

Date - 19/7/2016

Fundamentals of Computer

Computer

Input, processing, output
 → C.P.U.

India scores 5th position in making super computer
 PC = Personal Computer

S/w - Software → Collection of programme.
 H/w - Hardware → which can touch.
 F/w (firmware)

By saving any document we can shift easily primary memory to secondary memory.

Software → System → Related to operate

Application

Volatile → which need electricity

CPU → Central processing unit
 ALU → Arithmetic logical unit
 CU → Control unit

Interface → Type of communication

OMR → Optical Mark Reader

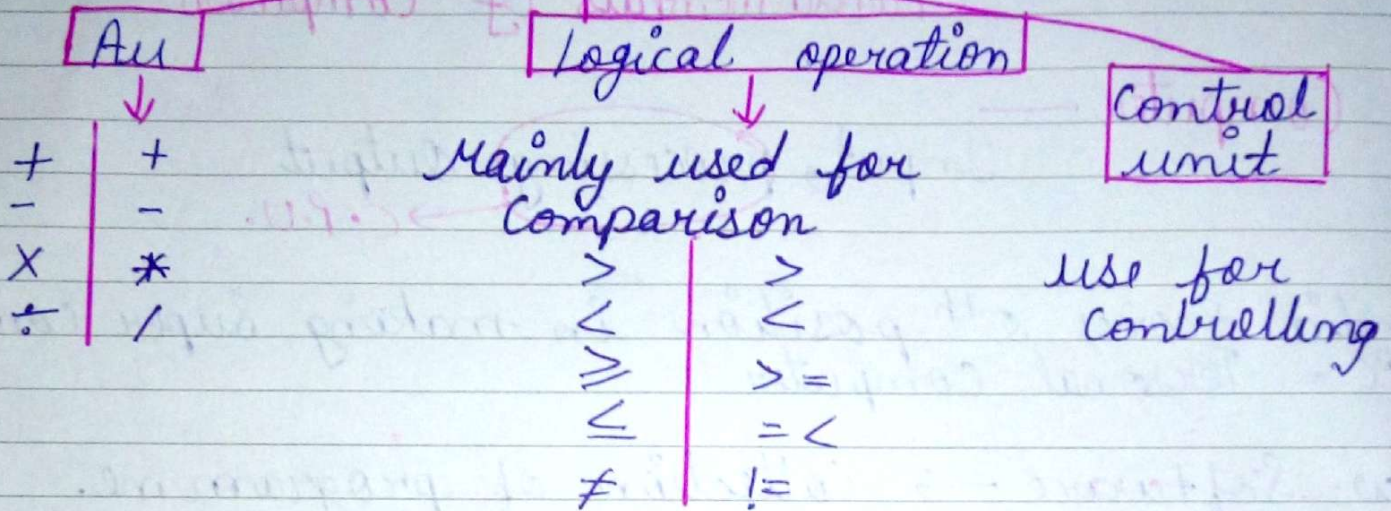
MICR → Magnetic Ink Character Reader

Soft Copy → Data which kept saved in comp.

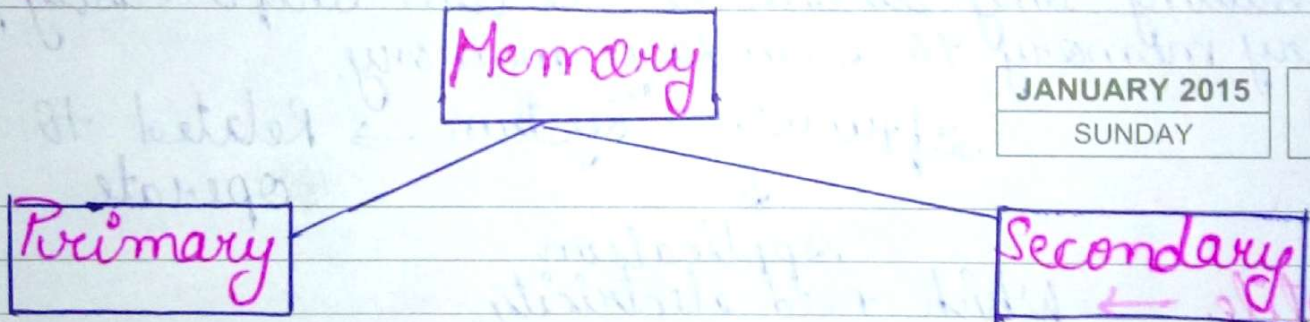
Hard Copy → Print out of a document.

