

Chapter-1 Introduction to Computers

INTRODUCTION

- We all are familiar with the word computer. We see much news in daily newspaper and televisions about computers bringing about a revolution in our lives.

What is computer?

DEFINITION OF COMPUTER

- "A computer is an advanced electronic machine that helps us to reduce the mental efforts that we have to use to solve mental problems."
- The word "Computer" comes from the word "Compute" which means to calculate.
- According to dictionary Computer may be defined as "automatic electronic devices for making calculations or controlling operations those are expressible in numerical or logical terms".
- Thus Computer can be defined as a device that operates on various kinds of data.

Q-2 What is Computer?

Explaining CHARACTERISTICS OF COMPUTER

- The increasing popularity of computers has proved that it is a very powerful and useful tool. The power and usefulness of his popular tool are mainly due to its following characteristics:

❖ Automatic:

- A machine is said to be automatic if it works by itself without human intervention.
- Computers are automatic machines because once started on a job, they carry on until the job is finished, normally without any human assistance.
- However, computers being machines cannot start themselves. They cannot go out and find their own problems and solutions.
- They have to be instructed.

❖ Speed:

- A computer is a very fast device.
- It can perform in a few seconds the amount of work that a human being can do in an entire year if he worked day and night and did nothing else.
- To put it in a different manner, a computer does in one minute what would take a man his entire lifetime.
- While talking about the speed of computer, we do not talk in terms of seconds or even milliseconds.
- Our units of speed are the microseconds.

❖ Accuracy:

- In addition to being very fast, computers are very accurate.
- The accuracy of a computer is consistently high and the degree of accuracy of a particular computer depends upon its design.
- But for a particular computer, each and every calculation is performed with the same accuracy.

❖ Diligence:

- Unlike human beings, a computer is free from monotony, tiredness, lack of concentration etc, and hence it can work for hours together without creating any error and without grumbling.
- Due to this property, computer obviously scores over human beings in doing routine type of jobs, which require great accuracy.
- If ten lakhs calculations have to be performed, a computer will perform the ten lakhs calculations with exactly the same accuracy and speed as the first one.

❖ Versatility:

- Versatility is one of the most wonderful things about the computer.
- One moment, it is preparing the results of particular examination, the next moment it is busy preparing electricity bills, and in between, it may be helping an office secretary to trace an important letter in seconds.
- In short, a computer is capable of performing almost any task provided.

❖ Power of Remembrance:

- HUMANS: At a human selects what it feels to unimportant details.
- COMPUTERS: A computer of its secondary stage, it will be as accurate.
- A computer forgets.

❖ No I.Q.:

- A computer is not intelligent.
- It can only perform what it has been programmed to do.
- The difference between a computer and a human being is that a computer does not possess intelligence.
- It has to be programmed.
- So only the computer cannot take decisions.

❖ No feelings:

- Computers do not feel.
- They have no feelings.
- Based on their judgment, they act.
- Their actions are pre-programmed.

❖ Portability:

- To transport.
- Very light weight.

❖ Maintenance:

❖ Power of Remembering (Storage capacity):

- HUMANS: As a human being acquires new knowledge, from where he likes, the brain selects what it feels to be important and keeps in its memory, and forgets unimportant details.
- COMPUTERS: A computer can store and recall any amount of information because of its secondary storage capability. Even after several years, the information recalled, it will be as accurate as on the day when it was entered to the computer.
- A computer forgets or losses the information only when user tell to do so.

❖ No I.Q.:

- A computer is not a magical device.
- It can only perform tasks that a human being can.
- The difference is that it performs these tasks with unthinkable speed and accuracy.
- It possesses no intelligence of its own is I.Q. Is zero.
- It has to be told what to do and in what sequence.
- So only the user can determine what tasks a computer will perform, a computer cannot take its own decision.

❖ No feelings:

- Computers are devoid of emotions.
- They have no feelings because they are machines.
- Based on our feelings taste, knowledge, and experience, we often make certain judgments in our day-to-day life. But computers cannot make such judgments by their own.
- Their judgment is based on the instructions given to them in the form programs that are written by human.

❖ Portable:

- Today computers are so small in size.
- When we move a computer one place to another place at that time it is easily moveable means portable.

❖ Multitasking:

- Multitasking means more than one task complete at the same time.

USES OF COMPUTERS

Today computers are used in almost every field of your life. The followings are the list of computer usages in various fields.

- In Banking sectors
- Personal use
- In weather forecasting
- Business Computing
- In on-line billing systems
- Automated customer care-support
- In decision making and expert systems
- In entertainment industry (Games, Movies and Animations)
- In Graphic design
- In Education
- In Desktop publishing
- In Railway, Air, Bus reservation systems.
- In Scientific computing and modeling

LIMITATIONS OF COMPUTERS

- Unlike the human brain a computer cannot think on its own, It has to be instructed.
- The computer will produce wrong results if user will do any type of mistake in giving instructions.
- Human have the ability to try out various alternatives to solve the errors, which computers do not have.
- Computers have no intuition.
- Computers can only process jobs which can be expressed in a finite numbers of steps leading to a specific goal.
- Computers do not learn from experience.

(1) First Generation:

Generation Period:

Technology: Vacuum

Advantages:

- Operations were
- Used in common
- ENIAC [Electron
- EDVAC [Electro
- EDSAC [Electro

Limitations:

- They were to
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- 18,000 vac
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GENERATION OF COMPUTERS

(1) First Generation :

Generation Period: 1942 to 1955

Technology: Vacuum Tubes

Advantages:

- Operations were performed in milliseconds.
- Used in common business system.
- ENIAC [Electronic Numerical Integrator And Calculator],
EDVAC [Electronic Discrete Variable Automatic Computer],
EDSAC [Electronic Delay Storage Automatic Calculator], etc.

Limitations:

- They were too big in size.
- Requiring large rooms for installation.
- 18,000 vacuum tubes were used
- Generating large amount of heat.
- Air-condition was required.
- High power consumption and short life.
- Constant maintenance required.
- Commercial production was difficult and costly.
- Limited programming capabilities.
- Non-portable.
- Very expensive.

(2) Second Generation:

Generation Period: 1955 to 1964

Technology: Transistors

Advantages:

- They were more than ten times faster than the first generation computers.
- They were able to reduce computation times from milliseconds to microseconds.
- They consumed less power than the first generation computers.
- They were much more reliable than the first generation computers.
- They were much easier to program and use than the first generation computers.
- Compared to vacuum tubes they are small in size and having more life.

Limitations:

- Though they produced less heat than first generation computers still second generation computers were located into properly air-conditioned room.
- In these computers thousands of individual transistors were used so, commercial production was difficult and costly.
- Required constant maintenance so it consumed much repairing expense.

