

UNIT-2

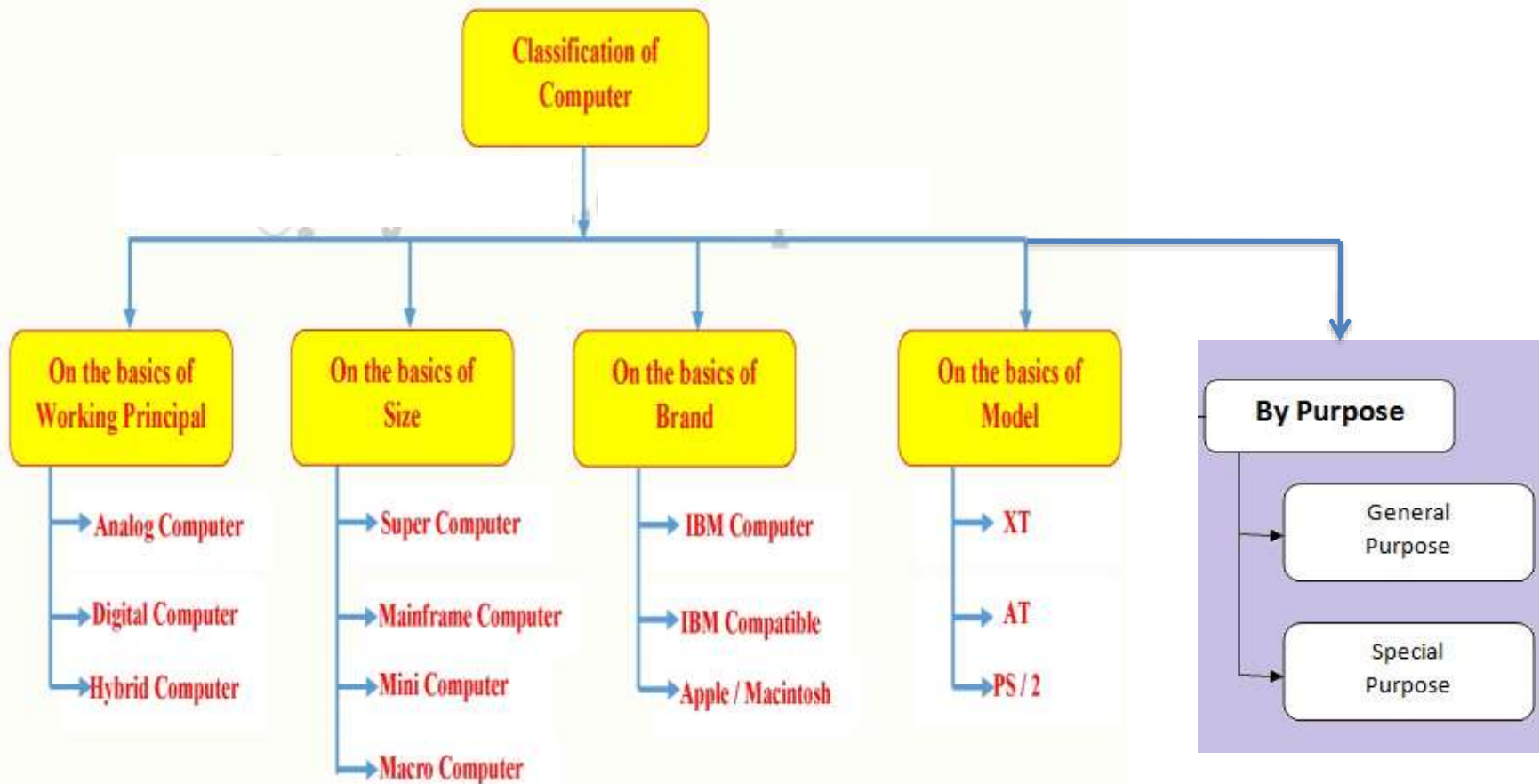
Classification Of Computer

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General concept

A single computer can be microcomputer on the basis of size , IBM compatible on the basis of brand , AT computer on the basis of model , digital computer on the basis of working principle and general purpose computer.