Modular unit → for getting remainder

Brain of Computer



Storage →



(1) **Primary Memory** → It is a temporary / volatile RAM (Random Access Memory)

- Capacity of storing is not more.
- More expensive.

(2) **Secondary Memory** →

- It is permanent.
- Capacity of data holding is high.
- It is not more expensive than primary.

Computer understand only binary language (0,1)

Bit

Byte

Smallest holding unit for a data

Combination of bit

8 Bits = 1 Byte

4 Bits = 1 Nibble

CHARACTERISTICS OF COMPUTER

(1) Speed → Speed of working is high

10^{-3} → milisecon.

10^{-6} → microsec.

10^{-9} → nano Sec.

10^{-12} → Pico Sec.

06

JANUARY 2015

TUESDAY

(2) Accuracy → It give accurate answer for type of question.

GIGO → Garbage In Garbage Out

(3) Diligence → There is no lazyness present in computer. It always do all the works fastly & accurately.

(4) Versatility → Variety of tasks can be done in a Singel System.

(5) Power of Remembering →

- Kept the datas for long time without any problem

(6) I.Q. → No I.Q. is present in Computers. They have no decision taking Capacity.

(7) No Emotions → It is emotionless machine.
ANN → Artificial Neural Network

★ Evolution Of Computer →

Hard copy
↓

- 1642 - Blaise Pascal
- 1671 - Gottfried (calculator)
- 1880 - Keyboard Machine
- 1970 - Herman Holbrith (punch card - used in giving inputs)

which have limitations and also to do only work one

19th century - Charles Babbage
 1940 → Von Neumann → He gave the concept of memory

← Accuracy

← Diligence

← Versatility

← Power of Remembrance

← A.I.

22/7/2016

Generations of Computer

Generations — (I) (1945-1959) (II) (1959-1965) (III) (1965-1971) (IV) (1971-1980) (V) (1980-1990) (VI) (1990-2000) (VII) (2000-2010) (VIII) (2010-2020) (IX) (2020-2030)

(I) 1945-1959 →

• Vacuum tube — vacuum tubes are basic components for memory & C.P.U. circuitry.

• Features —

- (1) Vacuum tube technology
- (2) Unreliable
- (3) Costly
- (4) Non-Portable
- (5) slow input and output device
- (6) Need of A.C.
- (7) Generate high amount of heat.
- (8) Support machine language.
- (9) consume lot of electricity

10

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SATURDAY

(6) Huge Size

• Examples —

- (1) ENIAC (Electronic Numerical Integrator & Calculator)
- (2) EDVAC
- (3) UNIVAC
- (4) IBM 701 (International Business Machine)
- (5) IBM 650

(2) IIrd Generation — (1959-1965) :-

11 SUNDAY

In this generation assembly language and high level programming languages are introduced such as fortran, Pascal, Cobol etc.

→ functions —

- (1) Use of transistors,
- (2) Smaller in size
- (3) Reliable computers as compare to computers of 1st generation
- (4) Generated less heat
- (5) A.C. Need

- (6) faster than first generation computers.
 (7) Supported machine and assembly language.
 (8) Costly and portable.

→ Examples —

- (1) IBM 1620 (3) CDC 1604 (5) UNIVAC 1108
 (2) IBM 7094 (4) CDC 3600

(3) IIIrd Generation (1965-1971) :-
 • It is integrated circuit (IC) base. The IC was developed by Jack Kilby.

→ Languages :-

- (1) FORTRAN (4) PL/I
 (2) COBOL (5) Basic
 (3) PASCAL (F)

→ Functions :-

- (1) IC used (6) Lesser maintenance
 (2) More Reliable (7) Still Costly
 (3) Smaller in size (8) Consume less electricity
 (4) Generated less heat (9) Supported high level lang.
 (5) faster

→ Examples :-

- (1) IBM 360 Series
 (2) Honeywell 6000 Series
 (3) PDP (Personal Data Processing)
 (4) IBM - 370/108
 (5) TDC 816

(4) IVth Generation (1971-1980) :-

- It is very large Scale Integration (VLSI) micro processor based generation
 In this time sharing, real time, network distributed operating system.