(3) Third Generation:

Generation Period: 1964 to 1975

Technology: Integrated Circuits(IC)

Advantages:

- They were much more powerful than the second - generation computers.
- Under this generation computations its speed were done in microseconds to nanoseconds.
- They were capable of performing about 1 million instructions per second.
- Smaller in size as compared to second- generation computers.
- Consumed much less power than the second - generation computers.

- They were much more reliable
- Commercial production was easier
- They were totally general purpose commercial applications.
- They are portable.

Limitations:

- Although they produce less rooms in which the third gen air-conditioned?
- Highly sophisticated technology manufacture of IC chip.

(4) Fourth Generation:

Generation Period: 1975 to 1985

Technology: Microprocessor

Advantages:

- The PCs were much smaller
- They consumed much less power
- They were much more reliable
- They generate noise less
- They had faster processing speed compared to the previous generation.
- Use of standard components.
- Fourth generation (VLSI Integration).

Limitations:

- Highly sophisticated technology

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- They were much **more reliable**.
- Commercial production was **easier and cheaper**.
- They were totally general-purpose machines suitable for both scientific and **commercial applications**.
- They are **portable**.

Limitations:

- Although they produce less heat than second generation computers still the rooms in which the third generation computers were located had to be properly air-conditioned?
- Highly sophisticated technology and expensive set up was required for the manufacture of IC chip.

(4) Fourth Generation :

Generation Period: 1975 to 1989

Technology: Microprocessors

Advantages:

- The PCs were much **smaller and cheaper** as compared to previous generations.
- They consumed much **less power** than the third-generation computers.
- They were much **more reliable**.
- They generate negligible(almost nil) amount of heat.
- They had **faster and larger** primary memory and secondary storage devices as compared to third-generation computers.
- Use of standard **high-level programming languages**.
- Fourth generation computers were based on **LSI** and **VLSI** (Very Large Scale Integration).

Limitations:

- Highly sophisticated technology required for the manufacture of **LSI** chips.

(5) Fifth Generation:

Generation Period: 1989 Onwards

Technology: Based on AI (Artificial Intelligence)

Advantages:

- These PCs are much smaller and handy, allowing users to use computing facility even while traveling.
- They consume much less power than all other generations.
- They are much more reliable.
- They have faster and larger primary memory and secondary storage devices as compared to other generations.
- They are totally general - purpose machine.
- Their manufacturing does not require any individual components so commercial production of these systems is easier and cheaper.
- Newer and more powerful applications including multimedia applications make the system more useful.
- This generation computers use the ULSI (Ultra Large Scale Integration) for making IC chips.

Q = 3

TYPES

Analog

Micro

According to type of data we can categorize.

❖ Classification of

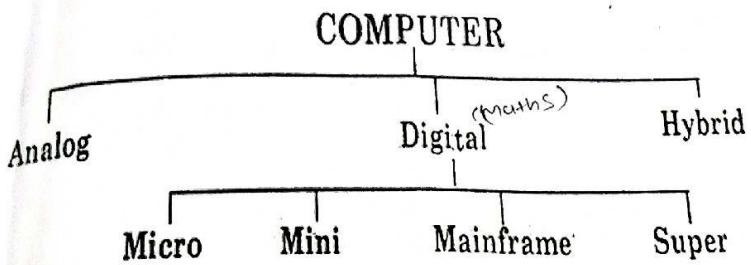
(1) Analog comput

- Analog is a General purpose computer.
- Analog computers work continuously.
- Analog computers are slow.
- Analog computers are less accurate.

(2) Digital comput

- Digital computers are faster.
- The data is stored in digital form.

Q=3 Explain:
TYPES OF COMPUTERS



According to type of data which they handle computer are classified following three categories.

❖ Classification of computers by Data Processed:

(1) Analog computer:

- Analog is a Greek word meaning to find the equality between two units.
- Analog computer is computer that operates on data which is in the form of continuously variable physical quantities such as electrical current, sound waves, etc.
- Analog Computer is the computer which can carry out multiple tasks simultaneously.
- Analog Computer was widely used in Scientific & Industrial application.

(2) Digital computer:

- Digital computer is machine based on digital technology.
- The data is represented as number in these types of computers.

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- Digital computers give the output by making necessary calculations from the given data. These types of computer cannot do any measurement.
- It means the computer that works with discrete quantities and uses numbers is known as digital computers.
- E.X. calculator.

(3) Hybrid computer:

- It is a combination of digital and analog computers combining the good qualities of both.
- Hybrid computer has the speed of analog computer and the accuracy and efficiency of digital computer.
- These types of computers are used for the special kind of work.
- The data is inserted in the form of measurement in this type of computer and then this data is transformed in the form of numbers to give the output.
- E.X. aero plane, radar, submarine.

Classification of computers by Processing Capabilities:

(a) Micro Computer:

- A microcomputer is a small, relatively inexpensive computer with a microprocessor as its CPU [Central Processing Unit].
- Microcomputers are generally synonymous with personal computer or PC, a computer designed for individuals.
- Microcomputers are designed to be used by individuals, either in the form of PC or in the form of Microprocessor.
- Microcomputers became popular in the 1970s & 80s because of its powerful microprocessor. ICP+TOP, PC, MOBILE, TABLET

(b) Mini Computer:

- A minicomputer is multi user computer capable of supporting from 10 to hundreds of users simultaneously.
- Initially minicomputers were 8 bit and 12 bit machines but by 1970s almost all minicomputer were 16 bit machines.

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NotePad, tablet

- With the advancement in technology, speed, memory, size developed and the minicomputer was then used for various applications.
- Gradually, the architectural requirements of minicomputer was introduced.
- Which was called super minicomputer? Which have to support more users working simultaneously on the previous minicomputers?

(c) Mainframe Computer:

- A powerful multi-user computer capable of supporting simultaneously.
- Mainframe computers are generally 32 bit machine.
- They are suitable for big organization, to manage data.
- Some of the popular mainframe series are IBM.
- There are several organizations such as Banks, Railways etc.
- Where large number of online transaction.
- Mainframe systems are the computers that handle data and information.
- They are also used in such environments as common computing facility.
- E.X. research group, educational institutions.

(d) Super Computer:

- Super computers are the most powerful computers.
- They are commonly used for Process control.
- For Example, weather forecasting.
- Some of the well-known application are:
 - AT petroleum Industry to calculate petroleum products inside tanks.
 - Film & TV industries use super computers to generate and TV programs.
 - Microelectronic Center.

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- With the advancement in technology, speed, memory, size and other characteristics developed and the minicomputer was then used for various stand alone applications.
- Gradually, the architectural requirements of minicomputers grew and a 32 bit minicomputer was introduced.
- Which was called super minicomputer? Which have larger memory and could support more users working simultaneously on the computer in comparison to previous minicomputers?

