Certificate in Computer Applications (CCA)
Study Material

CCA -101: Fundamentals of IT & Programming
Part 1 (Unit 1.1.1 to Unit 1.5)

Supported by
Institute of Management Studies (IMS),
Ghaziabad-UP

About CCA Program

The certificate program focuses on computer fundamentals. This program provides a comprehensive introduction to Fundamentals of Information Technology; Computer Applications; Internet & Communication Technologies; Web Programming; and Soft Skills.

The program is designed and conducted by CSC Academy along with one of the leading Management Institute, Institute of Management Studies, Ghaziabad (UP). Some of the core subject faculty are associated in delivering this program.

After the completion of this course, student will be able to:

- Get a basic understanding of personal computers and their operations.
- Use of MS Office Tools - Like MS word, MS excel and Power point presentations
- Understand basics of Programming.
- Recognize and describe the working of Computer Networks.
- Get familiar with the basics of communication skills
- Develop good skills at writing business letters, emails, minutes of meeting and other business correspondence.
- Design and Implement interactive, responsive web site using HTM5L, CSS5 and JavaScript.
- Build Dynamic web site using server-side PHP Programming and Database connectivity.

The CCA program covers five course modules:

Unit 101: Fundamentals of IT & Programming

Unit 102: Data Communications

Unit 103: Soft Skills & Communications

Unit 104: Web Technologies

Unit 105: Cyber Security

The objective of this study material is to provide the students to enable them to obtain knowledge and skills in the related subject. This material is not in itself to be read alone, and student should use this in addition to the CCA online e-learning content study. In case students need any further clarifications or have any suggestions to make for further improvement of the material contained herein, they may give the same at CSC Academy Centre.

All care has been taken to provide content in a manner useful to the students.

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About CSC Academy

CSC Academy was setup in 2017 that provides access to professional learning for learners of diverse backgrounds and educational needs. The CSC Academy is a not-for-profit society under the Societies Registration Act 1860 (Act 21 of 1860), as applicable to the Union of Delhi with its registered office in Delhi. The CSC Academy board comprises of the Additional Secretary, Ministry of Electronics & Information Technology, Government of India as Chairman, and others reputed members from academia. CSC Academy has received certificate from Income Tax Department under section 12 AA and 80 G.

The CSC Academy is committed to teaching, delivering of specialized courses/ training programs, leadership, communication skills and promotion of entrepreneurship among the rural masses in India. Presently, the CSC Academy is delivering various Government of India sponsored skill and education programs, in addition to courses from private sector.

About Institute of Management Studies, Ghaziabad (UP)

IMS Ghaziabad is a pioneer institute for management education in Northern India. It is the first institute of IMS Society Ghaziabad with 30 glorious years of excellence. IMS Ghaziabad offers full time AICTE approved & NBA accredited PGDM Programme which has been awarded the MBA equivalent status by the Association of Indian Universities (AIU), PGDM - International Business, PGDM - Big Data Analytics and MCA Programme are approved by AICTE and affiliated to Dr APJ AKTU, Lucknow.

Since its foundation IMS Ghaziabad has gathered a lot of feathers in its cap with global accreditations and memberships such as Accreditation Services for International Colleges (U.K), AACSB Business Education Alliance, National Assessment and Accreditation Council - 'A' Grade.

IMS Ghaziabad is amongst Top 10 best B-Schools in North India as per latest MBA and B School Rankings. It has been awarded as the "Best Campus for Industry Oriented Management Education in India / Asia Pacific 2019" by ASSOCHAM and the Education Post. It has been ranked as 5th in North India and 15th in India by Times of India B School Survey, February 2019, A++ Institute in Delhi - NCR by 9th Chronicle B-School Survey 2018.

Table of Contents

Course Outline

Course Objective

This subject aims to introduce skills relating to basic concepts and terminology of information technology & programming.

Course Outcomes

At the end of this course, student should be able to:

1. Understand basic concepts of I.T.
2. Have a basic understanding of personal computers and their operations.
3. Able to use MS office tools.
4. Understand basics of Programming.

Course Details

Unit I Introduction

Introduction to computers: definitions, evolution, characteristics, Organization of a Computer, Classifications, Distributed Computers, Parallel Computers.

Computer Memory: Random Access Memory (RAM), Read Only Memory (ROM), External Memory (Secondary Memory), Compact Disk Read Only Memory, Magnetic Storage Drives, USB.

Software: Types of S/W - System Software: Operating System, Utility Programs Application Software, Overview of proprietary software, Overview of open source technology.

UNIT II Introduction to MS Word

MS Word Processing basics: Menu Bar, Using the Icons below Menu Bar; Opening and closing Documents: Save and Save as, Page Setup, Print Preview.

Text Creation and manipulation: Document Creation, Editing Text, Text Selection, Cut, Copy and Paste, Spell check.