Classification of computer



On the basis of working Principle

Difference between Analog Computer and Digital Computer :

S.NO.	ANALOG COMPUTER	DIGITAL COMPUTER
01.	Analog computers works with continuous values or these types of systems process continuous data.	Digital computers works with discrete values or these types of systems process discrete data.
02.	Speed of analog computers is less than the digital computers.	Speed of digital computers is more than the analog computers.
03.	Analog computer has very low or limited memory and it can store less amount of data.	Digital computer has very big memory it can store large amount of data.

04.	Analog computer has no state.	Digital computer has On and Off these 2 steps.
05.	Analog computers are less reliable than digital computers.	Digital computers are more reliable than analog computers.
06.	Its performance is comparatively low.	Its performance is very high.
07.	Its speed of processing is not so high.	Its speed of processing is very high.
08.	Analog computers depends upon physical variations.	Digital computers does not depend upon physical variations.

09.	It provides results with less accuracy as compared to digital computers.	It provides results with higher accuracy as compared to analog computers.
10.	Analog computers are difficult to use.	Digital computers are not so difficult to use.
11.	Analog computers have complex architecture.	Digital computers do not have so complex architecture like analog computers.
12.	Readability of analog computer is low.	Readability of digital computer is high.
13.	Analog computers show the result in terms of voltage signals.	Digital computers show the result in computer display screen.

14. Analog computers employs analog encoding.

Digital computers employs digital encoding.

15. Power consumption is high.

Power consumption is low.

16. They are usually special purpose devices.

It can be general purpose devices.

17. Examples includes analog clock and thermometer etc.

Examples includes Digital laptop, digital camera, digital watches etc.

Hybrid Computers



- ❧ A hybrid computer combines the desirable features of analog and digital computers.
- ❧ It is mostly used for automatic operations of complicated physical processes and machines.
- ❧ Now-a-days analog-to-digital and digital-to-analog converters are used for transforming the data into suitable form for either type of computation.
- ❧ Hybrid computers are mainly used for specialized tasks.

Hybrid Computer

A hybrid computer is a type of computer that offers the functionalities of both a digital and an analog computer. It is designed to include a working analog unit that is powerful for calculations, yet has a readily available digital memory. In large industries and businesses, a hybrid computer can be used to incorporate logical operations as well as provide efficient processing of differential equations.

Advantages include the availability of both analog and digital computations within a single unit and an efficient processing speed. A hybrid computer is individually designed and integrated, taking into consideration the field of its application and processing requirements. A hybrid computer is constructed in such a way that its components make the device fast and accurate.

Advantages Of Hybrid Computers

- It combines the best features of both digital and analog.
- Hybrid computers have the accuracy of analog and speed of digital computers

Applications

- In hospitals
- In Air Defence system

Hybrid Computer

Combine the best feature of both digital and analog systems

Characteristics:

1. Works on both analog and digital data
2. Speedy like analog
3. Accuracy like digital
4. They are used mainly in specialized applications where both analog and digital information needs processing
5. Weather forecasting, Air Defense, Radar Controlling systems, digital petrol pumps etc.
6. In petrol pumps, fuel flow converts into quantity and then quantity is converted into values.

Examples:

1. Electronic cardiograph (ECG)
2. Automatic Teller Machine (ATM)

On the basis of Size

Supercomputer:

A **supercomputer** is a computer that performs at or near the currently highest operational rate for computers. Traditionally, supercomputers have been used for scientific and engineering applications that must handle very large databases or do a great amount of computation (or both). Although advances like multi-core processors and GPGPUs (general-purpose graphics processing units) have enabled powerful machines for personal use .

At any given time, there are a few well-publicized supercomputers that operate at extremely high speeds relative to all other computers. The largest, most powerful supercomputers are really multiple computers that perform parallel processing. In general, there are two parallel processing approaches: symmetric multiprocessing (SMP) and massively parallel processing (MPP).

Super Computer

The fastest type of computer.

Supercomputers are very expensive and are employed for specialized applications that require immense amounts of mathematical calculations.

For example, weather forecasting requires a supercomputer.

Other uses of supercomputers include animated graphics, , nuclear energy research, and petroleum exploration.

Characteristics

- *Powerful*
- *Expensive*
- *Dedicated to one purpose - weather, satellites, military*
- *Used by large governments or very large companies*
- *Can be used by thousands of people at the same time*
- *Very large - fill rooms*

Characteristics:

- The size of the supercomputer is very large (even up to a room-size).
- Powerful CPU and storage units are assembled.
- These are costly devices and mainly used in scientific research and complex computational works like weather forecast, calculating population, etc.
- These computers are capable of doing complex calculations very fast and also may have decision-making capabilities.

