Code: BSE-101   **First semester: Basics of Computer System**   **Credits: 04**
Course

Objectives: 1. Study of motherboard components.

2. Basic knowledge 4. Study of Computer Languages

Of computer evolution. 3. Managing Hardware Devices   4. Study of Computer Languages

Course Outcome: 1. Design, install, configure, troubleshoot and manage components of computer systems. 2. Apply basic knowledge of Hardware Devices. 3. Install, manage, and maintain Computer System. 4. Best Practices for Computer assembling.

Unit-1: Introduction: Characters of computers, The Evolution of computer, generations of Computer, Classification of computers, Basic computer organization

Unit2:   Hardware Component on Motherboard: Mother Board and its types, Types of HDD,   Types of RAM, Types of Chipsets, Microprocessor and its type, IDE and SATA cable other parts on motherboard

Unit-3: Input Output Devices: Input devices, Point-and-draw devices, Data scanning devices, Digitizer, Electronic card reader Output device, Monitors, Printers, Plotters, Screen image projector.

Unit-4: Processor & Memory : Central processing unit, The control unit, Arithmetic logic unit ,Instruction sets , Registers, Processor speed ,Types of processors, The main memory ,Storage evaluation criteria ,Main memory organization

Unit-5: **Secondary Storage Devices** :Sequential and Direct-Access Devices ,Magnetic tape ,Basic principles of operation Types of magnetic tapes ,Advantages & disadvantages of magnetic tapes , Uses of magnetic tapes ,Magnetic disks.

) **Unit-6** : **Computer Language**: machine Language, Advantages & Limitations of Machine Language, Assembly Language Assembler , Advantages & limitations of Assembly Language , Level Language Compiler, Linker, Interpreter, Advantages & limitations of high level language.

Reference book:

1. Fundamental of Computer –By Pradeep k.sinha &priti sinha
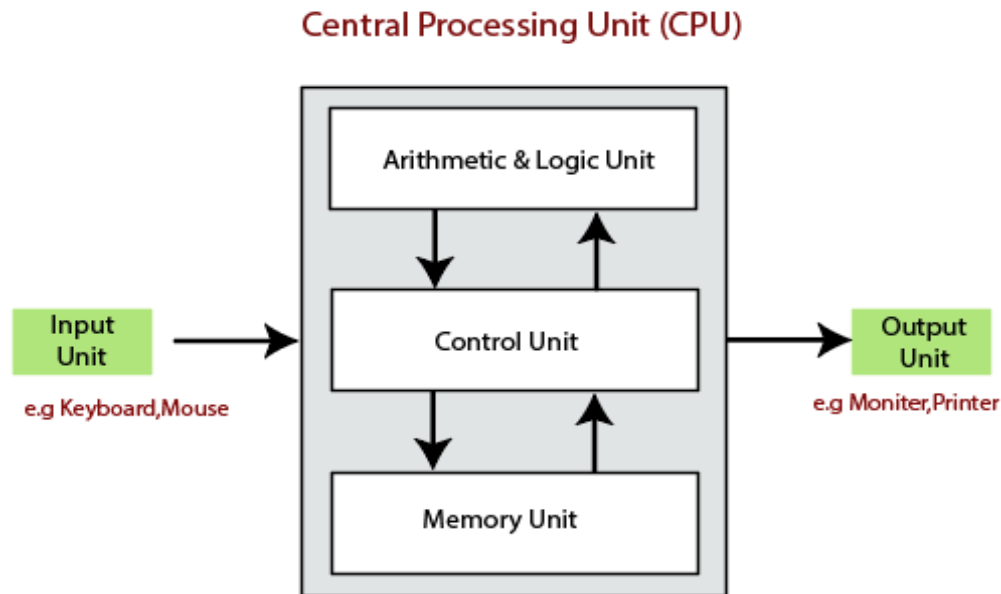2. Fundamental of computer system(low price edition

 Unit I

Basic Computer Organization:

Definition of Computer:- **"c**omputer is an electronic device which accept data from input device (keyboard, mouse) process it and gives result output to display screen &monitor"

"Computer is an electronic device data processing which accepts and

Stores data input, processes the data input, and generates the output

In a required format."