→ Languages :-

- (1) C (2) C++ (3) DBASE etc

Features:-

- (1) VLSI technology use
- (2) Very cheap
- (3) Portable and Reliable
- (4) Use of P.C.
- (5) Very Small in Size
- (6) Pipe Line Processing
- (7) Wide development in the fields of Network

Example:-

- (1) DEC-10
- (2) STAR-100
- (3) PDP-II
- (4) CRAY-I (first computer)
- (5) CRAY-X-MP

(5) Generation Vth (1980-onwards):-

- It is VLSI micro processor based technology type. This generation is based on parallel processing, Hardware & intelligence software based generation.

Languages:-

- (1) C
- (2) C++
- (3) Java
- (4) .Net
- PHP
- C#
- VB.Net

Designing:-

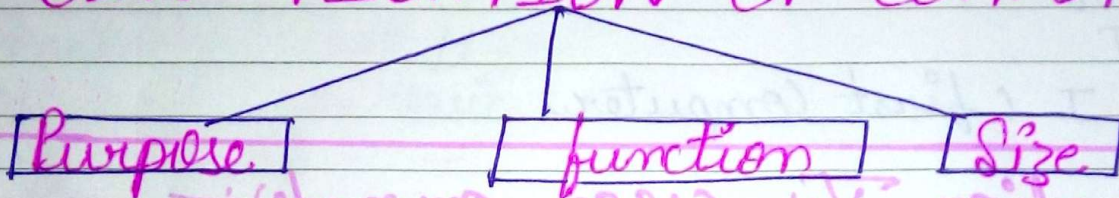
HTML, DHTML, CSS, XML

IT features:-

- (1) Robotics
- (2) Neural Network
- (3) Game playing programming
- (4) Development of expert system to make decision in real life situation.
- (5) VLSI technology based
- (6) Advanced in parallel processing
- (7) More user friendly
- (8) Advanced in super conductor technologies (ex: Silver, Pt)

- (9) Interface with multi media feature
- (10) Ability of very powerful and compact computer and cheaper rates
- (11) Development of true artificially intelligence
- Computers:—
- (1) Laptop (3) Palmtop
- (2) Desktop (4) Notebook

★ CLASSIFICATION OF COMPUTER —



- Computer depend on their data processing abilities.
- They are classified to purpose, data handling and function ability.
- Acc. to purpose computers are either **General purpose** & **Specific purpose**.
- Computers are designed to perform a range of task.
- Whenever specific purpose used for a specific task according to data ending.

★ ON THE BASIS OF FUNCTIONALITY

- (1) **Analog Computer** —
- Analog Computer is a form of computer that uses continuously physical phenomena such as electrical, mechanical or hydraulic quantities to model the problem the solved.

• Analog computers work on the principle of measuring in which the measurements obtained are translated into data.

Example :-

- Voltmeter for voltage measurement.
- Ammeter for current measurement.

(2) Digital Computer

• A computer that performs calculation and logical operation with quantities represented as digits usually in the binary No. systems.

• Digital computers are those that operate with information numerical or otherwise represented in a digital form. Such computers process data into a digital value they give the result with more accuracy & faster rate.

- Examples → Laptop, desktop, palmtop, netbook, tablet etc.

(3) Hybrid Computer

• A combination of computers those are capable of inputting and outputting in both digital & analog signals.

• A hybrid computer system set up offers a cost effective method of performing complex simulation.

• Hybrid computers incorporate the measurement feature of an analog computer and counting features of a digital computer.

Examples :-

- Scientific and medical use.

★ ON THE BASIS OF SIZE:-



(1) Super Computer — ^{its database is large}

- It is an extremely fast computer which can execute hundreds of millions of instructions per second.
- The fastest and more powerful type of computer. Super computers are very expensive & are employed for specialised applications.

Examples —

- Weather forecasting requires a super computer, animated graphics, fluid dynamics, nuclear energy research and petroleum exploration.

$$1\text{MB} = 1024\text{KB}$$

(2) Mainframe Computer —

- Very large and expensive computer. This type of computers capable of supporting hundred or even thousands of users simultaneously.
- In the hierarchical division with a simple micro processor it become top level & micro frame are just below super computers.
- In some ways main frames are more powerful than the super computers because they support more simultaneous programmes.