Example:

CRAY X-MP/24 , NEC-500 , PARAM , ANURAG , Fujitsu etc.

Mainframe Computer

Mainframe computer likes as a big centralized machine that contains the large memory, huge storage space, multiple high grade processors, so it has ultra processing power compare to standard computer systems. So, **mainframe computer system's importance** is increasing for large scale organization, scientific research, consumer statistics, and census data, because it is capable to execute multiple complex programs concurrently at the ultra speed. Today, most eminent vendors of mainframe computers are IBM, Hitachi, Amdahl, and Unisys.

- A mainframe computer, informally called a mainframe or big iron , is a computer used primarily by large organizations for critical applications, bulk data processing such as the census and industry and consumer statistics, enterprise resource planning, and large-scale transaction processing.
- A mainframe computer is larger and has more processing power than some other classes of computers, such as minicomputers, servers, workstations, and personal computers.
- Mainframe computers are designed to support hundreds or thousands of users simultaneously. They can support multiple programs at the same time.

Advantages

- The processing speed is very fast.
- Can handle multiple inputs at same time.
- Redundancy, Can withstand failure of a part without affecting the function of rest of the computer.
- Always available, as once started they will remain on for rest of the time.
- Reliability.

Mini Computer

- A minicomputer is a type of computer that possesses most of the features and capabilities of a large computer but is smaller in physical size.
- A minicomputer fills the space between the mainframe and microcomputer, and is smaller than the former but larger than the latter.
- Minicomputers are mainly used as small or mid-range servers operating business and scientific applications.
- A minicomputer may also be called a mid-range computer. Minicomputers emerged in the mid-1960s and were first developed by IBM Corporation.
- Minicomputers are generally used as mid-range servers, where they can operate mid-sized software applications and support numerous users simultaneously.

- Minicomputers may contain one or more processors , can support 4 to 200 users at one time, support multiprocessing and tasking, and are generally resilient to high workloads.
- Although they are smaller than mainframe or supercomputers, minicomputers are more powerful than personal computers and workstations.

Micro Computer

Microcomputer is also known as personal computer. A microcomputer is a computer with a central processing unit (CPU) as a microprocessor. It is a general purpose computer that is designed for individual use. Microcomputer is smaller than a mainframe or a minicomputer. A microcomputer's CPU includes random access memory (RAM), read-only memory (ROM) memory, input/output (I/O) ports, interconnecting wires and a motherboard. Laptops and desktop computers are examples of microcomputers.

A Micro computer can be categorized as

- **Portable and**
- **Non portable**

The micro computer in portable category is:

1. Laptop
2. Notebook
3. Tablet PC
4. Palm Top
5. PDA

Laptop :

- It is portable computer , which is easy to carry from one place to another .
- It is smaller to fit on the lap of the users and light to carry also called mobile computer.
- A laptop is a personal computer that can be **easily moved** and used in a variety of locations.
- Most laptops are designed to have all of the functionality of a desktop computer, which means they can generally run the same **software** and open the same types of **files**. However, laptops also tend to be more expensive than comparable desktop computers.
- A laptop has an all-in-one design, with a built-in monitor, keyboard, touchpad (which replaces the mouse), battery, and speakers.

Notebook

- A notebook computer is a battery- or AC-powered personal computer generally smaller to fit on the hand or palm of users and light to carry also called mobile computer.
- It is also designed for the people in move. But it is smaller in size compared to laptop.
- It has reduced keyboard , screen and usually doesn't contain CD/DVD drive due to its limited size.
- Among the best-known makers of notebook and laptop computers are IBM, Apple, Compaq, Dell, Toshiba, and Hewlett-Packard.

Tablet PC

- A tablet PC or simple tablet , is a mobile computing device with display , circuitry and battery in a single unit.
- Tablet is equipped with sensors , including camera , microphone and touch screen with finger or stylus gestures replacing computer mouse and keyboard.
- It may include physical buttons , like speaker volume , power , and ports for network communications and battery.
- An on screen , pop up virtual keyboard is usually used for typing instructions.
- Example : Apple's iPad , Samsung Galaxy Tab , Lenovo Idea Tab...