Formatting the Text: Font and Size selection, Alignment of Text, Paragraph Indenting, Bullets and Numbering, Changing case;

Formatting a document: Set page margin, paragraphs and sections within a document, Adjust indents

and hanging indents;

Table Manipulation: Draw Table, Changing cell width and height, Alignment of Text in cell, Delete / Insertion of row and column Border and shading, Table Formula.

UNIT III Spreadsheets and Presentations

Spread Sheet: Opening of Spread Sheet, Addressing of Cells, Printing of Spread Sheet, Saving Workbooks.

Manipulation of Cells: Entering Text, Numbers and Dates, Creating Text, Number and Date Series, Editing Worksheet Data, Inserting and Deleting Rows, Column, Changing Cell Height and Width.

Formulas and Function: Using Formulas, Function, basic mathematical operators, using AutoSum etc., using formulas with multiple cell references;

Presentation - Basic Concepts of presentation: Using PowerPoint, Opening A Power Point Presentation, Saving A Presentation; Creation of Presentation using a Template, Creating a Blank Presentation, Entering and Editing Text, Inserting and Deleting Slides in a Presentation; **Preparation of Slides:** Inserting Word Table or An Excel Worksheet, Inserting Other Objects,

UNIT IV Introduction to Programming

Programming Language: Machine Language, Assembly Language, High Level Language their advantages & disadvantages. Basic concepts – data types and its representation in programming, basic arithmetic operations – addition, multiplication, division, modulus; conditional checks, relational and comparisons and loops

Reference books

1. Introduction to Information Systems,JamesO'Brien,GeorgeMarakas,TMH
2. “Information Technology for Management”, (2010) Behl, Ramesh, 1st Ed Tata McGraw Hill, NewDelhi
3. Alexis & Mathews: “Fundamentals of Information Technology”, VikasPublication.
4. Turban - Information technology for Management : Transforming Organization in Digital Economy 7/e-Wiley
5. Henry Lucas, Information Technology For Management,TMH

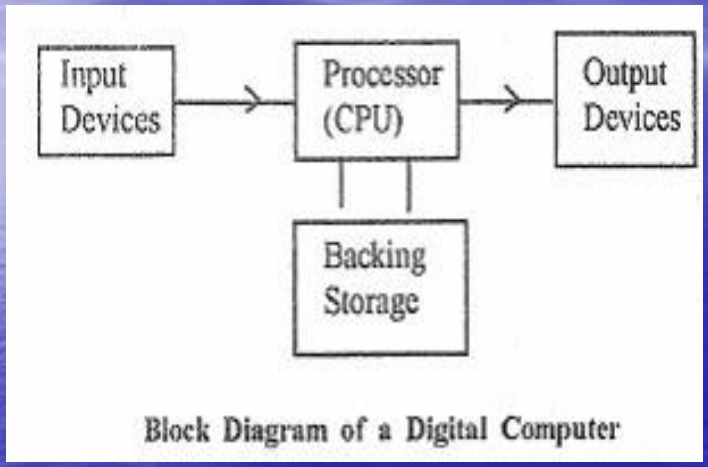
Unit I Introduction

Unit 1.1.1 Introduction of Computer

Computer

It is a programmable electronic device designed for storing and processing data, based on sequence of instruction.

A computer is a fast system that is organized to accept, store, and process data and produce output results under the direction of a stored program of instructions.



Block Diagram of a Digital Computer

Unit 1.1.2: Evolution (Development in Succession)

- The evolution of digital computing is often divided into generations.
- Each generation is characterized by dramatic improvements over the previous generation in the technology used to build computers, in terms of the internal organization of computer and programming languages.

First Generation: Vacuum Tubes (1940-1956):

- The first computer systems used vacuum tubes for circuitry and magnetic drums for memory
- These computers were very expensive to operate
- Computers of this generation consumed a lot of electricity

- First generation computers relied on machine language, the lowest-level programming language understood by computers to perform operations
- They could only solve one problem at a time. It would take operators days or even weeks to set-up a new problem
- Input was based on punched cards and paper tape, and output was displayed on printouts

- First computers generated a lot of heat ,which was often the cause of malfunctions

Example:

- The UNIVAC (Universal Automatic Computer)

  The UNIVAC was the first commercial computer delivered to a business client, the U.S. Census Bureau in 1951
- ENIAC (Electronic Numerical Integrator and Computer) computers

Second Generation: Transistors (1956-1963):

- Transistors replaced vacuum tubes in the second generation of computers.
- The transistor was far superior to the vacuum tube, allowing computers to become smaller, faster, cheaper, more energy-efficient and more reliable than their first-generation predecessors

- Second-generation computers still relied on punched cards for input and printouts for output

- Second-generation computers moved from binary machine language to symbolic, or assembly language

Third Generation: Integrated Circuits (1964-1971)

- The development of the integrated circuit was the hallmark of the third generation of computers
- Transistors were replaced by Integrated circuits, which drastically increased the speed and efficiency of computers.

