0. INTRODUCTION TO COMPUTERS (FOR ACADEMIC INTEREST ONLY)

Dear Students,

This chapter is not there in the syllabus of EIS subject. With this chapter you can understand the further chapters in a still better manner. It is sufficient if you just listen and understand the concepts taught in this chapter and it is not required to prepare the same from exam point of view.

Q.No.1. Computer.

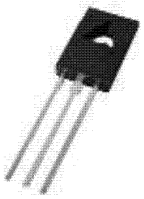
An electronic device capable of receiving data, processing the data & generating the data in the form of information. The word "Computer" came from the latin word "Computus" which means calculate.

Q.No.2. Different generations of computers.

FIRST GENERATION COMPUTERS: (1946 TO 1959)

1) These computers uses vacuum tube for data processing and storage.
2) They use punch card for data storage.
3) Language used was Machine level language.
4) Processors speed used to be measured in milliseconds.

SECOND GENERATION COMPUTERS: (1959 TO 1965)

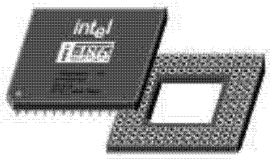


1) These computers employed transistors and other similar devices.
2) They use punch card for data storage.
3) Language used was Assembly language.
4) Processor speed started to be measured in microseconds.

THIRD GENERATION COMPUTERS: (1965 TO 1970)

1) They used integrated circuit (I.C.) to store data which consisted of many transistors.
2) They uses storage disk for data storage e.g. magnetic disks, tapes.
3) Processors speed started to be measured in nanoseconds.
4) The operating systems were introduced in this era.
5) In this generation, high level programming languages were used. For e.g. FORTRAN, COBOL, PASCAL and BASIC.

FOURTH GENERATION COMPUTERS: (FROM 1970)



1) One of the major inventions was the large scale Integrated Circuit (LSI).
2) They used large primary and secondary storage for storing program and data.
3) These computers use micro processors to process the data.
4) They use high level programming languages known as object oriented languages.
5) The GUI features of the computer made system user friendly in this generation.
6) The concept of resource sharing had been introduced using LAN, WAN & MAN in this generation.

FIFTH GENERATION COMPUTERS:

1) Introducing "Artificial Intelligence" to computers is the major development in this generation.
2) Artificial Intelligence is a software that tries to imitate human characters such as reasoning, communicating, seeing and hearing etc.

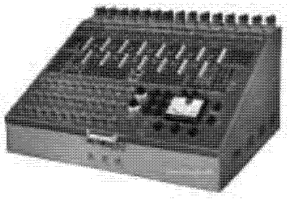
3) **ARTIFICIAL INTELLIGENCE INCLUDES:**

a) Games playing
b) Expert Systems
c) Natural Language
d) Neural Networks
e) Robotics

Q.No.3. Different types of computers.

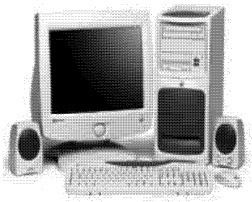
ON THE BASIS OF SIGNALS / ON THE BASIS OF WORKING PRINCIPLES

ANALOG COMPUTERS:



1) They represent numbers by a physical quantity. i.e. by physically measuring some physical property such as length of an object, voltage, temperature, pressure, etc
2) But they are less accurate and the storage capacity is also limited. Hence they are not suitable for business data processing.

DIGITAL COMPUTERS:



1) Digital computers represent data as numbers.
2) They accept input from various input devices, convert them into numbers and perform arithmetic or logical operations.
3) The accuracy is also high. Hence suitable for business data processing applications.
4) Cost is comparatively higher than analog computers.

HYBRID COMPUTERS:

1) Hybrid computers combine the best features of analog and digital computers.
2) Hybrid computers have the speed of analog computers and the accuracy of digital computers.

ON THE BASIS OF FUNCTION/ ON THE BASIS FOR SIZE AND DATA PROCESSING

SPECIAL PURPOSE COMPUTERS:

1) These computers are designed to perform a special task.
2) Thus a given task is performed quickly and efficiently.
3) They are generally used for applications such as air line reservation system or for solving navigational problems etc.