(3) Mini Computer —

- It is a multi user computer system which is capable of supporting hundreds of user can work at a time it is a mid size computer.
- In size & power mini computers lie between work stations and main frame computers. Mini computer is multi processing computer system.
- Example - Tablet.

(4) Micro Computer or PC —

(a) Desktop computer —

- A personal or micro computer sufficient to fit on a desk.
- It is a single user computer.
- Micro computer or personal computer have powerful micro processor.

(b) Laptop —

- A portable computer complete with an integrated screen and keyboard

It is generally smaller in size than a desktop computer and larger than a notebook computer.

(c) Palmtop, digital diary or Notebook —

A handsize computer like palmtop, digital diary, mobile, tablet, etc are known as small size or palm top type computers.

Palmtop computers have no keyboard but the screen or screens both has an input & output of computer or device.

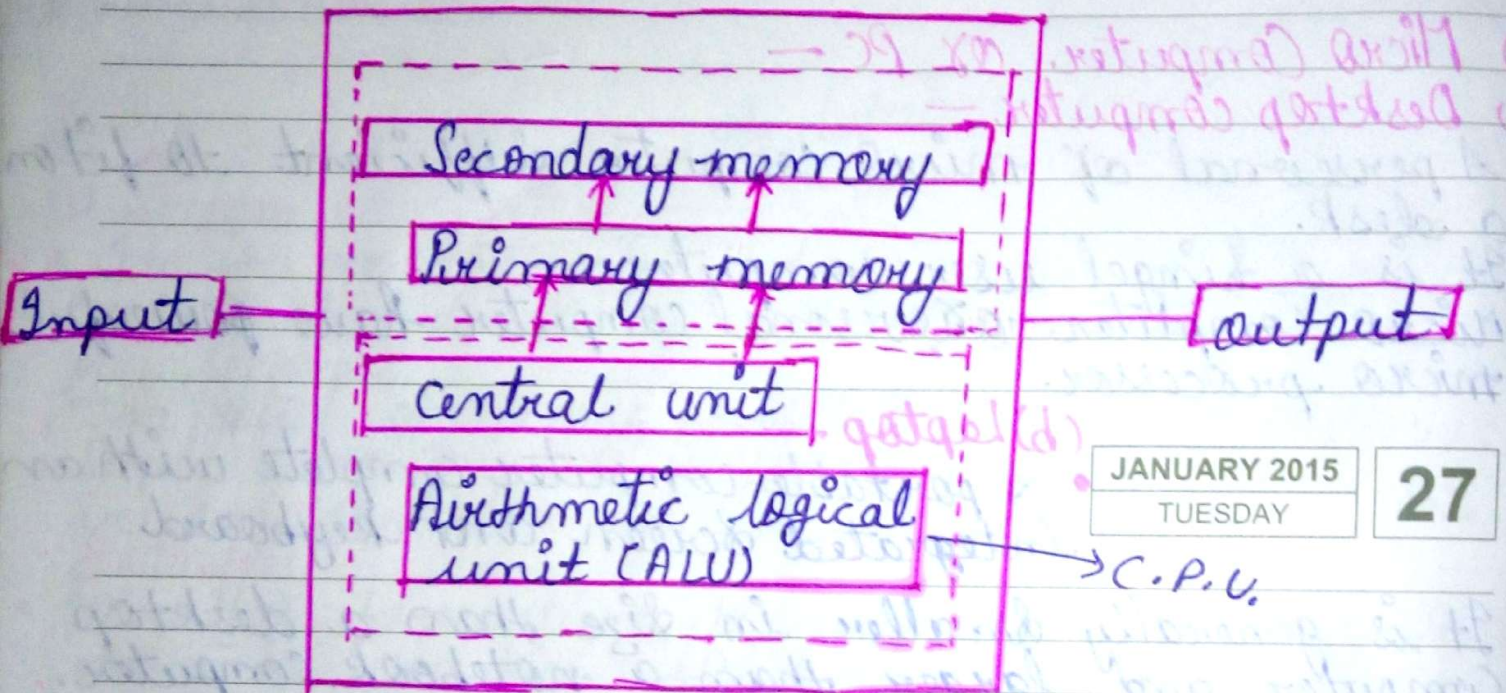
(5) Work Stations —

- It is also a single user computer system which is similar to personal computer but have more powerful microprocessor.

- A terminal or desktop computers are lies in work station type computer.