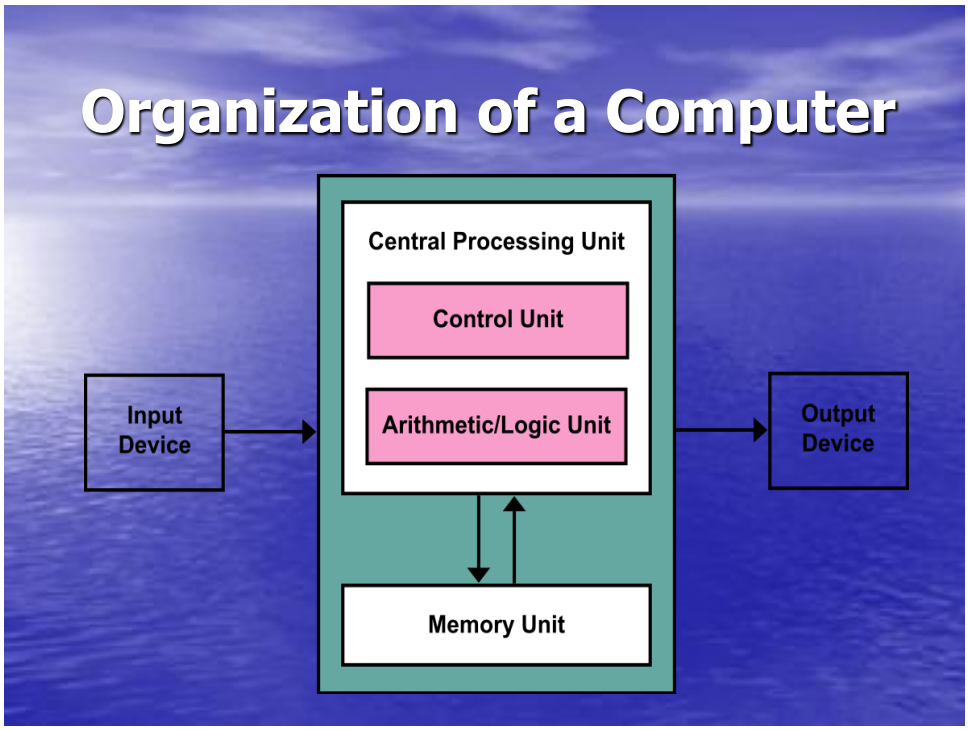
- Instead of punched cards and printouts, users interacted with third generation computers through keyboards and monitors
- Computers for the first time became accessible to a mass audience because they were smaller and cheaper than their predecessors.

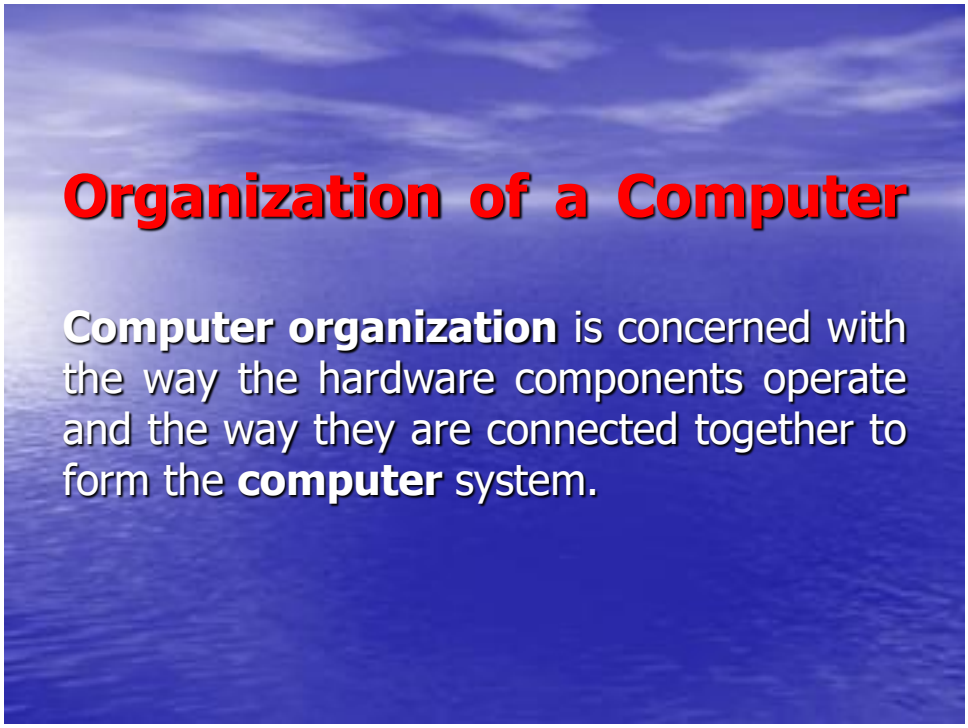
Fourth Generation: Microprocessors (1971-Present):

- The microprocessor brought the fourth generation of computers as thousands of integrated circuits were built onto a single silicon chip
- What in the first generation filled an entire room could now fit in the palm of the hand

- In 1981, IBM introduced its first computer for the home user
- in 1984, Apple introduced the Macintosh.
- Microprocessors also moved out to the desktop computers
- Fourth generation computers also covered the development of Graphical User Interface(GUIs), mouse and handheld devices

Unit 1.2.1 : Organization of a Computer





Input Devices: Computer systems use many devices for input purpose.