(c) Mainframe Computer:

- A powerful multi-user computer capable of supporting thousands of users simultaneously.
- Mainframe computers are generally 32 bit machines.
- They are suitable for big organization, to manage high volume application.
- Some of the popular mainframe series are MEDHA, Sperry, DEC, IBM, HP, HCL etc.
- There are several organizations such as Banks, Insurance Companies, Hospitals, and Railways etc.
- Where large number of online transaction required.
- Mainframe systems are the computers that are mainly used for handling bulk of data and information.
- They are also used in such environments where a large no. of users need to share a common computing facility.
- E.X. research group, educational institute etc.

(d) Super Computer:

- Super computers are the most powerful and most expensive computers.
- They are commonly used for Processing Complex Scientific Application.
- For Example, weather forecasting requires super computer.

Some of the well-known application where super computer is used:

- AT petroleum Industry to identify areas where there is possibility of getting petroleum products inside the earth.
- Film & TV industries uses super computer to create special effects for movies and TV programs.
- Microelectronic Centers use super computers for weather forecasting.

BLOCK DIAGRAM OF COMPUTER OR SIMPLE MODEL OF COMPUTER

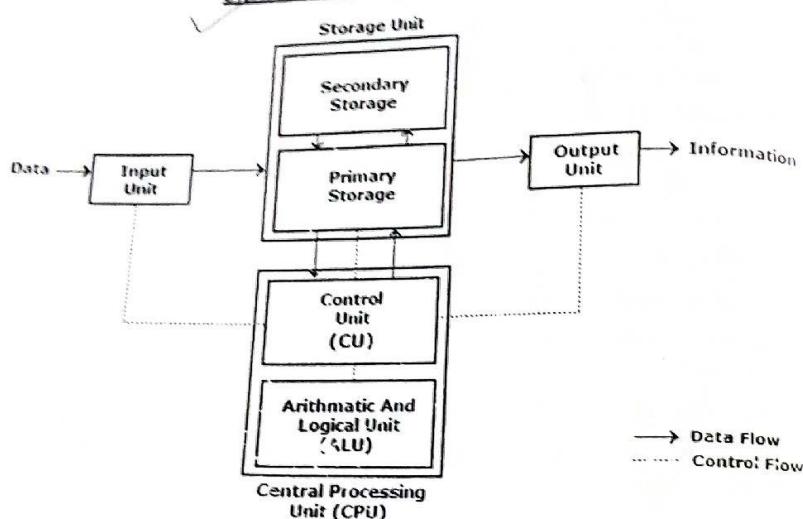


fig. : block diagram of computer

❖ INPUT UNIT

It performs following functions.

- i) It accepts the list of instruction and data from the outside world.
- ii) It converts this instruction and data in computer acceptable forms.
- iii) It supplied this converted data to the computer systems for further processing.

❖ OUTPUT UNIT

It performs following functions.

- i) It accepts the result produced by the CPU.
- ii) It converts these binary coded result to some meaningful form.
- iii) It supplies these converted result to the user.

❖ CPU [Central Processing Unit]:

- Arithmetic logic unit, control unit & memory.
- It is a brain of computer system.
- In human body all major decision and control are made inside the CPU.

❖ A.L.U. [Arithmetic & Logical Unit]:

- This is the unit in which all calculations are performed.
- The ALU can perform all types of arithmetic and logical operations.
- But almost all ALU can perform multiplication, division and comparison.

❖ Control unit:

- It does not perform any processing.
- But it co-ordinates the different parts of computer system.

❖ Primary Storage:

- Primary storage of a computer.
- It is used to hold programs recently produced results.

❖ Secondary Storage:

- Secondary storage of a computer.
- It is used to hold programs the computer is not working.

❖ OUTPUT UNIT

- It performs following functions:
 - i) It accepts the result produced by the computer in binary coded forms.
 - ii) It converts these binary coded results into human readable forms.
 - iii) It supplies these converted result to the outside world.

❖ CPU [Central Processing Unit]:

- Arithmetic logic unit, control unit & primary memory are jointly known as CPU.
- It is a brain of computer system.
- In human body all major decision are taken by brain, similarly in a computer all decision are made inside the CPU.

❖ A.L.U. [Arithmetic & Logical unit]:

- This is the unit in which all calculation are performed and all decisions are taken.
- The ALU can perform all types of arithmetical and logic operation of computer.
- But almost all ALU can perform basic functions such as addition, subtraction, multiplication, division and comparison.

❖ Control unit:

- It does not perform any processing.
- But it co-ordinates the different units and directs them to work as an entire computer system.

❖ Primary Storage:

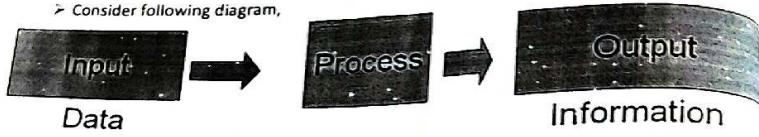
- Primary storage of a computer is also known as "Main Memory".
- It is used to hold program instruction & data, intermediate result of processing & recently produced result of job which the computer is currently working.

❖ Secondary Storage:

- Secondary storage of a computer is also known as "Auxiliary Storage".
- It is used to hold program instruction & data, & information of those jobs on which the computer is not working currently working but need to hold them for later processing.

DATA PROCESSING CYCLE:

- Data Processing Cycle is important thing to understand before understanding how computer processes data and generates information for you.
- Computer can definitely give you many information provided it must have some raw data within it.
- If computer does not have any raw data, how it is possible to give some information.
- What I want to tell you is, for any type of information, you must have some raw data which is processed and then you can obtain information by processing the data.
- Consider following diagram,



Data: It is a raw material which should be 100% fact which is processed.

Process: It is a bunch of instruction which is used to get the desired information.

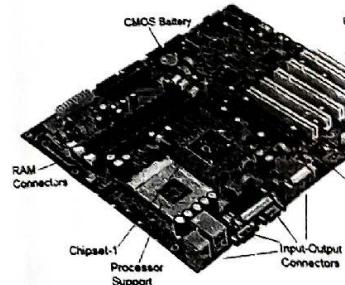
Information: It is a desired result that we want.

- You can see here that we must have some data first of all which can be processed and after processing information can be produced.
- If you don't have raw data to be processed how can you obtain some information?
- If the data is incorrect, the processing will be incorrect and ultimately you will get wrong information.

Internal/External Parts used

→ Introduction to Motherboard

- Motherboard is the most important component.
- It is also known as circuit board because of the motherboard.
- It controls the entire process of the computer.
- Keyboard, monitor, mouse, hard drive, etc. are connected through cables.
- Usually, the motherboard contains the CPU, RAM, ROM, and parallel ports, expansion slots, and standard peripheral devices.



