated easily. The use of CAM and CAD techniques reduces the cost of production and also reduces the requirement of human resources. It also enables the manufacturer to make quick alternation to product designs.

1.4.9 Schools: In schools the computer is used to maintain record of students, registration, attendance, grades in examinations, to create class rosters, dropouts, alumni records, scholarships, testing and evaluation, library records etc. Computers are nowadays used in imparting education with the use of movies, presentations etc. IT is used to speed up the clerical work by reducing the amount of manual work involved in the school administrative process. With the help of internet and intranet the concept of digital library can be introduced. The use of computers improves the method of teaching and learning in schools. Project based learning with the help of multimedia technologies offer good learning opportunities for students. Many interactive and informative tutorials are available online that can be used to help the challenged student with reading, writing or other weaknesses. The concept of distance education also helps the students to log in at the same time and submit their assignments and share their problems on message boards etc. Internet provides wide information for teachers to prepare their lectures and use computer as an aid for teaching.

1.4.10 In Science: Computer offers a very important method for learning through simulations. It is very helpful for the students of medical field as they can practice the real time cases on computer with the help of simulations. The major use of computer in science is in the field of research. Computers always assist to solve the problems faced by the mankind. The computers are used throughout the research process to store sample data. It helps from the first phase of research to last phase i.e. conceptual phase to dissemination phase. It can be used to formulate research problem by searching relevant documents tutorials and references from World Wide Web and also helps in design and planning phase, empirical phase i.e. collecting and preparing the data for analysis. It is widely used in genetic engineering to astrophysics research. Experimentation is the basic process involved in any research project. Experimentation results in large volume of data that needs to be stored and analyzed to reach to conclusions. A scientific simulation deals with the virtually creating solutions to a problem which can be carried out on computers.

1.5 Classification of Computers

Computer have been classified under four main classes, namely, Supercomputer, microcomputers, minicomputers and mainframes.

1.5.1 Supercomputers: These are amongst the fastest machines in terms of processing speed and using multiprocessing techniques, where a number of processors are used to solve a problem. The supercomputers are reaching speeds well over 25000 million arithmetic operations per second. They are very expensive and are employed for specialized applications that require immense amounts of mathematical calculations.

Supercomputers are mainly being used for weather forecasting, computational fluid dynamics, remote sensing, image processing, biomedical applications, etc. In India, we have one such mainframe supercomputer system- CRAY XMP-14, which is at present, being used by the Meteorological Department.

1.5.2 Mainframe: Mainframes are powerful computers used mainly by large organizations for critical applications. Mainframe computers are generally 32-bit machines. These are suitable for big organisations, to manage high volume applications. A few of the popular mainframe series are IBM, HP, etc. Mainframes are also used as central host computers in distributed systems. Libraries of application programs developed for mainframe computers are much larger than those of the micro or minicomputers because of their evolution over several decades as families of computing.

Mainframes are typically used in bulk data processing such as census, industry and consumer statistics, enterprise resource planning, and financial transaction processing.

1.5.3 Minicomputers: The term minicomputer originated in the 1960s when it was realized that many computing tasks do not require an expensive contemporary mainframe computer but could be done by a small, inexpensive computer. Initial minicomputers were 8-bit and 12-bit machines but by the 1970s almost all minicomputers were 16-bit machines. The 16-bit minicomputers have the advantage of large instruction sets and address fields, and efficient storage and handling of text, in comparison to lower bit machines. Thus, 16-bit minicomputer is a more powerful machine which can be used for a variety of applications and can support business applications along with scientific applications.

The minicomputers are used in business, education and many other government departments. Although some minicomputers are designed for a single user but most are designed to handle multiple terminals.

The first minicomputer was introduced in the mid-1960 by Digital Equipment Corporation (DEC). After this IBM Corporation (AS/400 computers) Data General Corporation and Prime Computer also designed the mini computers

1.5.4 Microcomputer: It is the smallest, least expensive of all the computers. The microcomputers are also known as personal computers. Micro computers have smallest memory and less power, are physically smaller and permit fewer peripherals to be attached. The first microcomputers were built

around the 8-bit microprocessor chips. An improvement on the 8-bit chip technology was seen in the early 1980s, when a series of 16-bit chips, namely, 8086 and 8088 were introduced by Intel Corporation.

1.6 The Computer Generations

The present day computer, however, has also undergone rapid changes during the last fifty years. This period, during which the evolution of computer took place, can be divided into five distinct phases known as *Generations of Computers*. Originally, the term "generation" was used to distinguish between varying hardware technologies. Each generation of computer is characterized by a major technological development that fundamentally changed the way computers operate, resulting in increasingly smaller, cheaper, more powerful and more efficient and reliable devices.