Input devices include the mouse, input pen, touch screen and microphone.

Regardless of the type of device used, all are components for interpretation and communication between people & computer systems.

Some example of Input devices

Keyboard is a human interface device which is represented as a layout of buttons. Each button or key can be used to either input a character to a computer, or to call upon a particular function of the computer

Keyboard

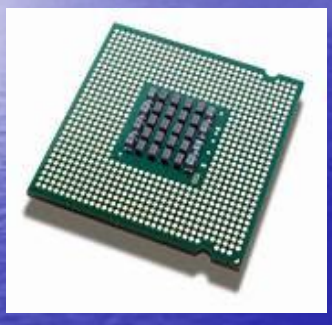
Mouse

- A **mouse** is a small handheld input device that controls a computer screen's cursor or pointer in combination with the way it is moved on a flat surface.
- The **mouse** term name originates from its likeness to a small, corded and elliptical shaped device that looks like a **mouse** tail.

Central Processing Unit (CPU) :

It is the brain of the computer. Computer can not process without it.

CPU Image



Output device

Output device is used to show the result of the instructions.

Example: Monitor, printer, Headphones, etc.

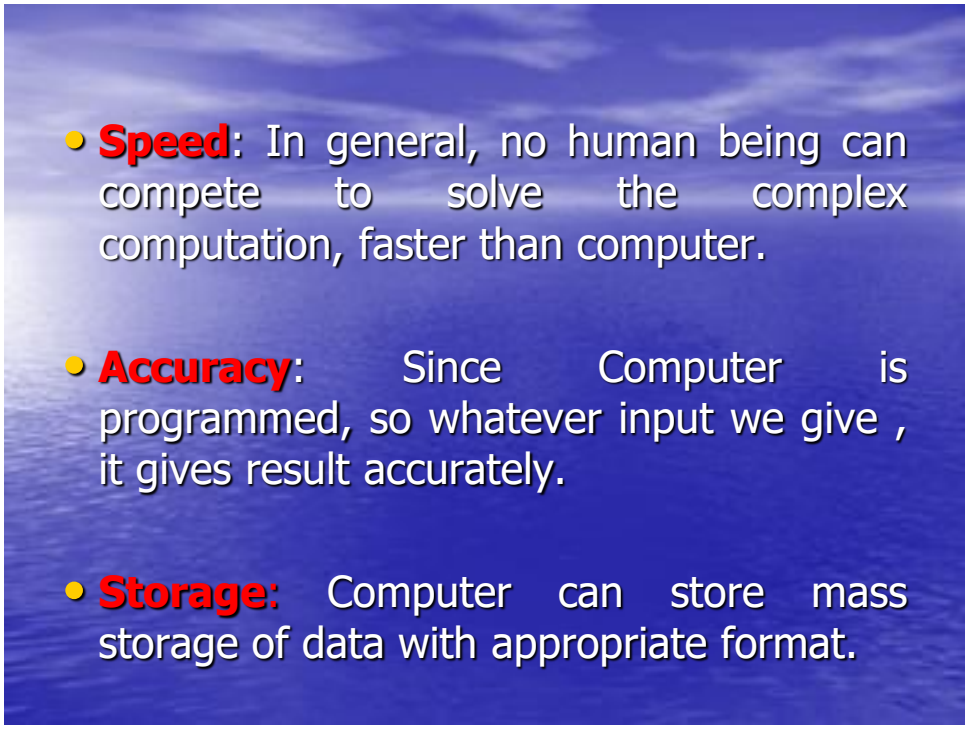
Monitor View

A **computer monitor** is an output device that displays information in user understandable form

Memory unit: A memory unit is the collection of storage **units** or devices together. The memory unit stores the binary information in the form of bits.