— BASIC COMPUTER —

— ORGANIZATION —



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TUESDAY

27

Block diagram of Computer

- ① Input unit / Input device —
 - An input device is an electromechanical device that accepts data or informations from outside world and translated into a form of computer language.
 - An Input device convert incoming data and instructions into a pattern of electrical signal like binary code these devices are called input devices.
 - A devices that all type of information or data give to computer processor that device is input device.

- (1) Keyboard
- (2) Mouse
- (3) Joystick
- (4) Track ball
- (5) Scanner
- (6) Microphone
- (7) MICR
- (8) OCR (Optical character Reader)
- (9) OMR
- (10) BCR (Bar Code Reader)
- (11) Light pen
- (12) Magnetic Strip Reader (MSR)
- (13) Web cam
- (14) Video display terminal (VDT)
- (15) Graphical tablet or digitizer

(1) Keyboard —

- Most common and very popular input device is keyboard.
- The keyboard helps in inputting the data to the computer.
- The layout of the keyboard is like that of traditional typewriter.
- Keyboard are of two sizes 84 keys &c. 101/102 keys but later it become 104-108 keys are also available.
- Keyboard can be divided into type keys.

Standard keys

Multimedia / extended keyboard

- According to connection code keyboards are of three types

PS2

Send data parallelly with high speed

Wireless



8 pins, out of 5 only 4 pins are come in use

- Keyboard have F_1 to F_{12} function keys, 0 to 9. Ten digit key, a to z alphabet keys and have some

Special types of keys.

(2) Mouse —

- Mouse is most popular pointing device. It is a very famous cursor controlled device.
- It is a small size device with a round ball at its base which sense the movement of mouse and send corresponding signals to C.P.U.
- It has two buttons called left and right and scroll bar is present at the mid.

Types of Mouse —

Wheel Mouse

Optical Mouse

→ Optical Mouse :-

- Optical mouse completely electronic mouse which have a sensor and a laser beam.
- Optical mouse sense direction by sensor with using laser beam or magnetic wave.
- According to connection port mouse are three types —

PS₂

USB

wireless

- Other mouse is laptop mouse mainly operation of mouse is like click (Single click or double click) & drag and drop.

(3) Joystick —

- Joystick is also a pointing device which is used to move cursor position on a monitor screen.
- It has stick with a ball at its both lower and upper ends.
- Joystick is mainly used to play game.

It often has one or more push button called switches whose position also be read by computer.

(4) Track Ball —

A track ball is a pointing device consisting of a ball held by a socket containing sensor to detect a rotation of ball such as up and down.
 Track ball is an input device or computer cursor controlled device used in many notebooks and laptop computers.

(5) Light Pen —

Light pen is a pointing device which is similar to a pen.
 It is used to select a displayed menu item or draw pictures on the monitor screen.
 It consists of a photocell and optical system placed in a small tube when light pen tips are moved over the monitor screen and pen button is pressed.
 Its photocell sensing elements detects the screen location & send the signals to C.P.U.

(6) Scanner —

Scanner is an input device which works like a photocopy machine.
 It is used when some information is available on a paper & it is to be transferred to the hardisk of the computer for further manipulation.
 When a document is scan it is converted into a digital format.
 This creates an electronic version of the document that can be viewed and edited on a computer.

• A scanner is a device that optically scan image printed text, hand written text or object then converts it to a digital image.

(7) Microphone or Speech recognition —

- Microphone is a input device to input sound that stored in digital form.
- The microphone is used for various application like adding sound to a multimedia presentation or mixing music.
- A microphone is an example of transducer (used in boosting the sound and catching the signal).
- A device that change information from one form to other.

(8) Optical Scanner —

(a) MICR —

- Magnetic Ink Character Reader (Recognition).
- It is a character recognition technology. used mainly by the banking, industries to ease the processing & clearances of cheques & other documents.
- The MICR and encoding called the MICR line is at the bottom of cheques.
- MICR records to scale and read the information directly into a data connection device.
- MICR characters can be read easily by humans like.
- MICR code is usually 9 digit codes.
- Comparison of some imp. inf. about the transaction & the bank.
- The first 3 digits in the MICR code represent the city code i.e. the city in which the bank.

branch is located.

In MICR code next 3 digits for bank code & next 3 digits for bank branch code, where bank is placed

940 199 (b)

(b) OCR →

Optical Character Reader.

OCR is an input device used to read a printed text.

