Introduction:

Computer has been the premier invention of this century. It plays an important role in almost every part of our lives. It has become so important that without it we would not be able to live the way we do. Look around you and you would find computers scattered all over the places, starting with the machine of computer to washing machine, refrigerator, and car, mobile and to life saving devices with the doctors. Everywhere a small computer is working for your convenience and they seem to perform almost any task in the world. Computers have had a tremendous impact on the way information is processed within an organization. Although information has been processed manually throughout the history yet in modern management where decision-making is very fast and in the era of corporate governance, it is not possible without the help of information system managed by computers.

COMPUTER DEFINATION

Computer is an electronic devices that can automatically accept & store input data, process them and procedure output result by interpreting and executing programmed instruction.

OR

A computer is a programmable machine (or more precisely, a programmable sequential state machine) that operates on data and is used for wide range of activities.

Computer

The word "computer" comes from word "compute" which means "to calculate." **Computer is an electronic device or a combination of electronic devices which solves problems after accepting data and supplies results to the user.** It is a tool which can be used to read and write stories, draw and look at images, and send and receive e-

mail. It can store a large amount of information and perform various scientific and mathematical tasks.

Basically, a computer system comprises the following five elements:

1. Hardware
2. Software
3. People
4. Procedure
5. Data/information

A computer organization is often compared with a human brain. Just think of a human brain, how it works? It can store data with its five senses (like input devices in a computer), process the gathered information and reach to some conclusion drawn from the raw data (like the processing of a computer system). Then, it can deliver an output or result with speech or with expression (like an output device).

Characteristics of Computers:

The ever-increasing use of computers is due to their special characteristics. A computer is not just a calculating machine. It is also capable of doing complex activities and operations.

The main characteristics of a computer are given below:

1. Speed

A computer is a very fast and accurate device. Since electronic pulses travel at incredible speed and are electronic devices, their

internal speed is virtually instantaneous. A microcomputer can process millions of instruction per second over and over again without any mistake.

2. Accuracy

Computer's physical circuits rarely make errors, if the data and instruction are correctly fed. Most of the errors occurring in computers are either hardware errors or human errors.

3. Storage

They have a large amount of memory to hold a very large amount of data. A large amount of data/information can be stored in secondary storage devices.

4. Programmability

A computer is programmable device, i.e. What it does depend on the lines of instruction (program) it is using.

5. Diligence

It is free from problems like lack of concentration, confusions etc. It is never confused like humans and can consecutively take instructions without failing or getting bored.

6. Versatility

Many different types of tasks can be performed on computer. At one point of time, it might be busy in calculating statistical data for annual performance evaluation of a business organization and at the other point of time; it might be working on inventory control.

7. Power of Remembrance

Unlike humans, computers can store things for unlimited period of time.

They have a great remembering power.

EVOLUTION OF COMPUTER

1 Mark-1 computer (1937-44)

- Also known as Automatic sequential control calculator
- Design by Howard Aiken of Harvard University in collaboration with IBM.
- Design based on techniques, developed for pinch card.
- 50 feet long, 8 feet high, 3000 electric switches,
- Complex design, huge in size.
- Capable to perform 5 basic arithmetic operations:- +,-, /,* and table Reference.
- Addition of 2 numbers takes approximately 0.3 sec
- Multiplication Of 2 numbers takes approximately 4.5 sec
- So very slow compare to today's pc.
- Often classified as 'computer' as instructions, faded by means of punch card.

2 ABC Atanasoft-Berry computers (1939-42)

- Developed by Dr.John Atanasoff
- To solve certain mathematical equations.
- Named based on inventors name &his assistant Clifford berry
- 45 vacuum tabs for internal logic &capacitor for storage

3 ENIAC (1943-46)

- 1st electronic computer.
- Electronic Numerical Integrated and Collocutor.
- Developed at more school of engineering of Pennsylvania University USA
- By design team lead by proof &John maachly.
- Develop as a result of military need.

- Require 20*40 square feet room, 18000 vacuum tabs.
- 30 tones weights, consume 200 kilowatts of power.
- Cost $487000
- Addition of 2 nabs in 200 micro sec.
- Multiplication Of 2 numbers in 2000 micro sec
- Shortcoming

  (1) Store &manipulate only limited Information

  (2) Programs were wired on Board. So it's difficult to detect error & change program.