First Generation (1942 – 1955): Vacuum Tubes

The first computers used vacuum tubes for circuitry and **magnetic drums** for **memory**, and were often enormous, taking up entire rooms. They were very expensive to operate and in addition to using a great deal of electricity, generated a lot of heat, which was often the cause of malfunctions. These vacuum tube computers could perform computations in milliseconds.

First generation computers relied on **machine language**, the lowest-level programming language understood by computers, to perform operations, and they could only solve one problem at a time. Input was based on punched cards and paper tape, and output was displayed on printouts.

The UNIVAC and ENIAC computers are examples of first-generation computing devices. The UNIVAC was the first commercial computer delivered to a business client, the U.S. Census Bureau in 1951.

Characteristics of First Generation Computer

1. These *first generation computers* were based on vacuum tube technology.
2. These first generation computers were the fastest computing devices of their times (computation time was in Milli-Seconds).
3. These first generation computers were very large, and required a lot of space for installation.
4. Since thousands of vacuum tubes were used, they generated a large amount of heat. Therefore, air conditioning was essential.
5. They were very expensive to operate and used a large amount of electricity.
6. They used assembly language – to prepare programs. These were translated into machine level language for execution.

1.6.1 *Second Generation (1956-1963) : Transistors*

A new electronic device, called Transistors replaced vacuum tubes, was invented at Bell Laboratories in 1947. Transistors are smaller than electric tubes and have higher operating speed. They have no filament and require no heating. Manufacturing cost was also very low. Thus, the size of the computer got reduced considerably. Though the transistor still generated a great deal of heat that subjected the computer to damage. Second-generation computers still relied on punched cards for input and printouts for output.

Second-generation computers moved from binary machine language or assembly, languages to high level language which allowed programmers to specify instructions in words, such as early versions of COBOL and FORTRAN. These were also the first computers that stored their instructions in their memory, which moved from a magnetic drum to magnetic core technology.

Characterstics

1. Second generation computer machines were based on transistor technology.
2. Second generation computers were smaller as compared to the first generation computers
3. The computational time of Second generation computers was reduced to microseconds from milliseconds.
4. Second generation computers were more reliable and less prone to hardware failure. Hence, such computers required less frequent maintenance.
5. Second generation computers were more portable and generated less amount of heat.
6. High Level Language was used to program Second generation computers. Hence, programming became easier and time-efficient.
7. Although the heat dissipation was much less, the Second generation computers still require air conditioning.
8. Manual assembly of individual components into a functional unit was still required. Hence, commercial production of these computers was difficult and costly.

1.6.2 *Third Generation (1964-1971) Integrated Circuits*

In 1958, Jack Kilby and Robert Noyce, developed the Integrated Circuit (IC). The Integrated Circuit combined three electronic components onto a small silicon disc, which was made from quartz rock. These components are transistors, resistors, and capacitors. Scientists later managed to fit more components on a single chip, called semiconductor. So the size of the computer got further reduced.

Instead of punched cards and printouts, users interacted with third generation computers through keyboards and monitors and interfaced with an operating system, which allowed the device to run many different applications at one time with a central program that monitored the memory. Computers for the first time became accessible to a mass audience because they were smaller and cheaper than their predecessors.

Characterstics

1. Third Generation Computers were based on integrated circuit (IC) technology.
2. Third Generation Computers were able to reduce computational time from microseconds to nanoseconds
3. Third Generation Computers devices consumed less power and generated less heat. In some cases, air conditioning was still required.
4. The size of Third Generation Computers was smaller as compared to previous computers
5. Since hardware of the Third Generation Computers rarely failed, the maintenance cost for it was quite low.
6. Extensive use of high-level language became possible in Third Generation Computers.
7. Commercial production became easier and cheaper.

1.6.3 *Fourth Generation (1971-Present) Microprocessors*

The microprocessor brought the fourth generation of computers, as thousands of integrated circuits were built onto a single silicon chip. The Size started to go down with the improvement in the integrated circuits. *Very Large Scale integration* (VLSI) and Ultra Large scale *integration* (ULSI) ensured that millions of components could fit into a small chip. It reduced the size and price of the computers at the same time increasing power, efficiency and reliability. "The Intel 4004 chip, developed in 1971, took the integrated circuit one step further by locating all the components of a computer (central processing unit, memory, and input and output controls) on a single chip.

A *microprocessor* contains all the circuits needed to perform arithmetic logic and control function, on a single chip. Hence, it become possible to build a complete computer with a microprocessor.