OCR is the recognition of printed or written text characters by a computer. This process is character done by photoscanning of the text character by character analysis of the scanned image and then translate of the character image into character code such as ASCII Code.

It commonly used in data processing.

OCR is a technology that enables us to convert diff. types of documents such as

(i) Scanned paper document,

(ii) PDF files or image captured by a digital camera. PDF = Portable document format.

(c) BCR —

Bar Code Reader

Bar Code Reader is a device used for reading Bar Code data.

Bar coded data is generally used in labelling goods, No. the books, print value of cost etc.

It may be a hand held scanner or may be embedded in a stationary scanner.

Bar Code reader scans a Bar Code image convert it into a alpha numeric value which is then fed to the computer.

To which bar code reader is connected

- BAR Code reader also known as price scanner or point of sale scanner

(d) Opt OMR →

Optical Mark Reader.

OMR is typical type of optical scanners and

to OMR is special type of optical scanner used to recognition the type of mark made by pen or pencil. It is used when one out of a few alternatives is to be selected and marked.

It is specially used for checking the answer sheet of examinations having multiple choice questions that called OMR sheet and device known as optical mark Reader.

OMR processing is popular for test where student receive a special card containing several empty circle and a special docket that contain the questions and possible answers to each of the question

(e) MSR —

- Magnetic strip reader.

A magnetic strip reader also called a message strip reader is a H/W device that read the information and coded in the magnetic strip located on the back of plastic edge.

Magnetic strip reader can be read by a computer program through a serial code USB connections or keyboard generally char categorised by the way

Array → group of same elements

MAR 2015	S	M	T	W	T	F	S	S	M	T	W	T	F	S
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	15	16	17	18	19	20	21	22	23	24	25	26	27	28
	29	30	31											

TATA HITACHI

FEBRUARY 2015

WEDNESDAY

11

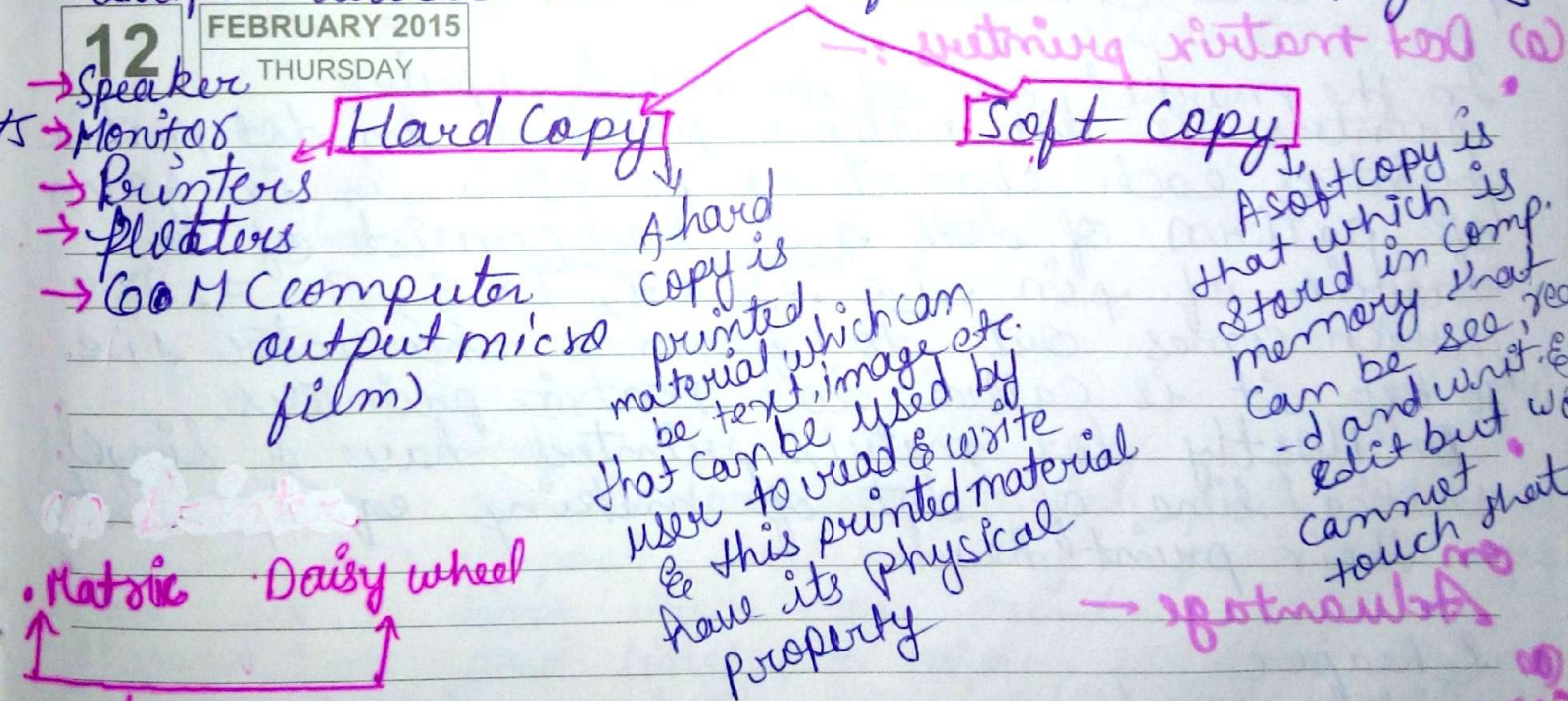
they read a badge (Ovals). ← printing format