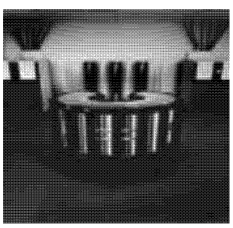
GENERAL PURPOSE COMPUTERS: They can be used for many purposes such as business, scientific, educational, social and other applications. Everything depends on the program it uses.

SCIENTIFIC & BUSINESS COMPUTERS:

1) Scientific problems involve huge amount of complex computations but involves small amount of input and output.
2) In the case of business applications, Volume of input / output is very high. Arithmetic computations are neither voluminous nor complex.
3) Storage requirement of scientific system is more when compared to that of business systems.

ON THE BASIS OF CAPACITY

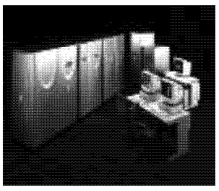
SUPER COMPUTERS:



1) Super Computers are the largest and fastest computers available.
2) Super Computers have huge amount of memory and high processing speed.
3) They can support up to 10,000 terminals at a time.

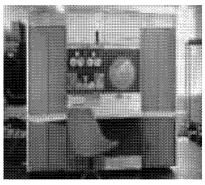
4) Super Computers can recover automatically from failures (fault tolerance).
5) Super computers have multiple processors.
6) These are generally used in Engineering and Scientific applications.

MAINFRAME COMPUTERS:



1) Mainframes can process several million instructions per second.
2) A typical application of these computers is airline reservation or railway reservation system.
3) Major suppliers of mainframe computers are IBM, HP, Sun Microsystems, Honey well, Burroughs, NCR, CDAC and Sperry etc.

MINI COMPUTERS:



1) The input/output capabilities are some what limited.
2) Data processing is similar to that of mainframe but on a small scale.
3) These computers can support multiple number of users.
4) Small to medium sized organizations use minicomputers for their data processing activities.
5) Programming languages include BASIC, PASCAL, COBOL, C and FORTRAN.

MICROCOMPUTER:

1) A microcomputer is a full-fledged computer system that uses a microprocessor as its CPU.
2) Micro Computers are most widely used computers, which we commonly refer to as "Personal Computers" or "Desktop Computer".
3) It is the lowest end of the computer range in terms of speed and storage capacity.
4) They support a number of input and output devices. Only one user can use it at a time.

Q.No.4. Server

1) A server is a computer system that provides services to other computers in a network, called clients or workstations.
2) Servers may be broadly classified as dedicated and non-dedicated.
   a) A dedicated server is completely reserved for the purpose of serving other computers.
   b) A non dedicated server is not completely reserved for this purpose i.e. it can also be used simultaneously for other purposes.

Q.No.5. Advantages & Disadvantages of computer.

ADVANTAGES OF COMPUTERS:

1) **SPEED:** The computer is a very high speed electronic device and it can handle complex tasks in seconds. Computer operations are measured in milliseconds, microseconds, nanoseconds and picoseconds.
2) **ACCURACY:** Computer is also very accurate device. It gives accurate output result provided that the correct input data and set of instructions are given to the computer.
3) **RELIABILITY:** The modern computer can perform very complicated calculations without creating any problem and produces consistent (reliable) results.
4) **STORAGE:** A computer has internal storage (memory) as well as external or secondary storage
5) **AUTOMATION:** A computer can automatically perform operations without interfering the user during the operations.

6) **VERSATILITY:** Versatile means flexible. Modern computer can perform different kind of tasks one by one or simultaneously.

7) **COMMUNICATIONS:** Today computer is mostly used to exchange messages or data through computer networks all over the world.

8) **DILIGENCE:** A computer can continually work for hours without creating any error.

9) **NO FEELINGS:** Computer is an electronic machine. It has no feelings. It detects objects on the basis of instructions given to it.

10) **CONSISTENCY:** People often have difficulty to repeat their instructions again and again

11) **PRECISION:** Computers are not only fast and consistent but they also perform operations very accurately and precisely.