During this generation, magnetic core memories were replaced by semiconductor memories, resulting in large random access memories with very fast access time. On the other hand, hard disks became cheaper, smaller, and large in capacity.

The continued improvement allowed the networking of computers for the sharing of data. Local Area Networks (LAN) and Wide Area Network (WAN)

were potential benefits, in that they could be implemented in corporations and everybody could share data over it.

LAN become popular for connecting several dozen or even several hundred computers within an organization, and WAN become popular for connecting computers located at larger distances.

Characterstics

1. Fourth generation computers are microprocessor – based systems.
2. Fourth generation computers are very small.
3. Fourth Generation computers are the cheapest among all other computer generations.
4. Fourth generation computers are portable and quite reliable.
5. Fourth generation computers do not require air conditioning since they generate negligible amount of heat.
6. Minimum maintenance is required for Fourth generation computers since hardware failure is negligible for them.
7. The production cost of Fourth generation computers is very low
8. GUI and pointing devices enables users to learn to use the computer quickly.
9. Interconnections of computers leads to better communication and resource sharing.
10. Fourth generation computers are very powerful than previous generations and can easily do more calculation or can run more programs at a time and for more hours.

1.6.4 *Fifth Generation (1990 and Beyond) Artificial Intelligence*

The fifth generation of computers brings the massive change in the technology. The systems became more powerful in terms of processing. These computers made a great change in both software and hardware technology. These systems were capable of doing parallel processing and provide a platform for future developments in artificial intelligence. The fifth generation computers based on artificial intelligence are still under development but there are some systems that are already into functioning like speech recognition system. These computers are based on the ULSI (ultra large scale integration) technology. Artificially intelligent systems are those systems that can perform those jobs that require human intelligence. However, there is very slow progress in the field of Artificial Intelligence. The fifth generation computers are compact, cheaper and more powerful than third and fourth generation computers. The most common among 5th generation computers are notebook computers which provide the facility to users to use it anywhere, supercomputers, powerful desktops, and work stations. The storage capacity of these systems has also increased and is increasing day by day. The CD-Rom technology also

emerged during this period. More and more computers are networked together and as a result communication becomes faster and network is growing at a fast pace.

The characteristics of fifth generation computers

1. The size of these systems is smaller and makes it handy and portable.
2. These systems are more powerful than previous generation computers. E.g. supercomputers
3. The machines became general purpose machines and can be used for any purpose.
4. The storage capacity of these systems is more i.e. larger primary and secondary memory.
5. These systems can be used for solving complex problems that was not possible for previous generation computers.
6. These systems are capable of running wide variety of multimedia applications.
7. These systems use the ULSI technology.
8. The network growth is also significant.
9. These systems demand less maintenance as they are less prone to hardware failures.
10. With the growth in network the information becomes readily available on Internet which leads to the development of virtual libraries, e-commerce applications etc.

QUESTIONS

1. What is a computer?
2. What are the characteristics of computer?
3. Explain the Advantage and Disadvantage of computer?
4. What is the use of computer in various fields?
5. Name the five generations of computer? And Explain.
6. Give the characteristics of Mainframe and Supercomputer?
7. What is the importance of microcomputers?
8. Discuss the characteristics of Main Frame Computers.
9. Explain the classification of computers?
10. What makes the difference in computers of each generation?

CHAPTER 2

Computer Organization

Objectives of this chapter

- Learn about the Basic operation of the computer
- Know the Types of Storage
- Differentiate between primary and secondary storage
- Learn what is RAMs, Explain the types of RAMs
- Learn what is ROM. Explain the Types of ROMs
- Know about Secondary Storage
- What is the difference between Primary storage and Secondary Storage

2.1 Introduction

In this lesson we will learn the basic design of a computer. You will know how different parts of a computer are organised and how various operations are performed between different parts to do a specific task.

1. Input: It is the process of capturing or acquiring the information, or it is the process of entering data and instruction into the computer system.

2. Storing: It is the process of storing or retaining the data or information or instructions, so that the user can retain and retrieve it whenever required. The storage unit performs the following major functions:

(a) All data and instructions are stored here before and after processing.

(b) Intermediate results of processing are also stored here.