(P) Web cam (digital camera) —

- A web cam short form of web camera it is also known as digital camera that connected to a computer and use with web browser.
- It can send like picture format where it is sitted to other location means of the internet

CLASSIFICATION OF OUTPUT DEVICES —

Output devices can be classified in two categories —



(1) Printers

Impact

Non-Impact

Character printer

line printer

Impact printers →

Impact printers print the characters by striking them on the ribbon which is then pressed on the paper.

It prints by physically touching the printing material.

It is noisier slower for printing (slow speed) poor printing quality.

It is usually cheaper and it can produce multiple copies at the same time by using carbon paper.

It used ink floated ink coated ribbon that also known as cartridge cartridge

These are of two types →

(1) Character printers →

Character printers are those printers which print one character at a time →

(a) Dot matrix printers :-

In the market one of the most popular printers is dot matrix printers. In dot matrix printers each characters printed is in form of pattern of dots and had consist of a matrix of pin size. 5×7 , 7×9 , 9×7 , 9×9 which comes out to form a character i.e.

why it is called dot matrix printers.

Mostly dot matrix printers have a single vertical line of dot of making equipments on their print head.

Advantage →

- Cheaper
- widely used
- Other language character can be printed
- portable
- Reliable

Disadvantage —

- (1) Slow Speed
- (2) Poor Printing quality

(b) Daisy wheel —

A kind of Impact printer where the character are arranged on the end of the spokes of the wheel had is laying on being lying on wheel and pins C to character are like patterns of daisy (flower name) i.e. why it is called Daisy wheel printer.

The wheel is rotated to select character to print them and electrically operated hammer mechanism, the selected spoke forward striking

Advantage —

(a) More reliable than D.M.P.

(b) Better quality

(c) The fonts of character can be easily changed

Disadvantage

- (a) Slower than D.M.P.
- (b) Noisy
- (c) More expensive than D.M.P.

Line Printer →

Line printer are the printers which print line at a time an impact printer that printers are line at a time then can print.

300 to 3000 and lines per min., so that they are very fast. Line printer are still validly used in data center line printers can be classified into category.

1. Drum printer →

A line printer that uses a rotating drum with raised characters against which the papers press. This printer like a drum in a shape. It is a cold drum printer. The surface drum of is divided into numbers of tracks. Total tracks are equal to size of paper.

A paper with of 132 character drum will have 132 tracks.

The different character sets in the market in this printer papers is placed between the ribbon and printer head (hammer) there are many plane size then be connected to drum.

Advantage → (i) Very fast

Disadvantage → (i) Very expensive (ii) graphics printing property not possible

★ Non-Impact Printer —

Non impact printers prints the character without using ribbon. These printers print a complete page at a time. So they are also called as a page printers.

There are two types of Non-Impact printer —

Non-Impact printer

Lasex Printer

Ink Jet Printer

② Laser printer →

• A laser printer is a popular type of printer that use as a non-impact photocopier technology.
 • They use laser light/beam to produce the dots needed to form the character to be printed on page when a document is send to the printer a laser beam draw the documents on a selenium coated drum using electrical charges.
 After the drum is charged it is roller in toner ^{powder} a dry powder type of ink.
 The toner adhesive to the charge image on the drum. The toner is transferred onto a piece of paper and fused to the paper with heat pressure. After the document is printed the electrical charges is removed from the drum and the excess toner is cancelled.