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it must have some raw
to give some information
must have some raw data
processing the data.

Output
Information

processed.

red information.

processed and after

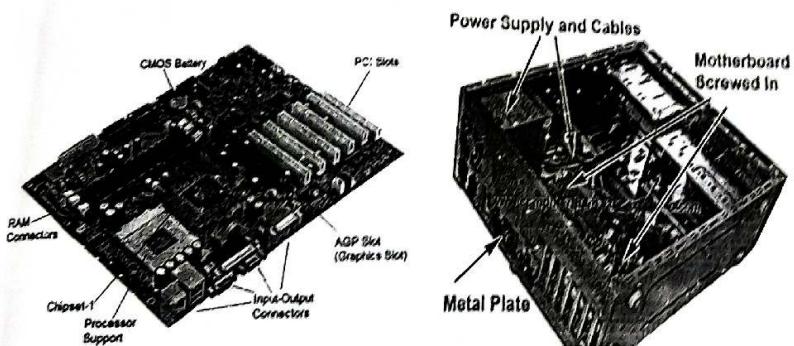
information?

I get wrong

Internal/External Parts used with Computer Cabinet

→ Introduction to Motherboard:

- Motherboard is the most important component of computer.
- It is also known as circuit board because the entire components are connected to the motherboard.
- It controls the entire process of the computer.
- Keyboard, monitor, mouse, hard drive, etc. are all connected to the motherboard through cables.
- Usually, the motherboard contains the BIOS, memory, mass storage interfaces, serial and parallel ports, expansion slots, and all the controllers required to control standard peripheral devices.



IDEs

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No.	Part/Module	Description
1	Power supply connector	This is the main part which supplies power to the other parts of motherboards.
2	Input Output Connectors	These are provided for external devices like mouse, keyboard, USB, Printers, power supply, etc.
3	Processor Support	The processor is fit (mounted) in the motherboard and in order to supply instruction to other parts.
4	Jumpers	A rubber type part which is used to find out different IDEs (hard disk, floppy disk, CD). Depending on the jumpers setting/ arrangement.
5	CMOS Battery	It provides power to some important part even when the motherboard/ CPU is switched off.
6	Processor Power Supply Connectors	It gets power supply from main power supply on motherboard and supplies to processor.
7	AGP Slot (Advanced Graphics Port)	It provides the fast connection that video card needs to communicate with processor and display.
8	RAM (Random Access Memory) Connectors	RAM installed on connector is called as sockets. RAM chips are mounted on these <u>sockets</u> .
9	Audio Chip	The main chip which works for audio sounds. You must install audio driver in order to hear specific sound.
10	PCI Extension Slots	PCI (Peripheral Component Interconnect) is an interconnection system between a microprocessor and attached devices for high speed operation.

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Chips

Chapter 1 Introduction to Computers

Chipsets

Chips which provide CPU and external com-

Case fan + power supply connector

This connector pro-

keeps cool to inter-

BIOS

Also known as ROM (Output System), It is supplied to the m-

(searching, count-

Types of Process

Introduction:

- In the simplest of terms, Processor is the brain of the computer.
- The processor tells your computer what to do.
- Processor decides which tasks are required by the computer's needs.
- A processor is a primary chip in a computer.
- A processor executes all the programs.
- Its speed is measured in the GHz.

1000 MHz (Megahertz)

= 1GHz (Gigahertz)

= 1000,000,000 Cycles

➤ Higher the processor's speed, the faster it is known as the CPU.

➤ The processor is the "engine" of the computer.

➤ There are mainly 2 types of processors:

✓ Intel

✓ AMD

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The main part which supplies power to the other parts of boards.

provided for external devices like mouse, keyboard, power supply, etc.

is fit (mounted) in the motherboard and in order to other parts.

part which is used to find out different IDEs (hard CD). Depending on the jumpers setting/

o some important part even when the is switched off.

from main power supply on motherboard

connection that video card needs to processor and display.

is called as sockets. RAM chips are

audio sounds. You must install specific sound.

connect) is an interconnection and attached devices for high

1	Chipsets	Chipsets which provides the supporting interfaces between the CPU and external components.
2	Case fan power supply connector	This connector provides power to the case fan (Cabinet fan) which keeps cool to internal parts.
3	BIOS	Also known as ROM BIOS (Read Only Memory, Basic Input Output System), The chip works very first as soon as the power is supplied to the motherboard. When you start computer, you see (searching, counting). This Instructions are read from ROM BIOS.

► Types of Processors:

• Introduction:

- In the simplest of terms, Processor is a computer's brain.
- The processor tells your computer what to do and when to do it.
- Processor decides which tasks are more important and prioritizes them to your computer's needs.
- A processor is a primary chip inside a computer and it contains the digital circuitry.
- A processor executes all the programs and instructions inside the computer.
- Its speed is measured in the Gigahertz.

1000 MHz (Megahertz)

= 1GHz (Gigahertz)

= 1000,000,000 Cycles per second.

- Higher the processor's speed, the more instructions it can process in less time. It also known as the CPU.
- The processor is the "engine" of a computer.
- There are mainly 2 types of manufacturers in the market for processors:

✓ Intel

✓ AMD

Chapter 3: Introduction to Computers

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> The processors are per 3 different levels as per the usages of them. They will be

- [1] High-End Processors
- [2] Mid-Range Processors
- [3] Economy Processors

(1) High-End Processors

> As the name implies, High-End Processors are used for high level of operations. These are mainly used for following work,

- Intensive Statistical Analysis
- Professional Video / Audio
- Advanced 3D Graphics
- High-End Mobile Applications

> Ex. of High-End Processors,

- Intel Core i7 / Intel Core i7 Mobile
- Intel Core i5 / Intel Core i5 Mobile
- Intel Core i3 / Intel Core i3 Mobile
- AMD Phenom II X6
- Intel Core 2 QUAD

Chapter 3: Introduction to Computers

(2) Mid-Range Processors

> These are also almost same as High-End Processors. They are mostly used in educational institutions.

- > General characteristics
 - Speed and Memory
 - Some communication
 - All general purpose
 - Basic Video / Graphics

> Ex. of Mid-Range Processors

- Intel Core 2
- Intel Pentium
- AMD Phenom
- Intel Core 2

(3) Economy Processors

> These can be purchased at low cost. They are used for tasks of office and home.

> Following can be used for Economy Processors

- Internet Browsing
- Office Applications
- Simple Games

> Ex. of Economy Processors

- Intel Celeron
- Intel Atom
- AMD Athlon
- Intel Atom

s of them. They will be

h level of operations.