Hard disk view

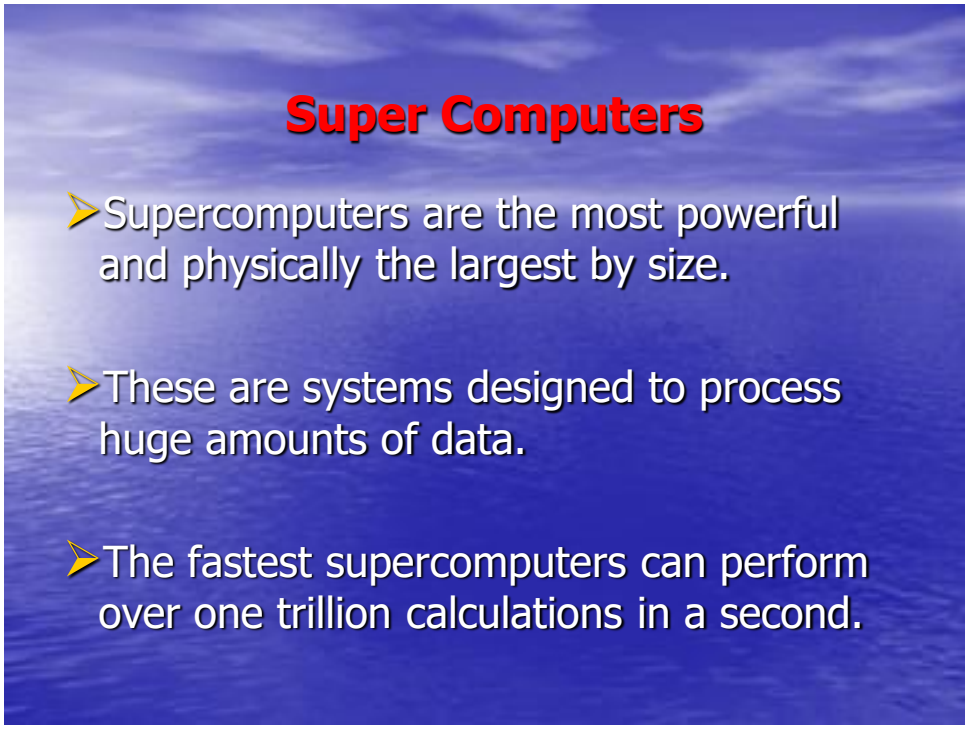
Unit 1.2.2 : Characteristics of Computer



- **Carefulness**: Computer can work for hours without creating any error.
- **Versatility**: We can use computer to perform completely different type of work at the same time.
- **High Power of Memory**: It can remember facts/data for us.

- **No Feeling**: Computer does not have emotions, knowledge, experience and feeling
- **No IQ (*Intelligence Quotient*)**: Computer does not work without instruction

Unit 1.3.1-Classifications of Computers



- Supercomputers have thousands of processors.
- Because of their extraordinary speed, accuracy and processing power, supercomputers are well suited for solving highly complex problems & huge amounts of calculations.
- Example: JAGUAR, ROADRUNNER etc

Supercomputers View

Mainframe Computer

- Mainframe computers are very large often filling an entire room and can process thousands of millions of instructions per second.
- In a mainframe environment, users connect to the mainframe through the many terminals wired to the mainframe.

- Mainframes are capable of supporting hundreds to thousands of users simultaneously.
- Some of the functions performed by a mainframe include: flight scheduling, reservations and ticketing for an airline etc

Example: IBM mainframes Z13, IBM System z9 mainframe

Mainframe computers View

Minicomputers

- Minicomputers are much smaller than mainframes.
- These computers are also less expensive.
- Sometimes referred to as Midrange Server or Midrange Computer.

- They are typically larger, more powerful and more expensive than desktop computers.
- Midrange computers are usually used by small and medium-sized businesses as their servers
- Users connect to the server through a network by using desktop computers.

Example: Apple iPod, CDC 160A

Minicomputers view

Microcomputers

- Microcomputers are the most frequently used type of computer.
- It is also, known as Personal Computer (PC)
- A microcomputer is a small computer system designed to be used by one person at a time.

Example :Desktop **computers,** laptops

Micro computers View

Unit 1.3.2-Type of Computation

Distributed Computation

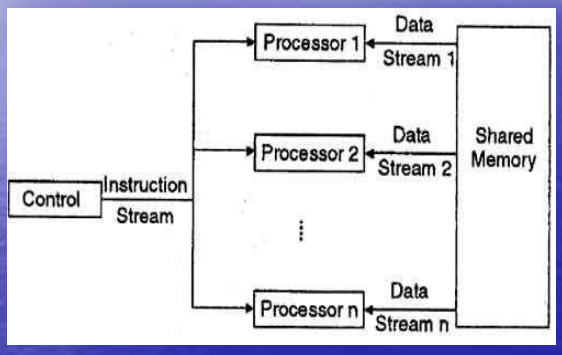
- It is a model in which components of a software system are shared among multiple computers to improve efficiency and performance.
- As per micro approach about the concept, distributed computing is limited to programs with components shared among computers within a limited geographical area.

Parallel Computation

- It is a type of computation in which many calculations or the execution of processes are carried out simultaneously.
- Large problems can often be divided into smaller ones, which can then be solved at the same time.