4 EDVAC (1946-52) – USA

- Electronic Discrete Automatic computer.
- ENIAC handicapped by wired board, to overcome this limitations 'stored program' concept developed by Dr.John Von Neumann.
- A sequence of incrustations + data, stored in computer. Memory, in binary form of 0 & 1, for purpose of automatically directing the flow of operations.
- Stored program feature influenced the development of modern digital computer.

5 EDSAC (1947- 49)

- Britishers developed Electronic Delay Storage Automatic Calculator.
- Machine executed its 1st program in May 1949.
- Developed by group of scientists headed by professor Mauric Wilkes at Cambridge University.
- Addition In 1500 microsecond.
- Multiplication In 4000 microsecond.

6 Manchester Mark – 1 (1948)

- Small experimental machine based on stored program concept.

- Design @ Manchester University, by group of Scientist, headed by MHA Newman.
- Storage capacity – 32 words, each of 31 Binary digits, so too limited to store data & instructions.
- Thus there's No practical use of it.

7 UNIVAC- I (1951)

- Universal Automatic computer
- Many UNIVAC produces, but 1st installed in Census Bureau, 1951 & use for continues 10 years.
- 1st Business use was by General Electric Corporation in 1954.
- In 1954 IBM introduced Models of UNIVAC- 1 & other 700 series.
- In 1953, IBM produces IBM-650 & sold over 1000 of these computers.
- Thus commercially available digital computer could be used for business & scientific Application.

Computer Generation:

Generation provide framework for growth of computer industry in terms of 'Technology'.

1st Generation (1942-55)

- Made of vacuum tubes (it is a glass tube, with circuits inside it, & also no air inside it)
- Look & behave like bulb.
- Slow, big, balky, & fill up whole building.
- I.e. ENIAC, EDVAC, EDSAC, UNIVAC, etc.

ADVANTAGES

(1) Use of vacuum tubes only available option.

(2) Fastest calculating device of their time. (Millisecond)

DISADVANTAGES

(1) Too bulky in size.
(2) Unreliable
(3) Thousands of vacuum tubes generate much heat & burn out frequently
(4) Air condition require
(5) Frequent H/W failures
(6) Non-portable
(7) Constant maintains require
(8)Manual assembling of components in function unit is require
(9) Commercial production difficult & costly
(10) Limited commercial use

2nd Generation (1955-64)

- Made of transistor (like switch on/off)
- I.e. ibm-700, 1401, atlas, icl 1901,TX-0

ADVANTAGES

(1) Smaller in size in-compare to 1st generation
(2) Less heat generated
(3) Reduce computational time form millsec to micro sec
(4) Less H/W failure
(5) Better portability
(6) Wider commercial use
(7) More reliable

DISADVANTAGES

1. A/C require
2. Frequent maintenance required
3. Manual assembly of components into functional unit is required.

3rd generation computer (1964-75)

- Made of ICs having 10 to 12 components.
- It is integration of large no of circuit element into very small surface of silicon.
- It is cover with photosensive from using mask light source show into slice of silicon chip.

ADVANTAGES

1. Smaller in size compare to other generation
2. More reliable
3. Lower heat generated
4. Computational time from microsecond to nanosecond
5. Low maintenance cost
6. Less power required
7. Commercial product easier & cheaper
8. Manual assembling of individual components into functional unit not required.

DISADVANTAGES

1. AIR CONDITION REQUIRED in many cases.
2. Highly sophisticated technology required for manufacture of ICs.

4th generation computer (1975 onwards)

- Made & SSIC (Small Scale Integration) in which ICS contained only 10 + 20 components.
- Also made of MSI (Medium Scale Integration), which ICS contained up to 100 components in a single chip.
- In the era of LSI (Large Scale Integration) which ICS can integrate over 30,000 components in a single chip.

- Efforts R still on VLSI (Very large scale Integration) which is expected to integrate more than 1 millions components on single chip.
- Whole comp. Circuit available on single chip, size & postage stamp.

ADVANTAGES

1. Smallest in size
2. Heat generated is negligible
3. No air condition required in most cost
4. Much faster in computational
5. Totally general purpose
6. Easily portable as small size
7. Min. labour & cost involved at assembling
8. Cheapest among all generation
9. How failure is negligible so min maintenance require
10. Very reliable.