DISADVANTAGES OF COMPUTERS:

1) **PROGRAMMED BY HUMAN:** computer cannot do anything independently without a program.

2) **NO INTELLIGENCE:** Even though it can do the job efficiently & faster based on the instructions, it does not have human intelligence.

3) **NO DECISION MAKING POWER:** Computer cannot make any decisions nor can it render any help to solve a problem at its own like.

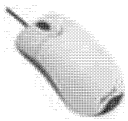
4) **EMOTIONLESS:** They do not have any emotion like humans.

Q.No.6. Basic components of a computer system.

A computer performs four major operations or functions. These are

1) **INPUT:** A computer must receive both program statements and data to solve problems. Input devices are used for this purpose. Some of the most commonly used input devices are given below:

   a) **Mouse:** Mouse is generally used in GUI environment. Under GUI, a small graphic is used to identify each function or program, such as 'store', 'print', etc. When the cursor is placed on the required graphic, user presses a button on the top of the Mouse and such function is activated.



   b) **Trackball:** A trackball is a pointing device that works like an upside-down mouse. This is an alternative to mouse. The user rests his thumb directly on the ball and his fingers on the buttons. To move cursor around the screen, the ball is rotated with the thumb.

   c) **Joystick:** The joystick is a vertical stick which moves the graphic cursor in a direction the stick is moved. It typically has a button on top that is used to select the option pointed by the cursor. Joystick is used as an input device primarily used with video games, training simulators and controlling robots.

   d) **Digitizing tablet:** A graphics tablet consists of a flat surface upon which the user may "draw" or trace an image using an attached stylus, a pen-like drawing apparatus. These tablets may also be used to capture data or handwritten signatures.

   e) **MIDI (Musical Instrument Digital Interface):** MIDI is a system designed to transmit information between electronic musical instruments. A MIDI musical keyboard can be attached to a computer and allow a performer to play music that is captured by the computer system as a sequence of notes with the associated timing

   f) **Touch screen:** It allows users to select one among several options, by touching the screen, either with finger or with another device (like stylus). Now the touch screen can sense the option being selected by the user.

   g) **Light pen:** A light pen is a touch input device. It is a pointing device which can be used to select an option by simply pointing at it. It can also be used to draw figures directly on the screen. It is useful for drawing graphics in CAD. With the help of light pen, an engineer, architect or a fashion designer can draw directly on the screen.

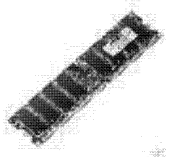
2) **STORAGE:** The storage unit performs the following major functions:
   a) **Primary Memory:**
      i) Primary memory acts as volatile memory and is used to store information which will be used during computations. EX:RAM
      ii) Primary memory is very fast and expensive and limited in capacity (few MB's).
   b) **Secondary Memory:**
      i) Primary memory storage capacity is limited, expensive and volatile. Hence, it is necessary to have secondary or permanent or auxiliary storage for holding data and programs permanently.
      ii) EX: magnetic tape drives, magnetic disk drives (Hard disks, floppy disks, etc.), optical disk drives (CDs, DVDs, etc.)
3) **PROCESSING:** The task of performing operations like arithmetic and logical operations is called processing. The Central Processing Unit (CPU) takes data and instructions from the storage unit and makes all sorts of calculations based on the instructions given and the type of data provided. It is then sent back to the storage unit.
4) **OUTPUT:** This is the process of producing results from the data for getting useful information.
   a) Output devices are instruments of communication between people and machines.
   b) They are used to present the results of processing to outside world.

   Following table shows the commonly found forms of output and output devices.

Form of output	Output devices used
Soft copy output	Visual Display Unit or Monitor
Hard copy output	Printers, Plotters, COM
Sound output	Speakers

Q.No.7. RAM.

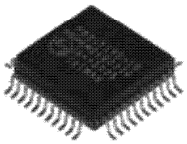
1) RAM stands for Random access memory.
2) It is used to hold intermediary data in the computer. The contents of this memory chips are temporary and can be easily changed.
3) It is the workspace for the computer's processor.