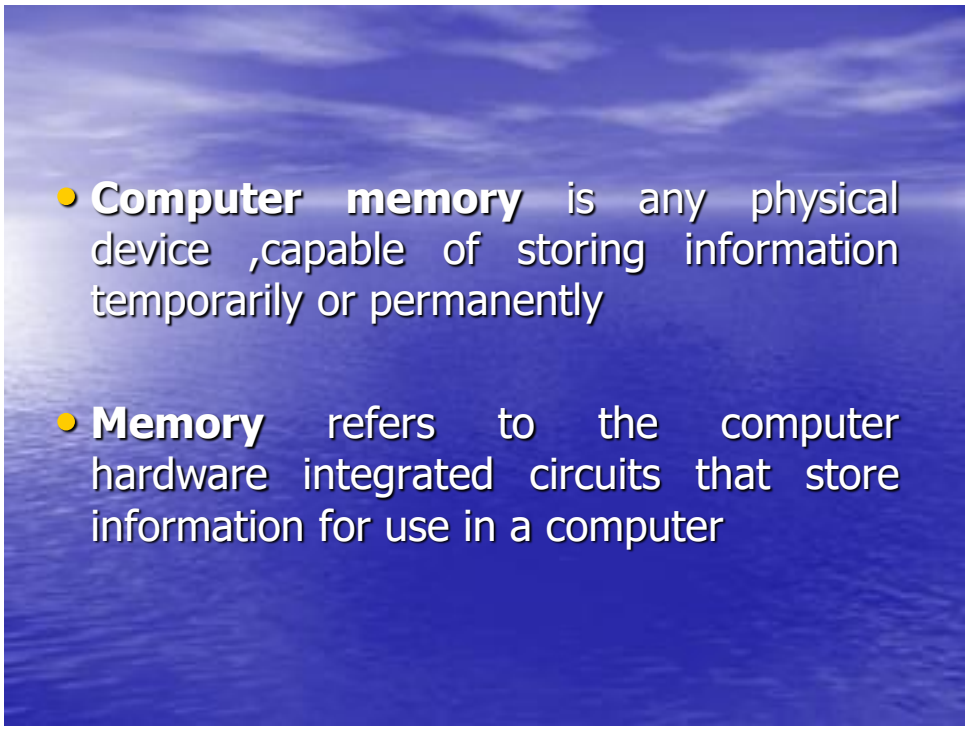
- In parallel computing, all processors may have access to a shared memory to exchange information between processors.

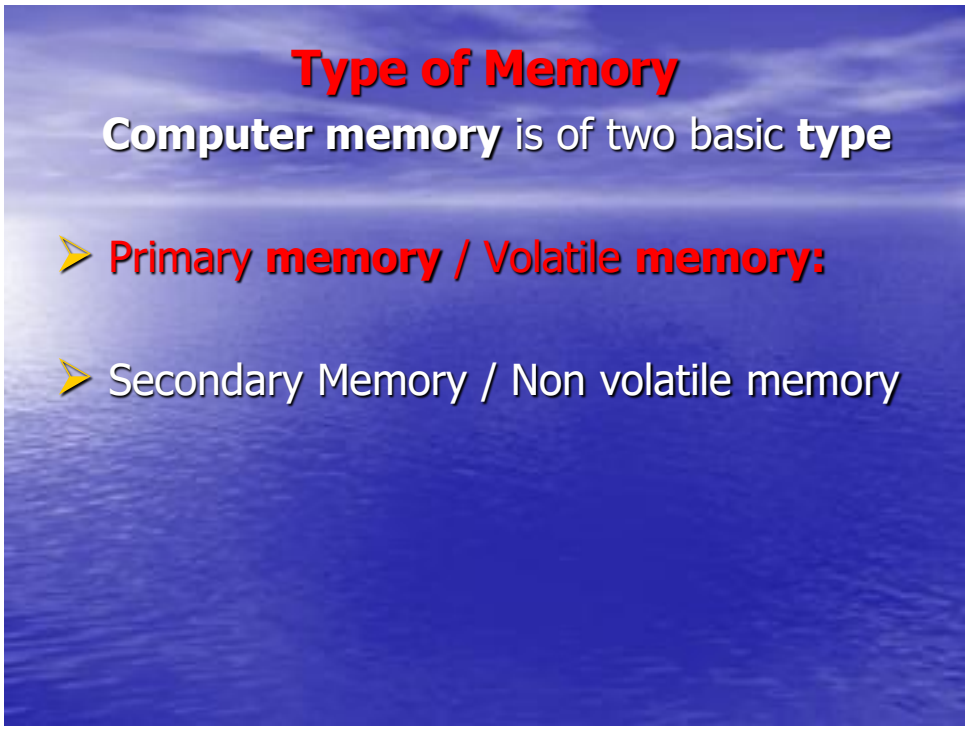
Working of parallel computation



Difference Between Parallel computing and Distributed Computing		
S.No	**Parallel computing**	**Distributed Computing**
1	Type of computation in which many calculations /executions of the processes are carried out simultaneously	A system whose components are located at different network computers which communicate and coordinate by passing their messages
2	It occurs in a single computer	It involves multiple computers in coordination
3	Computer uses shared memory	Each computer has its own memory
4	Processors of Computer communicate using bus	Computers communicate with each other through network

Unit 1.4.1 : Memory





1) Primary **memory** / Volatile **memory:** **Volatile memory** is a computer storage that only maintains its data while the device is powered

Example: RAM (Random access memory) is volatile. When we are working on a document, it is kept in **RAM**, and if the computer loses power, your work will be lost.