3. Process: It is the transformation process to convert the input into output.

4. Output: It is the result, which comes from the transformation process or it is the outcome of the process.

5. Controlling: It is the process of directing the manner and sequence in which all the operations are to be performed.

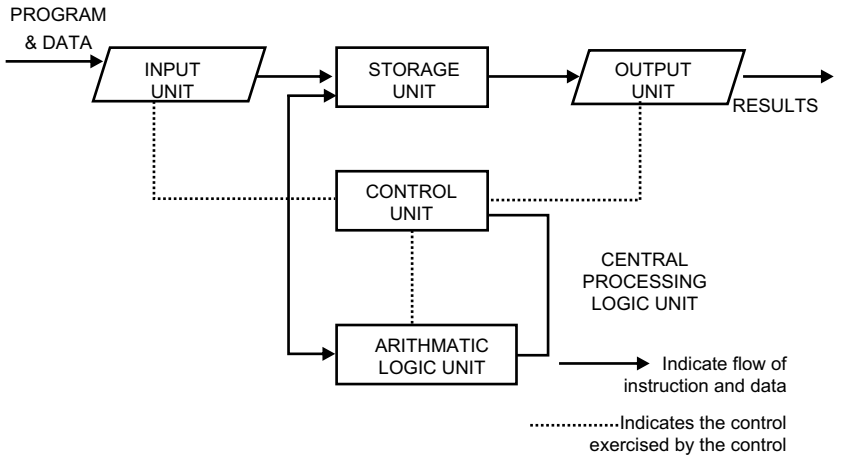

Fig: Basic Operations of a Computer.

Input Unit -> This operation is used to feed the information in the computer. The standard devices are keyboard, Mouse-a pointing device, and card redirect. The input devices must accept the data from the outside world and the computer to process it must accept the same data. All input devices must transform the input data into the binary codes, which the primary memory of a computer is designed to accept. This transformation is accomplished by units called ***input interfaces***.

In short, it performs the following functions

(a) It accepts the data and instruction from input devices like keyboard, mouse, scanner etc.

(b) It converts data & instruction into computer acceptable form or binary codes.

(c) It supplies the converted instructions and data to the computer system for further processing.

Output Unit -> This operation is used to display the feeded data or the processed data. Some standard output devices are: monitor or screen, printer, etc. These output devices must accept the data, which was processed by the processor. The processing is done binary format and before supplying the results to the outside world, it must be converted into human readable form. This task is accomplished by units called ***output interfaces.***

In short, it performs the following functions:

(a) It converts the binary format data into human readable form.

(b) It supplies the converted result to the outside world through output device like monitor, printer etc.

Storage Unit -> Storage unit is to store any kind of information. Whatever the data inserted or feeded through keyboard is first stored in the

memory before the actual processing starts. It must also store the intermediate results for further processing. Similarly, the result produced by the computer after processing, must also be kept inside the storage unit, before being passed to the output units.

In short, it performs the following functions:

(a) The data inserted through input device is first stored in the memory.

(b) Store Intermediate result for processing.

(c) Final result of processing, before these results are released to an output device.

The storage unit is comprised of the following two types of storage:

1. Primary Storage: The primary storage, also known as main memory, is used to hold program instruction and data, intermediate result for processing, recently produced results of processing for a short period of time. The central processing unit can only access programs when they are in primary storage. However, Primary storage is volatile; as soon as the power is turned off, all of the information in it is lost. Moreover, the primary storage normally has limited storage capacity, because it is very expensive.

Following are the types of Primary Storage

(a) RAM (Random Access Memory) -> RAM stands for Random Access Memory. It is known as random access because one can access any memory cell directly if the row and column that intersect at that memory cell is known rather than sequentially moving from starting location. It temporarily stores data to enhance the computer performance. It basically stores the frequently used data or active files so that the computer can access the data much faster as compared to if it has to retrieve from any other storage medium. Random access memory is volatile in nature, meaning it loses all its contents once power is off. The random access memory consists of large number of small capacitors that store the data. When loaded, the logical state of the capacitor is equal to 1, otherwise it is 0. Each capacitor represents one memory bit. In 1955 the writable Ram was used which was named as magnetic core memory. Before its introduction the computers used relays, delay lines and vacuum tubes to implement main memory. The Modern RAM is categorized into two forms:

(i) **SRAM (Static RAM)**

(ii) **DRAM (Dynamic RAM)**

SRAM uses large number of transistors which makes it more costly and therefore is basically used for CPU Internal registers and cache memory. SRAM requires around 4 to 6 transistors per bit. The word static means that it does not need to be refreshed. The Static RAM retains data as long as the power is supplied to the computer system. It provides faster access to the data stored. It has bistable two state systems same as flip flops. It occupies more space on the chip because of its complex structure. SRAM can be synchronous or Asynchronous. Synchronous Static Random Access memory works synchronously with the clock pulse of the Central Processing Unit. In contrast