DISADVANTAGES

1. Highly sophisticated technology required for LSI Chip

5th generation computer (yet to come)

- Aim to made machine with genuine IQ. Ability of reasoning & logical thinking.
- Use of VLSI & ULSI
- It will have KIPS (Knowledge Information Processing Sys) rather than present DIPS/ LIPS (Data /Logic Information Processing)
- AI & Expert Sys

TYPES OF COMPUTER

CLASSIFICATION BASED ON PURPOSE:

1 General purpose computer

- Machine which follow general instructions such as sates analysis, financial accounting, invoicing, inventory management etc are called general purpose computer
- They are digital comps
- Applications
  1. All comps. Use in offices for commercial
  2. Education

2. Special purpose computer

- Machines, which are design for special purpose, like weather Forecasting, space applications, etc are called special purpose Computer
- General purpose comp's + highly specialized data Processing task/problem
- Applications
  1. Completed contorted automated manufacturing process
  2. Scientific application
  3. Medical diagnostics
  4. Weather forecasting
  5. Space-astrology application
  6. nuclear power plant
  7. Marine exploration,
  8. Athletics

CLASSIFICATION BASED ON TECHNOLOGY USED:

1 Analog computer

- Are program to measure & perform calculations on physical quantities like pressure, speed, chemical, reaction, amt of voltage pass in circuit, etc.
- It's like special purpose computer.
- Especially for scientific, engineering applications.
- After intro of electricity & electronic, variety of analog controlled devices are develop which lead to development of analog comp.
- It not requires program but daring manufacturing of analog computer, program is wired on it. if any change/modification require in operation, physical change in wire is require.
- It very continuously rather than in units numerical increment/decrement.
- Limitations:
  1. Its operations are dependent upon
  2. Also limited by:
     2.1 Limitation of periodicity
     2.2 Accuracy etc because it relates to prediction of measurements.
- I.e.
  1. Thermometer-as temperature may very goes up/down.
  2. Speedometer-position if needle represent speed of car.
  3. To control process in industry.
  4. Monitoring distillation operation in petroleum refinery.
  5. It has continuous state, rather than discrete no states.
  6. It can represent fractional/irrational values exactly I.e. with no round off.
  7. It almost never used outside of experimental settings.
  8. It handle/process information which is of physical nature.

2 Digital computers

- It is a programmable-clocked sequential state machine.
- It uses discrete state such as positive/negative, on/off, binary digits (0/1), high/low.
- They process info, which is essentially in binary state.
- It's a general purpose comp, which is used nowadays.
- All processing done in terms of numerical representation of data (in binary digits)
- Though user input data in form of character, decimal, it convert into 0&1.
- It's a multi purpose machine.
- I.e. mainframe, mini, micro, super comps.
- High in speed, high in accuracy, small size, less cost.

3 Hybrid computer

- Analog computer +digital computer =hybrid computer.
- It accepts analog signals for convert into digital signal, visevarsa.
- It use in application where material to be worked with is analog in nature, but processing must be digital.
- It generally use training simulator.
- Simulator is a comp. Controlled device for training people under simulator/artificially created conditions/environment.
- Aircraft industry use simulator to train pilots 4 cockpits it seduce training cost a then after pilots goes to actual aircraft.
- It is like analog comp.
- We use analog &digital computers in our daily life While hybrid computer used in
  1. AI (robotics),
  2. CAM/CAD,
  3. Power generation plant
  4. Chemical generation plant

5. Food processing plant
6. Fight radar
7. Steel making plant
8. Oil refineries
9. Medical care
10. Control national defense

CLASSIFICATION BASED ON SIZE & CAPACITY:

PERSONAL INFORMATION SYSTEM

MICRO COMPUTER / PC

- Smallest digital computer
- Uses a single microprocessor as its CPU.
- Can be use as
  - – Stand alone machine
  - - Use in multiuser
- Plut and play concept is emerging
- Ability of users to plug in is difficult
- H/W & S/W components and customize Pc to meet user requirement.