Basic Computer Organization:-

Central Processing Unit (CPU)

Arithmetic & Logic Unit

Input Unit

e.g Keyboard,Mouse

Control Unit

Output Unit

e.g Moniter,Printer

Memory Unit

Fig: Block Diagram of computer organizations

Basic Computer Organization are as follows:

1. **Input Unit:**

The process of sending the data and Instructions for the processing

Through some suitable devices such as Keyboard, Mouse etc. is

Called Input. The devices translate the data from human

Understandable form into electronic impulses which are understood

By the computer.

2. **Central Processing Unit (CPU):-**

Once the data accepted it fed in to Central Processing Unit before

The output is generated as data has to be processed, which is done

By CPU. This unit of the computer is the brain of computer system,

Which does all the processing, calculations, problem solving and

Controls all other functions of all other elements of the computer.

The CPU consists of the following three distinct units namely. 1.

Memory Unit   2. Control Unit   3. Arithmetic and Logic unit.

i**) Memory Unit**: This holds the data in in terms of Program and

Files. The data stored can be accessed and used whenever required

By the CPU for necessary processing. This memory unit is usually

Referred as primary storage section. The units in which memory

Unit is measured are known as BYTES. BYTE is the space

Required to store 8 characters or alphabet or digits to any other

Special character.

ii**) Control Unit**: This unit which coordinates all the activities of

Each and every element of computer. It decodes the instructions

Given by various users and it sends commands and signals that

Determine the sequence of various instructions. Through this unit

Does not process data but it acts as the central system for data

Manipulation, as it controls the flow of data to and from the main

Storage.

iii**) Arithmetic and Logic Units:-**

This unit performs arithmetic operations such as addition,

Subtraction, multiplication and division. It also does Logical

Operations such as comparison of numbers etc. Thus this unit helps

By processing data and taking logical decisions. 3. Output: - The

Processing of extracting the data from CPU through some suitable

Devices is called Output. The common used output devices are

VDU, Printers, Plotter, magnetic media like floppy, hard disk.

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    i.   Are VDU, Printers, Plotter, and magnetic media like floppy Disks etc?

Characteristics of Computer:-

1**) High Speed**

Computer is a very fast device.

It is capable of performing calculation of very large amount of data.

2) **Accuracy**

In addition to being very fast, computers are very accurate.

The calculations are 100% error free.

Computers perform all jobs with 100% accuracy provided that

Correct input has been given.

 3**) Storage Capability**

Memory is a very important characteristic of computers.

A computer has much more storage capacity than human beings.

It can store large amount of data.

It can store any type of data such as images, videos, text, and audio

And many others.

4**) Diligence**

It can work continuously without any error.

It can do repeated work with same speed and accuracy.

5) Versatility (versatile)

A computer is a very versatile machine.

A computer is very flexible in performing the jobs to be done.

6) Reliability

A computer is a reliable machine.

Modern electronic components have long lives.

Computers are designed to make maintenance easy

7) Automation: Computer is an automatic machine.

Automation means ability to perform the given task

Automatically.

Once a program is given to computer i.e. stored in computer

Memory, the program and instruction can control the program

Execution without human interact

The evolution of computer:

 Overview: The term Computer, originally meant a person capable of performing numerical calculations with the help of a mechanical computing device. The foundation stone of the development of computers was laid way back in the era before Christ. Binary arithmetic is at the core of computer systems.

The history of computers dates back to the invention of a mechanical adding machine in **1642. ABACUS**, an early computing tool, the invention of logarithm by John Napier and the invention of slide rules by William Ought red were significant events in the evolution of computers from these early computing devices. Here's introducing you to the ancestors of modern computers.

 # Abacus was invented in 2400 BC.

 # Pin gala introduced the binary number system, which would later form the core of computing systems.

 # later in 60 AD, Heron of Alexandria invented machines that could follow instructions. Who knew back then that this idea would evolve into intelligent machines?