2)Secondary memory/ non-volatile memory: **Non-volatile memory** is a type of computer **memory** that has the capability to hold saved data even if the power is turned off.

Example: Read-only **memory** (ROM), Hard disk, floppy disk ,etc

Random Access Memory (RAM):

- It is also called as read write memory or the main memory or the primary memory.
- The programs and data that the CPU requires during execution of a program are stored in this memory.

- It is a volatile memory as the data loses when the power is turned off.
- RAM is further classified into two types- SRAM (Static Random Access Memory) and DRAM (Dynamic Random Access Memory).

Read Only Memory (ROM) –

- Stores crucial information essential to operate the system, like the program essential to boot the computer.
- It is non volatile.

- Always retains its data.
- Used in embedded systems or where the programming needs no change.
- Used in calculators and peripheral devices.
- ROM is further classified into 3 types- *PROM*, *EPROM* and *EEPROM*

Types of Read Only Memory (ROM):

- **PROM (Programmable read-only memory)** – It can be programmed by user. Once programmed, the data and instructions in it cannot be changed.
- **EPROM (Erasable Programmable read only memory)** – It can be reprogrammed.
- To erase data from it, expose it to ultra violet light.
- To reprogram it, erase all the previous data.

EEPROM (Electrically erasable programmable read only memory) –

- The data can be erased by applying electric field, no need of ultra violet light. We can erase only portions of the chip.

Comparison :RAM vs. ROM

S.N.	RAM	ROM
1	Temporary Storage	Permanent Storage
2	Store data in MBs	Store data in GBs
3	Volatile	Non-Volatile
4	Used in normal operations	Used for startup process of computer
5	Writing data is faster	Writing data is slower

Unit 1.4.2 : Secondary Software

Secondary Memory

It Consists of all permanent or persistent **storage** devices such as read-only memory (ROM), flash drives, hard disk drives (HDD), magnetic tapes, etc.

- Primary memory has limited storage capacity and is volatile.
- Secondary memory overcomes this limitation by providing permanent storage of data and in bulk quantity.
- Secondary memory is also termed as external memory and refers to the various storage media on which a computer can store data and programs.

- The Secondary storage media can be fixed or removable.
- Fixed Storage media is an internal storage medium like hard disk that is fixed inside the computer.
- Storage medium that are portable and can be taken outside the computer are termed as removable storage media.

Compact Disc Read-Only Memory

- A CD-ROM is a CD that can be read by a computer with an optical drive.
- The "ROM" part of the term means the data on the disc is "read-only", or cannot be altered or erased.
- Because of this feature and their large capacity, CD-ROMs are a great media format for retail software.

Magnetic Storage Drives

- Magnetic storage is one of the most affordable ways to store large amounts of data.
- Magnetic storage uses the two types of magnetic polarities to represent the binary information consisting of zeros and ones.

- Commonly used devices that use magnetic storage include magnetic tape, floppy disks and hard-disk drives.
- Magnetic media is coated with a magnetic layer which is magnetized in clockwise or anticlockwise directions.
- When the disk moves, the head interprets the data stored at a specific location in binary 1s and 0s at reading.

Floppy Disk:

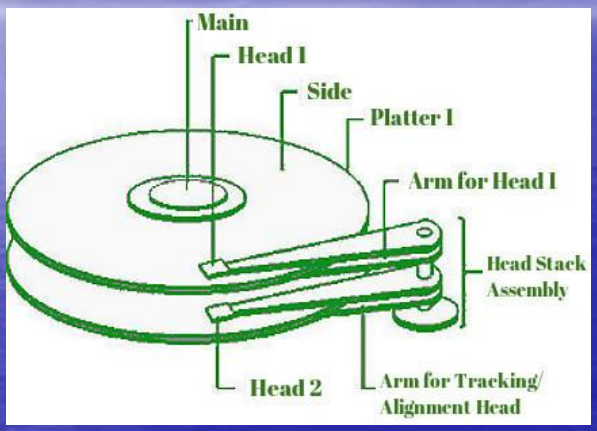
- A floppy disk is a flexible disk with a magnetic coating on it.
- It is packaged inside a protective plastic envelope.
- These are one of the oldest types of portable storage devices that could store up to 1.44 MB of data but now they are not used due to very less memory storage.

Hard disk:

- A hard disk consists of one or more circular disks called platters which are mounted on a common spindle.
- Each surface of a platter is coated with a magnetic material.
- Both surfaces of each disk are capable of storing data except the top and bottom disk where only the inner surface is used.