LAPTOP / NOTEBOOK

- Provide mobile computing technology.
- It is battery operated so it can be use anywhere, anytime.
- Mobile computing devices:
  1. Pocket organizers.
  2. PDA personal digital assistance.
  3. Sub notebooks
  4. Hand held comps.
  5. Pen based computers
- Difference between Both are size & weight

- Notebook is smaller than Laptop & weightless. Otherwise both having powerful microprocessor, Graphic capabilities, adequate memory size. Mouse driven Inputs.
- It having:
  1. Fax capabilities.
  2. CD ROMs
  3. Optical storage devices.
- Application:
  1. Sales representative generally hold it.
  2. Nagger – editor & photographer & magazine.

HAND HELD COMPUTER

- Smaller them notebooks
- Use to collect filed data.
- Application
  1. Archaeologists at dig site in Jorgen use it to collect into about entwines old artifact.
  2. New York police – use it to apprehend criminals. When a suspect is apprehend. Police use it to do background check.1200 records can store.

PEN BASED COMPUTING

- Facing users from constrains of keyboard
- Electronic writing pad & light sensitive e-pen.
- Applications
  1. It store & collect data, image also guide Insurance estimate cost of damage in accident, also helpful to detect that accident was happen to bumper, at front to end, headlight, etc.
  2. Sales representative.
  3. ADP Automotive claims use to estimate auto claims

ORGANIZTION WIDE SYSTEM

SUPER COMPUTER

- Biggest in size & fastest in speed
- Billion instruction/second
- Fault tolerance-use backup mechanism to automatically isolate & reconfigure h/w that fail during system operation
- Parreral processing
- Traditionally 1 processor perform instruction at a time in super multiple processor perform multiple instruction at a time
- Resource optimization
- Advantages

  High cost $250,000 & $3 million, s/w that run on it also very expensive, that's why 200 super computers are there in usa.
- I.e. CRT-3, CRY-XMP-14, NEC-500, PARAM-9000, PARAM-10000
- Applications
  1. Weather Info
  2. Petroleum Exploration & Production
  3. Energy Management
  4. Defense
  5. Nuclear Energy Research
  6. Electronic Design
  7. Medicine
  8. Real Time Animation
  9. Graphics & financial portfolio analysis
  10. European banks
  11. US security & exchange commission
  12. White house

MAINFRAME

- general purpose computer

- Large & fast but smaller & slower
- Many terminals connected to 1 CPU & CPU can support thousand of users at a time.
- Disadvantage
  1. Expensive to purchase operate & maintenance
  2. Require customized s/w
  3. & Also require highly train users to operate/run s/w are in 1950.
- I.e.- IBM 3090, IBM 4381, IBM 4300, IBM ES-9000
- Applications
  1. Rail- air reservation
  2. Banking
  3. Investment analysis

In large companies

HARDWARE & SOFTWARE

HARDWARE DEFINATION

The electronic circuits use in building the computer that executes (Run the program) the software is known as hardware. It is physical parts of computer.

OR

Hardware is physical component of a computer system such as electronic, magnetic, and mechanical devices.

E.g. Mouse, Keyboard, etc…

SOFTWARE DEFINATION

A set of instruction to the computer that directs its operations is called software.

OR

A set of computer programs, procedures and, and associated documents (flowchart, manuals, etc.) related to the effective operation of a computer system.

E.g. MS-Office2003, etc…

TYPES OF COMPUTER SOFTWARE:

1. SYSTEM SOFTWARE
2. APPLICATION SOFTWARE

SYSTEM SOFTWARE

Programs included in a system software package are called system programs and programmers who prepare them are called **system programmers**

E.g. of System software are operating system, programming language translator, utility programs, and communication software.

System software comprises programs design to co-ordinate the operation of computer system it manages in the Hardware, Software and Data resources of the computer system. It includes the type of programs are:

1. System Management Programs:

These Programs manage the hardware, software and data-resources of the computer system. It includes the operating system, Data Base Management System (DBMS) and Tele Communication Monitors DBMS is set of programs creation, Maintenance and use of Data Base. It also square data in the data – base from misuse.

2. System Support Programs:

These are programs support operation of computer. They provide a variety of support services to users and management of computer

system. These services include utility programs, squarely monitors. Utility consist of the programs that are very frequently requested by many application programs for transferring data from one medium to other formatting disk and shorting of files.

3. System Development Programs:

These programs help users any system developers and designing and building system. They help in developing programs and prepare programs for computer processing this include language translator. Programming tools and software engineering packaging language translator translate application programs written in a high level language into machine language. The language translate may be assemblers, compilers or interpreter.