TYPES OF RAM:

1) **DYNAMIC RAM:** It is the most common type of main memory. It is dynamic because each memory cell quickly loses its charge. So it must be refreshed for hundreds of times each second.
2) **STATIC RAM:** SRAM is like DRAM but it is faster, larger and more expensive. It is static because it is not required to refresh the contents of RAM continuously.

Q.No.8. ROM

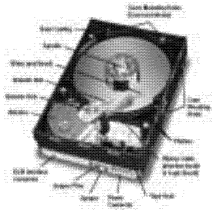


1) ROM stands for Read-Only-Memory.
2) It is used for storing micro programs, not available to normal programmers.
3) The information is permanently stored during manufacturing. The information from the memory can be read but fresh information cannot be written.

DIFFERENT KINDS OF ROM:

1) **PROM:** Programmable Read Only Memory is a non-volatile memory.
2) **EPROM:** EPROM stands for Erasable Programmable Read Only Memory.
3) **EEPROM:** It stands for Electrically Erasable Programmable Read Only Memory.

Q.No.9. Magnetic disk



1) A hard disk is a stack of one or more metal platters that spin on one spindle. Each platter is coated with iron oxide and the entire unit is encased in a sealed chamber.
2) To achieve best performance, the read/write head must be extremely close to the surface of the disk. It is so close that even a small dust particle or human hair or even a fingerprint can fill up the gap between head and the disk, causing the head to crash.

Q.No.10. CD-ROM discs

1) CD-ROM is stands for Compact-Disk-Read-Only Memory.
2) An optical disk is a round platter on which small holes are used to store data. Each hole represents the binary digit 1 and the absence of hole represents binary digit 0.
3) However, the data on the disk is fixed and can't be altered.
4) The capacity of a single CD-ROM is over 650 MB
5) CD-ROM provides direct access to any image or data on the disk.
6) CD's can store any type of data i.e. text, images, audio, video, etc.

Q.No.11. DVD (Digital Versatile Disk)

A digital video disk (DVD) closely resembles a Compact Disk (CD).

1) But the pits on DVD are much smaller and closer than CD.
2) Video disks can support both direct and sequential access.
3) DVDs can store as much as 4.5 GB of data.

Q.No.12. Magnetic tapes

1) Magnetic tape is probably the oldest secondary storage technology still in wide use.
2) Its biggest drawback is that it can only access data sequentially.
3) However, many data processing operations are sequential or batch oriented in nature, and tape is still economical.

Q.No.13. Barcode reader

Barcode is a machine readable code consisting of vertical bars of different widths which are used to represent data. It uses vertical printed lines that can be converted into binary numbers. It is a photoelectric scanner that reads bar codes by means of reflecting light.

Q.No.14. Image Scanners

A scanner is a peripheral device that converts a printed image into digital form that can be read by the computer. Thus it is used to digitize a document/image.

In some situations it is necessary to input some printed image to a computer. The simplest way is to take a photo of the image, directly from the source and convert it into a form that can be understood by the computer (i.e. 0's and 1's).

Q.No.15. Software and its types

1) The term Software is used to describe the instructions that tell the hardware how to perform a task. Without software, hardware cannot do any work. Software is the means of controlling hardware.

2) Software is a program or a set of programs.

a) **System programs or system software:** These programs are designed to make the computer easier to use. A system program can't solve a particular problem, but it makes easy to use necessary application programs. An example of system software is an Operating system.

b) **Application programs or application software:** These programs are designed for specific computer applications. For example, a program that prepares payroll for a business is an application program.

Q.No.16. Network and its types

A Network is a collection of computers connected by a communication system that may be wired (or) wireless.

NETWORK CAN BE THREE TYPES:

1) **LAN (Local Area Network):** It is a group of computers and network devices connected together, usually with the same building, campus or company.

2) **MAN (Metropolitan Area Network):** It is a collection of systems or local area networks with in a metropolitan area roughly 40 kms. In length from one point to another.

3) **WAN (Wide Area Network):** It covers large geographic areas with various communication facilities such as long distance telephone service, satellite transmission and under-sea cables.

Ex.: Inter-state banking networks, airline reservation system

THE END