Tablet PC

- A tablet is a wireless, portable personal computer with a [touch screen](#) interface.
- The tablet [form factor](#) is typically smaller than a notebook computer, but larger than a [Smartphone](#).
- A tablet, or tablet PC, is a portable computer that uses a [touch screen](#) as its primary [input device](#).
- Most tablets are slightly smaller and weigh less than the average [laptop](#).

Palm Top

- Palm top is also a portable PC with the size of our palm. Unlike laptop and notebook, it has very limited memory and features.
- It is mainly used for storing phone numbers , addresses ,pictures , calendar and other small data...

PDA (Personal Digital Assistant)

- PDA is also a species of portable computer. It is a mobile computing device that works as a personal information manager.
- It is much limited in terms of the task , it can perform.
- PDA contains facilities such as colored screen , scientific calculator , digital diary for storing telephone numbers and addresses , web browser ,cell phone for communication , audio – video and games.
- At present , the use of PDA has decreased due to the popularity of smart phones and Tablet PC.

Non - Portable

The micro computer in non – portable category can be:

1. Personal Computer
2. Workstation computer

Personal computer: It is small computer that easily fits on a normal sized office table. It is generally designed to be used by one person at a time. It is the common computer and can be found everywhere like office, college , hospital and shop..

Workstation computer

- A workstation is a specialized computer which has more power and features than a standard desktop PC.
- Thus it lies between Mini computer and Personal Computers.
- The Processing power is typically 5 to 10 times more than that of PC.
- Workstation usually has larger main and backup memory , larger and high resolution monitor and graphics handling capabilities.
- This machine is mainly popular among database administrators , scientists , engineers, animators and graphics designers , who need a faster system and the power to perform sophisticated tasks than PC.

On the basis of Brand

IBM PC : IBM stands for International Business Machine . The IBM is one of the largest computers and other electronic equipment manufacturing company in the world, founded by an American Herman Hollerith in US in 1924 AD. The micro computers of IBM company are called IBM PC . It is leading company in computer manufacturing. IBM computers are reliable , durable and processes high speed processing.

IBM computers are of two types:

1. IBM PC
2. IBM Compatible PC

IBM pc: This computer is developed by IBM Corporation itself , so it is also called a “branded” or “original IBM PC”. It is expensive , durable and reliable than IBM Compatible PC.

IBM Compatible PC : This computer is developed by companies other than IBM Company but uses the parts and principle of IBM. IBM compatible can use hardware and software designed for the IBM PC. It is generally called as “assembled or duplicate of IBM PC “ and it is comparatively cheaper than the IBM PC.

Apple Macintosh :

The computers that are manufactured by Apple Company but having different architecture and configuration than IBM Compatibles are known as Apple Macintosh. Apple Company was established in late 1970s and giving a good competition to IBM company.

Purpose wise computer can be classified into two types::

- General Purpose Computer
 - Special Purpose Computer
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- **1. General Purpose Computer** – These computer can store different programs and can thus be used in countless application. A General Purpose Computer can perform any kind of jobs with equal efficiency simply by changing the application program stored in main memory.
 - **2. Special Purpose Computer** – A Special Purpose Computer is the one that is designed to perform only one special task. The program or instructions set is permanently stored in such a machine. It does its single task very quickly and it cannot be used for any other purpose.
These computers are often used to perform specific function such as controlling a manufacturing process or directing communications.

ON THE BASIS OF Model

There are three types (model) of computer that are as follows:

- XT Computers (Extended Technology)
- AT Computers (Advanced Technology)
- PS/2 Computers (Personal System 2)

XT Computers :

The computers having 8086 or 8088 microprocessor and processing speed of 4.77 MHz are known as XT Computers. These computers are outdated now because they cannot run on latest software versions.

AT Computers :

The computers having 80286 or later versions of microprocessors are known as AT Computers. Their storage capacity as well as speed is much higher than XT computers. Besides that they have math co-processor to support main processors to perform complex mathematical calculations.

PS/2 Computers:

IBM developed another model of computer in 1990 that have much advanced architecture design than AT computers. They are known as PS/2 computers. They are much faster than AT computers. Most of the laptop computers based on PS/2 model use OS/2 or UNIX operating system and 1.44 MB floppy diskette