12] Mid-Range Processors:

- These are also almost similar to High-End Processors in terms of general use. These are mostly used in educational institutions and offices.
- General characteristics of Mid-Range processors:
 - Speed and Multi tasking
 - Some common creative work
 - All general purpose use
 - Basic Video / Audio and 3D graphics
- Ex. of Mid-Range Processors,
 - Intel Core 2 Duo
 - Intel Pentium Dual Core
 - AMD Phenom I X3 and X4
 - Intel Core Duo / Intel Core Solo

13] Economy Processors:

- These can be purchased for very basic office activities which have some standard tasks of office automation (Ms Office).
- Following can be the general usages of Economy processors.
 - Internet Browsing & E-Mailing
 - Office Automation (Word, Excel, Power Point, etc. related packages)
 - Simple Games
- Ex. of Economy Processors,
 - Intel Atom
 - Intel Celeron
 - AMD Sempron
 - Intel Centrino / Centrino Duo

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- AMD Athlon Neo / Neo X2

[4] Processors:

➢ Dual Core:

- Dual core processor based on the core micro architecture.
- The Pentium Dual core is available in current desktops and laptops.

➢ Core 2 Duo:

- Contains two processing cores to optimize gaming, video, and image processing.
- Laptops with this chip tend to be thinner and more energy-efficient.

➢ Core i3:

- Core i3 processor presents higher levels of performance than the Core 2 at a smaller cost.
- Hyper threading is available; it does not feature Turbo Boost.

❖ Core i7:

- This is the latest processor manufactured by i7.
- The i7 is a 64-bit processor offering either 2,4 or 6 cores of the highest levels of general performance available.
- The i7 combines hyper threading and Turbo Boost technologies for the most demanding and advanced of applications.

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OS5 describe;

↳ Memory Structure and

↳ Types of Memory:

COMPUTER

Primary(Main)

Volatile Memory Non-volatile
RAM ROM, P

Magnetic Tape

➢ In general there are two types

1. Primary Memory

2. Secondary Memory

1. Primary Memory:

➢ Primary Memory has two types

A. Volatile Memory

B. Non-Volatile Memory

A. Volatile Memory:

• RAM:

➢ RAM is a volatile memory

➢ Primary memory is usually possible to randomly select

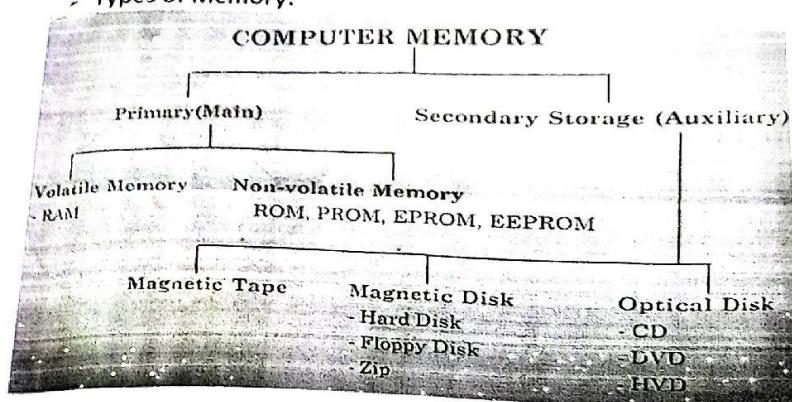
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Q=5 describe:

Memory Structure and Types of Memory:

Types of Memory:



> In general there are two types of memory:

1. Primary Memory

2. Secondary Memory

1. Primary Memory:

> Primary Memory has two types:

A. Volatile Memory

B. Non-Volatile Memory

A. Volatile Memory:

• RAM:

- > RAM is a volatile memory.
- > Primary memory is usually known as Random Access Memory(RAM) because it is possible to randomly select and use any location of this memory to directly store and

retrieve data.

- This memory consists of some IC and it attached to the motherboard.
- It is also known as read/write memory because information can be read from a RAM chip and can also be written into it.
- RAM chips are of two types:
 - (1) **DRAM** (Dynamic Random Access Memory)
 - (2) **SRAM** (Static Random Access Memory)

(1) **DRAM:**

- DRAM is also volatile memory because it needs continuous power. If the power is not supplied to it, all the contents of DRAM are deleted.
- The advantage of DRAM is only one transistor and a capacitor are required per bit, compared to four or six transistors in SRAM.
- Different types of DRAMs as follows:
 - a) **FPM RAM** (Fast Page Mode Random Access Memory)
 - b) **EDO RAM** (Extended Data Out Random Access Memory)
 - c) **SD RAM** (Synchronous Dynamic Random Access Memory)

(c) **SD RAM:-**

- SD RAM is about three times faster than FPM RAM and twice as fast as EDO RAM.
- Within SD RAM there are two types as follows:
 - ✓ **SDR SDRAM** (Single Data Rate RAM)
 - ✓ **DDR SDRAM** (Double Data Rate RAM):-
 - Many subversions of DDR RAM has been developed now like DDR2, DDR3 and DDR4.
 - DDR SDRAM are generally used with personal computers today.
 - DDR is faster than SDRAM because it provides more powerful

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mechanism of data transfer.

- **SRAM (Static Random Access Memory)**
- It does not need continuously power in order to read memory uses multiple transistors, typically four to six does not have a capacitor in each cell.
- SRAM cell has three different states.
 - 1) Standby (the circuit is idle)
 - 2) Reading (the data has been requested)
 - 3) Writing (Update the contents)
- SRAM to operate in read mode and write mode "writability" respectively.
- It is more expensive, but faster and consumes less power.

B. Non-Volatile Memory:

• **ROM:**

- ROM is a Non-volatile memory.
- Data is stored permanently and cannot be used but cannot be changed.
- This is a reason it is called read-only memory.
- The data stored inside a ROM are not changeable.

• **PROM**

- PROM - Programmable Read Only Memory
- PROM is also Non-volatile storage.
- You can store program as per your requirement and can change the contents which were stored.

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attached to the motherboard.
use information can be read from a RAM

continuous power. If the power is
detected.

a capacitor are required per bit,

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Chapter-1: Introduction to Computers

mechanism of data transfer.

(2) SRAM (Static Random Access Memory)

- It does not need continuously power in order to maintain data - static random memory uses multiple transistors, typically four to six, for each memory cell but does not have a capacitor in each cell.
- SRAM cell has three different states.
 - 1)Standby(the circuit is idle)
 - 2)Reading(the data has been requested)
 - 3)Writing(Update the contents)
- SRAM to operate in read mode and write mode should have "readability" and "writability" respectively.
- It is more expensive, but faster and consume less power than DRAM.

B. Non-Volatile Memory:

• ROM:

- ROM is a Non-volatile memory.
- Data is stored permanently and cannot be altered by the programmer. Only read and used but cannot be changed.
- This is a reason it is called read-only memory.
- The data stored inside a ROM are not lost when power supply is switch off.