★ Advantage →

21 FEBRUARY 2015
 SATURDAY

Very high speed
 Very high quality output.
 Give good graphics quality.
 Support many font size & diff. character size.

Disadvantage →

→ Expensive

→ Cannot be used to produce multiple copies of a document in a single printing.

① Inkjet printers → Ink jet printers are non impact character printers based on relatively new technology.

Ink jet printers are specially popular as portable printers.

They print character by spring small drops of ink onto paper.

22 SUNDAY

Ink jet produce high quality output with extra features these drops lets ionised which allow them to be directed by magnetic plates in the ink path.

→ Advantage —

- (1) High quality printing than laser.
- (2) More reliable
- (3) portable
- (4) low printing cost than dot matrix.

→ Disadvantage —

- (1) Slow in speed than laser printer.
- (2) Per paper printing cost is high.

✦ Chain printer →

A line printer in which the type is an a continuous chain of a character set are used so it is called chain printer.

A starter character set may have 48, 64, 96, character. There are also some hammer these are placed in front of the chain and paper placed between the hammer and inked ribbon.

The total number of hammer will be equal to the total number of print position this printer chain is rotated at very high speed and character is printed by activity of hammer with a suitable character.

Advantage →

1. Character fonts can easily change.
2. Different language can be use.
3. fast speed.
4. Multiplied copies can be created.

Disadvantage →

1. Noisy
2. A paper character chain system cannot be find.

Projector →

It is an output device. It is used to display any image or information on a big screen by using a light beam.

It works the same as monitors but one difference is that it produces output or results on a big screen.

In a projector, any information is converted into light rays or beams.

Plotter →

It is the same as a printer but it prints 3D graphics by itself whenever a normal printer cannot print 3D graphics or images.

Monitors →

(1) Cathode Ray Tube Monitor (CRTM) →

26

FEBRUARY 2015

THURSDAY

CRT Monitors made by cathode ray tube.

- CRT is a large bulky size monitor.
- It has high power consumption so, it is not appropriate/suitable for portable devices.
- It is cheaper and has better brightness so, it is preferred by graphics designers.
- The CRT display is made up of small picture elements or pixels.
- The smaller pixels are better the range clarity or resolution.
- A finite number of characters can be displayed on a screen at a time. The screen can be divided into a series of characters raised fixed locations on the screen where a statement character can be placed.
- CRT monitors have high resolution or picture quality. So, it is popular in Photoshop designers.

Advantage → (1) It has better brightness.

(2) It is cheaper in cost.

(3) It is more readable or durable.

(4) It has better regulations.

(5) It has better graphics and larger view angle.

Disadvantage → (1) It has no portable.

(2) It required high power (more consumable).

(3) Big size & occupies more space.

(4) Due to its high brightness human eyes are negatively effected.

(2) TFT (Thin film Transistor) monitors →

- It is based on thin film transistor.

- It is used less power consumption.

- It is small in size and also portable. It is more reliable or durable. It has better contrast.

→ Advantage: -

(1) It is portable

(2) It is small in size.

(3) It is cheaper (as compare to CRT).

(4) It operate 0 to 5 watt.

→ Disadvantage: -

(1) less view angle $< 180^\circ$.

(2) It has more sensitive screen.

Com →

- It is the product of copying information from electronic media onto micro film.
- Com technology has been used for document and newspaper etc.
- Computer output microfilm (COM) is a system that converts stored data directly to micro film.
- COM system are still used today mostly by organisations who need to store payroll, accounting, insurance, inventory or employees data.
- COM to microfiche they have to manually search for a record and use a reader printer to save output in a particular file.

Audio output →

(a) Speakers →

- Speakers are used with computers although usually capable of other audio uses for e.g. MP₃ player most such speakers has an internal amplifier and consequently require a power source which may be a mains power supply often via an AC adapter, batteries; USB port
- USB port may supply both signal and power
- Computer speakers range widely in quality and price.
- Computer speakers sometimes packaged with comp. system are small plastic and have media case. Sound quality computer attach speaker become multimedia speakers because it have computer inbuilt itself and general speakers have not inbuilt amplifier both type speakers are audio output.