#

. The 1600s witnessed the invention of slide rules, the system of movable rods based on logarithms used to perform basic mathematical calculations, and a mechanical adding machine, which in some way, laid the foundation of modern-day calculating machines or computers. 1800s saw some remarkable feats in the history of computers. They included:

 # a punching card system was devised by Joseph Marie Jacquard in 1801.

 # Charles Babbage designed the first mechanical computer in 1822 and the Analytical Engine in 1834.

 # Morse code was invented in 1835 by Samuel Morse

 # George Boole invented the Boolean algebra in 1848, which would later be at the heart of programming

First Generation – Vacuum Tubes (1940 – 1956)

These ancient computers utilized vacuum tubes as circuitry and magnetic drums for recollection. As a result they were huge, actually taking up entire rooms and costing resources to run. These were ineffective materials which produce a huge amount of heat, sucked enormous electricity and subsequently engendered an abundance of heat which caused perpetual breakdowns.

These first generation computers relied on 'machine language' (which is the most fundamental programming language that can be understood by computers). These computers were limited to solving one problem at a time. Input was predicated on punched cards and paper tape. Output emerged on print-outs. The two eminent machines of this era were the UNIVAC and ENIAC machines – the UNIVAC is the first ever commercial computer which was purchased in 1951 by a business named as the US Census Bureau.

Second Generation – Transistors (1956 – 1963)

The supersession of vacuum tubes by transistors, visualized the onset of the second generation of computing. Although first invented in 1947, transistors weren't used considerably in computers until the cessation of the 1950s. They were a huge development over the vacuum tube, despite the fact still subjecting computers to destroying different levels of heat. However they were extremely superior to the vacuum tubes, making coma king computers smaller, more expeditious, inexpensive and less burdensome on electricity use. They still count on punched card for input/printouts.

The language emerged from strange binary language to symbolic ('assembly') languages. This meant programmers could discover instructions in words. Meanwhile during the same time high caliber programming languages were being developed (early versions of COBOL and FORTRAN). Transistor-driven machines were the first computers to store instructions into their recollections, peregrinating from magnetic drum to magnetic core 'technology'. The anticipatory versions of these machines were created for the atomic energy industry.

Third Generation – Integrated Circuits (1964 – 1971)

By this phase, transistors were now being miniaturized and put on silicon chips. This led to a huge improvement in speed and effectiveness of these machines. These were the first computers where users interacted utilizing keyboards and monitors which interfaced with an operating system, a consequential leap up from the punch cards and printouts. This facilitated these machines to run various applications at once utilizing a central program which functioned to monitor memory.

As a result of these advances which again made machines more reasonable and tinier, a brand new group of users emerged during the '60s.

Fourth Generation – Microprocessors (1972 – 2010)

This innovation can be defined in one word: Intel. The chip-maker accomplished the Intel 4004 chip in 1971, which located all components of computer such as CPU, recollection, input/output controls onto a single chip. What overcrowded a room in the 1940s now gets fit in the palm of the hand. The Intel chip contained thousands of unified circuits. The year 1981 saw the first ever computer (IBM) categorically designed for home use and 1984 saw the Macintosh introduced by Apple. Microprocessors even transformed beyond the realm of computers and into an incrementing number of everyday products.

The incremented power of these small computers denoted they could be linked, establishing networks. Which event

Eventually led to the expansion, birth and rapid evolution of the Internet. Other primary advances during this period have been the Graphical user interface (GUI), the mouse and more of late the startling advances in laptop capability and hand-held contrivances.

Fifth Generation – Artificial Intelligence (2010 Onwards) Computer devices with artificial potentiality are still in development, but some of these technologies are commencing to emerge and be used such as voice recognition. AI is an authenticity, made possible by adopting parallel processing and superconductors. Inclining to the future, computers will be thoroughly revolutionized again by quantum computation, molecular and Nano technology. The essence of fifth generation will be utilizing these technologies to ultimately engender machines which can proceed and acknowledge natural language, and have efficiency to determine and organize themselves.

Generations of computer:-

First Generation:

The period of first generation was 1946-1959. The computers of first

Generation used vacuum tubes as the basic components for memory

And circuitry for CPU (Central Processing Unit). In this generation

Mainly batch processing operating system were used. Punched cards,

Paper tape, and magnetic tape were used as input and output devices.

The computers in this generation used machine code as

Programming language.