• PROM

- PROM- Programmable Read Only Memory.
- PROM is also Non-volatile storage.
- You can store program as per your requirement but once stored, You can not changed the contents which were stored in PROM.

- It is possible for a user to modify a system by converting his/her programs to micro programs and storing them.

• **EPROM**

- EPROM- Erasable Programmable Read Only Memory.
- In this type of memory it is possible to erase information stored and in the chip can be reprogrammed and to store new information.
- Information stored in an EPROM chip is erased some times by ultraviolet light.
- When an EPROM is in use, information can only be 'read' and the information remains on the chip until it is erased.

• **EEPROM**

- EEPROM- Electrically Erasable Programmable Read Only Memory.
- In this type of memory the stored information is erased by using high voltage electric pulses.

- The form is known as Ultra Violet EPRCM-UVEPROM and latest is known as EPROM-EPPROM.

◆ Computer Slots:

• **Introduction:**

- Slots are also known as Expansion(increase) Slots or Motherboard Slots.
- They are used to extend(make longer) the hardware capacity of your computer.
- Different Expansion Slots are used for different types of cards on a motherboard.
- The various slots on a motherboard serve a vital purpose for your computer.
- Each slot allows a number of various components to interface with your computer.
- Expansion Slots are located on the motherboard, and opening on the back of the computer.
- There is a wide range of Motherboard slots which are available like RAM Slot, ISA Slot, PCI Slot, AGP Slot, etc.

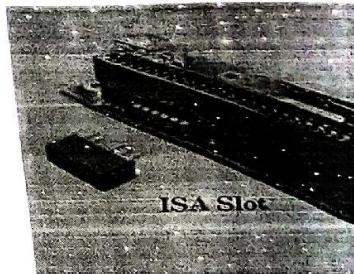
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L. **RAM Slot (Memory slot):**



- RAM Slot is also known as Memory Slot.
- The random access memory(RAM) slot on a right-hand area.
- These are vertical slots, and there are normally four.
- These slots house the RAM sticks that your computer takes from the hard drive on its way to the CPU.
- Computer will not function without RAM, filling one slot.

2. **ISA Slot:**



- ISA stands for Industry Standard Architecture.
- These slots are an older type of expansion slot.
- ISA slots are slower than PCI slots.

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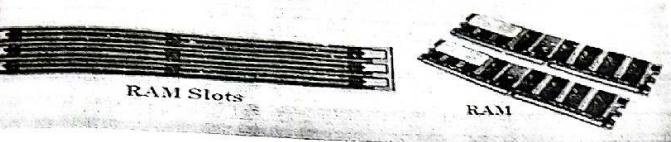
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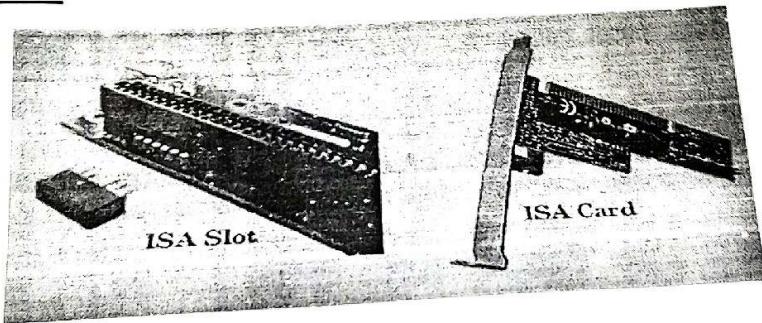
nown as EPROM-

1. RAM Slot (Memory slot):



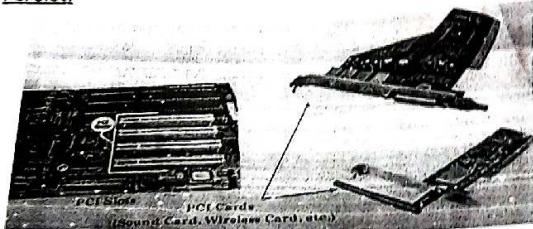
- RAM Slot is also known as Memory Slot.
- The random access memory(RAM) slot on a motherboard is located at the upper right-hand area.
- These are vertical slots, and there are normally three or four.
- These slots house the RAM sticks that your computer users to store transient data from the hard drive on its way to the CPU.
- Computer will not function without RAM, so you must have at least one RAM stick filling one slot.

2. ISA Slot:



- ISA stands for Industry Standard Architecture.
- These slots are an older type of expansion slot. They are usually black.
- ISA slots are slower than PCI slots and as twice as big PCI slots.

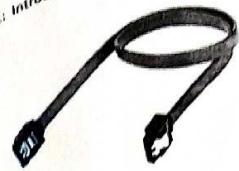
- These slots are called multi-purpose slots because they can be used for variety of cards.
- ISA networking cards, ISA sound cards, ISA video cards, etc. cards can be used in the ISA slot.
- Some new motherboard technology has replaced ISA with PCI because ISA slots are not compatible with all types of motherboard.

3. PCI Slot:

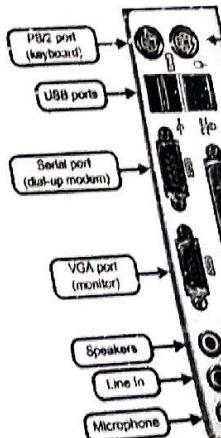
- PCI – Peripheral Component Interface.
- Now a days mostly manufacture motherboards with only PCI slots available.
- PCI slots usually white.
- They are used as general purpose slots. Single PCI slot can be used for different types of expansion cards.
- PCI slot is the main motherboard slot that is improve computer.
- PCI slots are horizontal, at the lower left of the motherboard and normally below the AGP slot.

4. SATA/Serial At Attachment)

- SATA is a computer bus interface that connect host bus adapters to mass storage devices such as harddisk driver,optical driver.

**Computer Ports:**

- ports are sockets usually mounted on the back of computer.
- We plug cables into these ports to connect peripherals.
- ports are of four types:
 1. Serial Port
 2. Parallel Port
 3. USB Port
 4. PS/2 Port

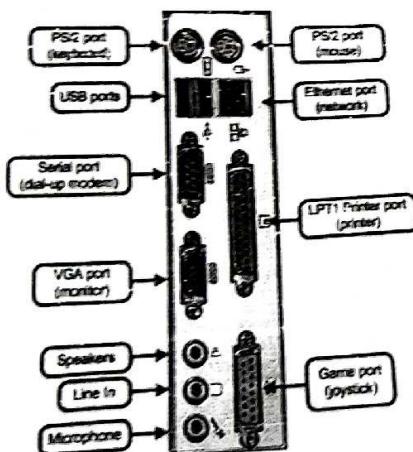


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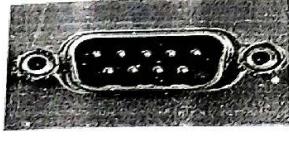
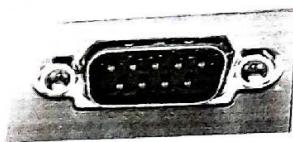