- The information is recorded on the surface of the rotating disk by magnetic read/write heads.
- These heads are joined to a common arm known as access arm.

Internal hard disk view

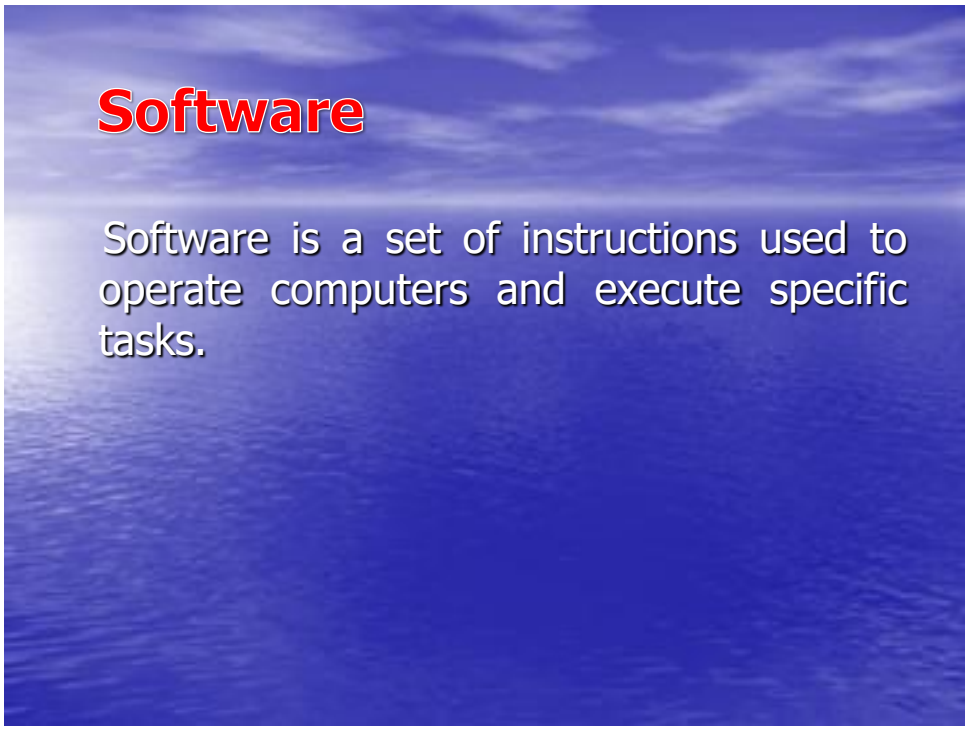


Universal Serial Bus (**USB**)

- A Universal Serial Bus (**USB**) is a common interface that enables communication between devices and a host controller such as a personal computer (PC).
- It connects peripheral devices such as digital cameras, mice, keyboards, printers, scanners, media devices, external hard drives and flash drives.

USB View

Unit 1.5 : Software



System Software

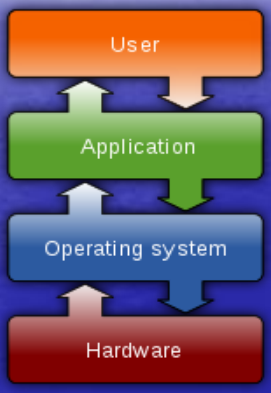
- It is a type of software that is designed to run a computer's hardware and application programs.
- Software like operating systems, compilers , editors and drivers etc., come under this category.
- A computer cannot function without the presence of system software.

If we think of the computer system as a layered model, the system software is the interface between the hardware and user applications.

Operating system(OS)

- It is system software that manages computer hardware and software resources and provides services.
- Operating system acts as manager of all the resources of computer i.e. **resource manager.**

Thus, operating system becomes an interface between user and machine.



Operating System Representation

Application Software

- It is software created for a specific purpose, used by end users. It can be called an application or simply an app.
- Examples: Word processor, accounting application, a web browser, an email client, media player etc

Some other type of software

Utility Programs :

- These programs analyze and maintain a computer.
- These programs are focused on how OS works to perform the task to enable the smooth functioning of computer.

This program may come along with OS like windows defender, windows disk cleanup tool, Antivirus, backup software, files manager, disk compression tool all are utility software.

Proprietary Software:

- It is software that is owned by an individual or a company (generally the one that developed it).
- There are almost always major restrictions on its use, and its source code is almost always kept secret.

- The proprietary Software is a non-free computer software for which the software's publisher or another person retains intellectual property rights usually copyright of the source code.
- It is also known as 'closed-source software'.

Overview of open source technology

Open source technology is defined as the development of software for allowing end users and developers to not only see the source code of software, but modify it as well.

Open source software (OSS)

- It is a type of computer software in which **source** code is released under a license in which the copyright holder grants users rights to study, change and distribute the software to anyone and for any purpose.
- The Linux operating system (OS) is the best-known examples of open source software .