The main features of first generation are:

- ❖ Vacuum tube technology
- ❖ Unreliable
- ❖ Supported machine language only
- ❖ Very costly
- ❖ Generated lot of heat
- ❖ Slow input and output devices
- ❖ Huge size
- ❖ Need of A.C.(Alternating current)

❖ Non-portable

Examples:

IBM-701

IBM-650

Second Generation:

The period of second generation was 1959-1965. In this generation

Transistors were used that were cheaper, consumed less power, more

Compact in size, more reliable and faster than the first generation

Machines made of vacuum tubes. In this generation, magnetic cores

Were used as primary memory and magnetic tape and magnetic disks

As secondary storage devices. In this generation assembly language

And high-level programming languages like FORTRAN, COBOL

Were used. The computers used batch processing and multiprogramming operating system

The main features of second generation are:

❖ Use of transistors

- ❖ Reliable in comparison to first generation computers
- ❖ Smaller size as compared to first generation computers
- ❖ Generated less heat as compared to first generation computers

- ❖ Consumed less electricity as compared to first generation Computers Computer
- ❖ Faster than first generation computers
- ❖ Still very costly
- ❖ A.C.Needed

   Examples

   IBM 1620

   IBM 7094

Third Generation

The period of third generation was 1965-1971. The computers of

Third generation used integrated circuits (IC's) in place of transistors.

A single IC has many transistors, resistors and capacitors along with

The associated circuitry. The IC was invented by Jack Kilby. This

Development made computers smaller in size, reliable and efficient.

In this generation remote processing, time-sharing, multi-

Programming operating system were used. High-level languages

(FORTRAN-II TO IV, COBOL, PASCAL PL/1, BASIC, ALGOL-

68 etc.) Were used during this generation.

The main features of third generation are:

❖ IC used
❖ More reliable in comparison to previous two generations
❖ Smaller size
❖ Generated less heat
❖ Faster
❖ Lesser maintenance
❖ Still costly
❖ A.C needed
❖ Consumed lesser electricity
❖ Supported high-level language some
❖ Computers of this Generation were:
❖ **Example**
❖ *IBM-360 series*
❖ Honeywell-6000 series
❖ PDP (Personal Data Processor)

Fourth Generation

The period of fourth generation was 1971-1980. The computers of

Fourth generation used Very Large Scale Integrated (VLSI) circuits.

VLSI circuits having about 5000 transistors and other circuit

Elements and their associated circuits on a single chip made it

Possible to have microcomputers of fourth generation. Fourth

Generation computers became more powerful, compact, reliable, and

Affordable. As a result, it gave rise to personal computer (PC)

Revolution. In this generation time sharing, real time, networks,

Distributed operating system were used. All the high-level languages

ʟ**The main features of fourth generation are:**

- ❖ VLSI technology used
- ❖ Very cheap
- ❖ Portable and reliable
- ❖ Use of PC's
- ❖ Very small size
- ❖ Pipeline processing
- ❖ No A.C. needed
- ❖ Concept of internet was introduced
- ❖ Great developments in the fields of networks
- ❖ Computers became easily available
- ❖ Some computers of this generation were:
                 DEC 10   STAR 1000

Fifth Generation

The period of fifth generation is 1980-till date. In the fifth generation,

The VLSI technology became ULSI (Ultra Large Scale Integration)

Technology, resulting in the production of microprocessor chips having

Ten million electronic components. This generation is based on parallel

Processing hardware and AI (Artificial Intelligence) software. AI is an

Emerging branch in computer science, which interprets means and

Method of making computers think like human beings. All the high-

Level languages like C and C++, Java, .Net etc. are used in this Generation.

AI includes:

- ❖ Robotics
- ❖ Neural networks
- ❖ Game Playing
- ❖ Development of expert systems to make decisions in real life Situations.
- ❖ Natural language understanding and generation

The main features of fifth generation are:

- ❖ Development of true artificial intelligence
- ❖ Development of Natural language processing

- ❖ Advancement in Parallel Processing
- ❖ Advancement in Superconductor technology
- ❖ More user friendly interfaces with multimedia features
- ❖ Availability of very powerful and compact

Computers at cheaper rates some computer

Types of this generation are:

Desktop

Laptop

Classification of computer:

PC (Personal Computer): A PC can be defined as a small, relatively inexpensive computer

Designed for an individual user. PCs are based on the microprocessor

Technology that enables manufacturers to put an entire CPU on one

Chip. Businesses use personal computers for word processing,

Accounting, desktop publishing, and for running spreadsheet and

Database management applications. At home, the most popular use for

Personal computers is playing games and surfing Internet.