Computer Ports:

- Ports are sockets usually mounted on the back of computer.
- We plug cables into these ports to connect peripherals such as printers or modems.
- Ports are of four types:
 1. Serial Port
 2. Parallel Port
 3. USB Port
 4. Ps/2 Port

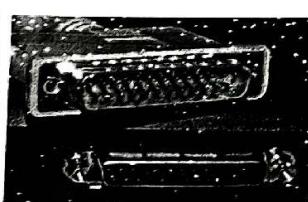
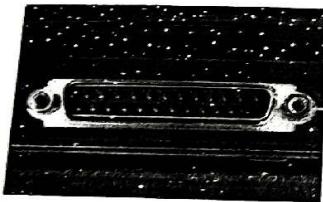


1. Serial Port:

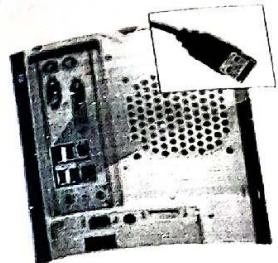


- It is also known as asynchronous port or RS-232-C port.
- The main advantage of this type of port is data sent and received over only two lines.
- Therefore such type of port ideal for connections to the phone circuits, which also use two data lines.
- Because of slower communications they are not suitable for printer connections.

2. Parallel Port:



- A parallel port is a type of socket found on personal computers for interfacing with various peripherals.
- It is also known as a printer port.
- This type of port normally reserved for printer and some type of external storage devices.
- They carry 8 bits at a time on parallel path. Because they can transmit 8 data bits at a time.



3. USB Port:

- USB is one of the new interface standards.
- It can connect computer to joystick, scanners, digital cameras, etc.
- USB ports operate at twice the speed of the device attached to it.
- Keyboards, mouse use USB for high speed.
- USB 2.0 operates at a maximum speed of 480 Mbps using 4 pins. Generally defined as Hi-Speed USB.
- USB 3.0 operates at a maximum speed of 5 Gbps using 20 pins. It has a blue connector to differentiate it from USB 2.0.

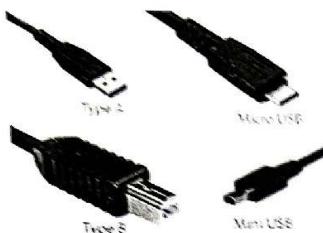
- They are faster way for the computer communicate with input and output devices.
- One disadvantage of this port is their signal travelling capacity is less than serial port.



RS232-C port.

data is sent and received over only two lines.
This port connects to the phone circuits, which also

suitable for printer connections.



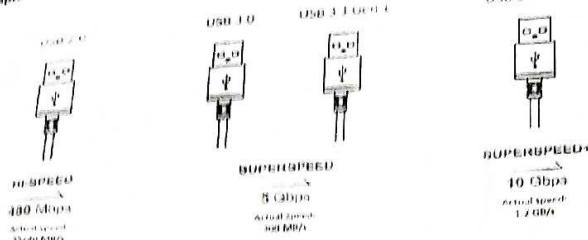
3. USB Port:

- USB is one of the new interface technologies.
- It can connect computer peripherals such as mouse, keyboard, gamepads, joystick, scanners, digital cameras and printers.
- USB ports operate at two speeds- 1.5 Mbps and 12 Mbps, depending upon the speed of the device attached to the port.
- Keyboards, mouse use the low speed while digital cameras, scanners use the high-speed.
- USB 2.0 operates at a max. of 480Mbps transfer data called "high speed" and it only has 4 pins. Generally defined in black color connector.
- USB 3.0 operates at max. speed of 5Gbps transfer data rate called "super speed" and uses a blue connector to differentiate from USB 2.0 and has more pins.

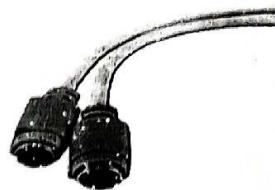
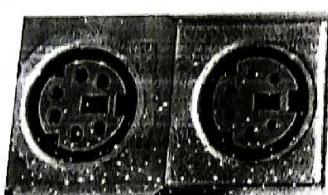
Computers for interfacing

use of external storage

transmit 8 data bits at a



4. PS/2 Port:



- A type of port developed by IBM for connecting a mouse or keyboard to a PC.
- The PS/2 port supports a mini plug containing just 6 pins.
- Most PCs have a PS/2 port so that the serial port can be used by another device, such as a modem.
- The PS/2 port is often called the mouse port.

Computer Cables:

• Introduction:

- It is basically a type of special wire which is used to connect different type of hardware components with computer cabinet.

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Page 30

- Many computer devices such as digital cameras must be connected to a system using cables.
- There are many types of cables that can all be connected to a system using cables.

1. Serial Cable:

- Serial cables are designed to replace the parallel port.
- They provide higher data transfer speeds.
- So, almost all modern motherboard has serial ports.

2. Parallel Cable:

- This cable is known as parallel cable because it connects to the parallel port.
- It is also known as IDE (Integrated Drive Electronics) cable used to connect hard disk, CD, DVD drives etc.

3. USB Cable:

- It is the most popular standard for connecting peripheral devices to a computer.
- There are 3 versions of USB:

- USB 1.0 / 1.1 (data transfer rate up to 12 Mbps)
- USB 2.0 (data transfer rate up to 480 Mbps)
- USB 3.0 (speeds up to 5 Gbps)

- Different types of USB cables:

- Type-A
- Type-B
- Micro USB
- Mini USB

- Type-A is the type of USB cable.

- USB was designed to standardize the connection of peripheral devices.

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- Many computer devices such as digital cameras, keyboard, mouse, monitor, printer must be connected to a system using cables.
- There are many types of cables that can allow devices to connect to a computer like VGA Cable, USB Cable, RJ45 Cable(Network Cable), etc.

1. Serial Cable:

- Serial cables are designed to replace the older cable.
- They provide higher data transfer speed.
- So, almost all modern motherboard have this adapter.

2. Parallel Cable:

- This cable is known as parallel cable because it is used to connect with the parallel port.
- It is also known as IDE (Integrated Drive Electronics) cable because it is used to connect hard disk, CD, DVD drives with the motherboard.

3. USB Cable:

- It is the most popular standard for connecting various peripheral devices to a computer.

- There are 3 versions of USB:

- USB 1.0 /1.1 (data transfer speeds up to 12 MB)
- USB 2.0 (data transfer speeds up to 480 MB)
- USB 3.0 (speeds up to 4.8 GB.)

- Different types of USB cables which are

- Type-A
- Type-B
- Micro USB
- Mini USB

- Type-A is the type of USB cable which is mostly used.