APPLICATION SOFTWARE

Programs included in an application software package are called application programs and he programmers who prepare them are called application Programmers.

E.g. of Application Software re word processing, inventory management, preparation of tax returns, etc.

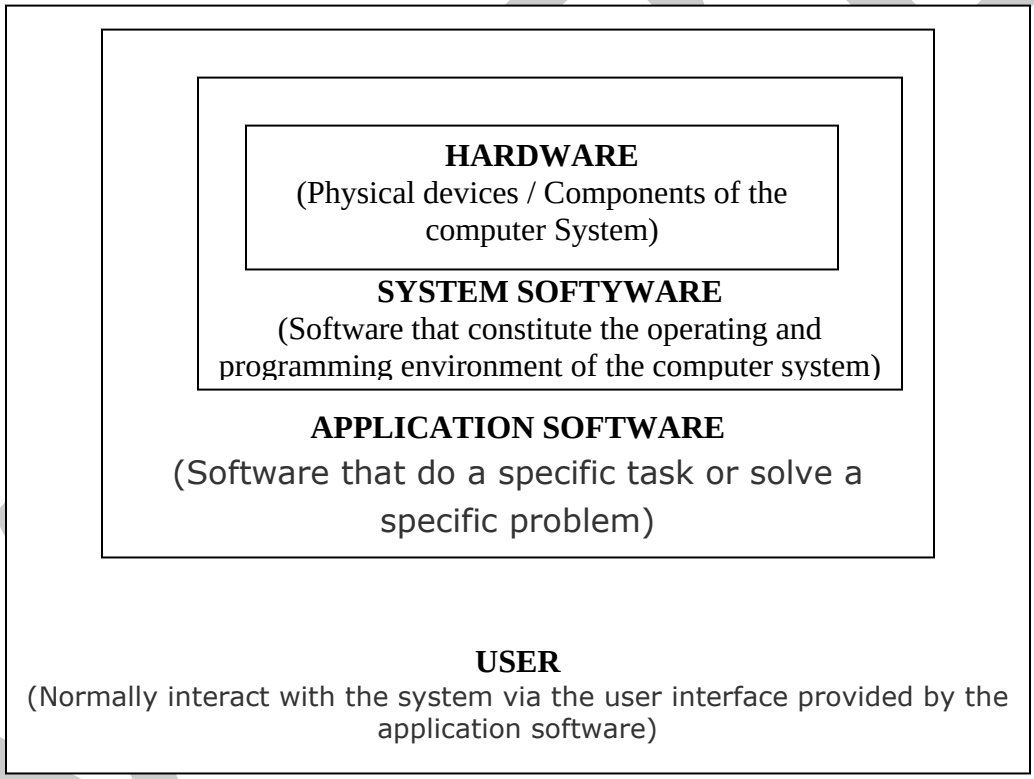
1. General Purpose Programs
2. Application Specific Programs

1. General Purpose Programs:

General purpose software would be anything that aids in allowing you to accomplish simple computer related tasks. For example: word processing software, spreadsheet software, etc.

2. Application Specific Programs:

Any data entry, update, query or report program that processes data for the user. It includes the generic productivity software (spreadsheets, word processors, database programs, etc.) as well as custom and packaged programs for payroll, billing, inventory and other accounting purposes. For a list of major application software categories, see application software. See also program. Contrast with system program.



Relationship among hardware, system software, application software, and users of a computer system.

Firm ware

Software that is substituted for hardware and stored in read – only memory.

OR

Firm ware is combination of hardware and system software.

E.g.

The chip it self is a physical component and hence it is hardware item, while the instruction permanently printed on the chip is a part of software.

Operating system

In computer system to control and co-ordinate (Its means manage) the operation between hardware and software. OS provide discounting the users of a computer does not interact with the physical/hardware of the machine. The software that manages resources of computer system and schedules its operation is called operating system. The operating system as act interface between the hardware and user programs. Same of the facility provided by modem operating system are:

- Easy interaction between humans and computer.
- Started the computer operation automatically when the power is come on.
- Logging and scheduling users programs a long with necessary compilers
- Controlling program execution
- Scheduling the processes managing use of main memory.
- Edit the file providing security to user's files.
- Accounting resources use.
- E.g. MS – DOS, Windows, Unix