Although personal computers are designed as single-user systems,

These systems are normally linked together to form a network. In terms

Of power, now-a-days High-end models of the Macintosh and PC offer

The same computing power and graphics capability as low-end

Workstations by Sun Microsystems, Hewlett-Packard, and **Dell.**

Workstation:

Workstation is a computer used for engineering applications

(CAD/CAM), desktop publishing, software development, and other

Such types of applications which require a moderate amount of

Computing power and relatively high quality graphics capabilities.

Workstations generally come with a large, high-resolution graphics

Screen, large amount of RAM, inbuilt network support, and a graphical

User interface. Most workstations also have a mass storage device such

. As a disk drive, but a special type of workstation, called a diskless

Workstation, comes without a disk drive

Common operating systems for workstations are UNIX and Windows

NT. Like PC, Workstations are also single-user computers like PC but

Are typically linked together to form a local-area network, although

They can also be used as stand-alone systems.

Minicomputer:

A minicomputer, or colloquially mini, is a class of smaller computers

That developed in the mid-1960s and sold for much less than

Mainframe and mid-size computers from IBM and its direct

Competitors. It is a midsize multi-processing system capable of

Supporting up to 250 users simultaneously.

Mainframe:

Mainframe is very large in size and is an expensive computer capable of

Supporting hundreds or even thousands of users simultaneously.

Mainframe executes many programs concurrently and supports many

Simultaneous execution of programs.

Supercomputer:

Supercomputers are one of the fastest computers currently available.

Supercomputers are very expensive and are employed for specialized

Applications that require immense amount of mathematical calculations

(Number crunching). For example, weather forecasting, scientific

Simulations, (animated) graphics, fluid dynamic calculations, nuclear

Energy research, electronic design, and analysis of geological data (e.g.

In petrochemical prospecting).

Client and Server:

The client–server model is a distributed application structure that

Partitions tasks or workloads between the providers of a resource or

Service, called servers, and service requesters, called clients.

Clients and servers communicate over a computer network on separate

Hardware, but both client and server may reside in the same system. A

Server host runs one or more server programs which share their

Resources with clients. A client does not share any of its resources, but

Requests a server's content or service function. Clients therefore initiate

Communication sessions with servers which await incoming requests.

Examples of computer applications that use the client–server model

Are Email, network printing, and the World Wide Web.
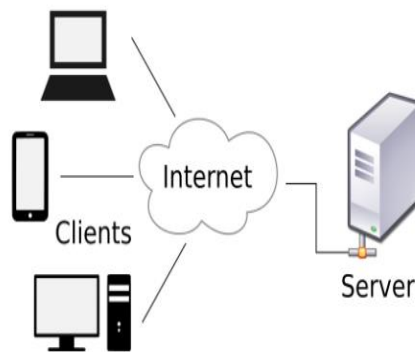
Hand Held Computer:

A handheld PC, or H/PC for short, is a computer built around a

Form factor which is smaller than any standard laptop computer. It

Is sometimes referred to as a palmtop computer. The first hand-

Held device compatible with desktop IBM personal computers of

The time was the Atari Portfolio of 1989.

Question Bank :- (5 Marks Each)

1) What is Computer? Explain its Characteristics.

2) Explain Basic Computer Organization.

3) Explain First Generation of Computer.

4) Explain Second Generation of Computer.

5) Explain Third Generation of Computer.

6) Explain Fourth Generation of Computer.

7) Explain Fifth Generation of Computer.

Or

8) Explain Generations of Computer.

9) Explain Classification of Computer.

Or

1) Explain Minicomputer.

2) Explain Workstation Computer.

3) Explain Personal Computer.

4) Explain Client and Server.

5) Explain Hand Held Computer.