USB was designed to standard connection of computer peripherals, such as

keyboards, pointing devices, digital cameras, printers, etc.

- Each USB cable has two connectors.
- Mini-USB and Micro-USB, which are used in mobile devices.

4.HDMI

- HDMI stands for High-Definition Multimedia Interface, a standard for simultaneously transmitting digital video and audio from a source, such as a computer or TV cable box, to a computer monitor, TV or projector.
- Originally developed by a consortium of electronics manufacturers, it has been widely adopted with almost all televisions and computer monitors supporting the interface.

❖ Graphics Card:

- Graphics cards are also known as AGP cards.
- AGP stands for Accelerated Graphics Port, which is used for good quality video and audio.
- The Graphics card is responsible for delivering the image you see on your PC monitor.
- A graphics card, also known as a video card.
- The images you see on your monitor are made of tiny dots called pixels.
- At most common resolution settings, a screen displays over a million pixels.
- The computer has to decide what to do with everyone in order to create an image.
- To do this, it needs a translator something to take binary data from the CPU and transfer it into a picture.

❖ Network Card

- A network interface card (NIC) is a hardware component, typically a circuit board or chip, which is installed on a computer so that it can connect to a network.
- Modern NICs provide functionality to computers such as support for I/O interrupt, direct memory access (DMA) interfaces, data transmission
- The network card operates as a middleman between a computer and a data network. For

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example, when a user requests a web page, the card which converts it into electrical impulse

Those impulses are received by a web server page back to the network card as electrical impulses, which then convert them into the data that the computer displays.

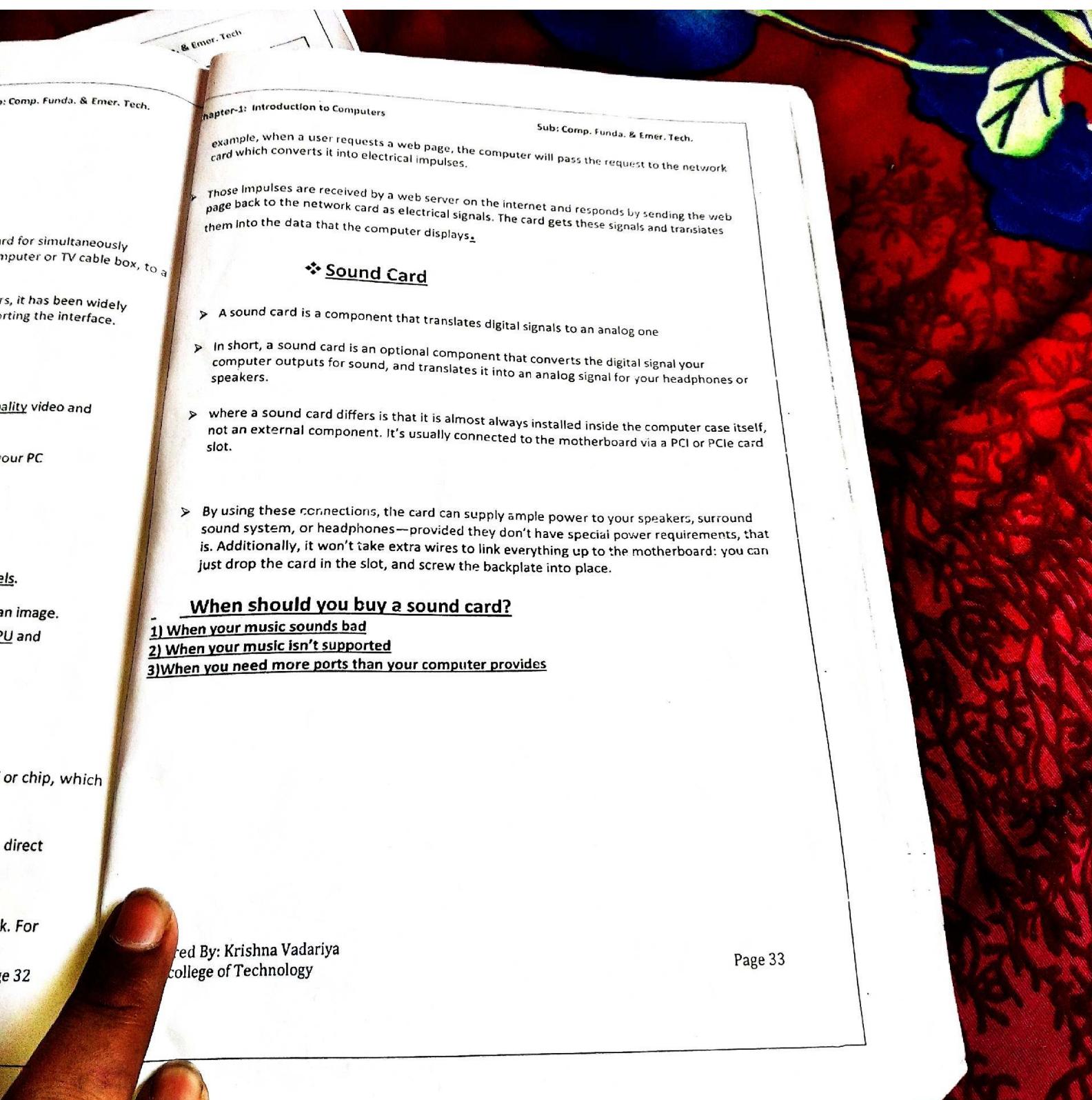
❖ Sound Card

- A sound card is a component that converts analog signals into digital signals.
- In short, a sound card is an optional component that allows a computer to output sound, and speakers.
- Where a sound card differs is that it is not an external component. It's an internal slot.
- By using these connections, the sound system, or headphones, can be connected to the sound card. Additionally, it won't take up any space on the desktop just drop the card in the slot.

When should you buy a sound card?

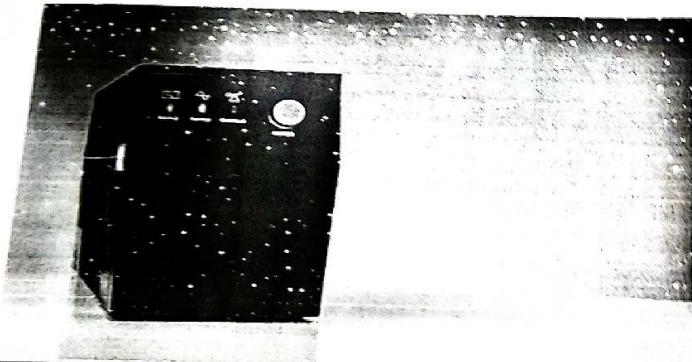
- 1) When your music sounds bad
- 2) When your music isn't supported by your speakers
- 3) When you need more ports than your motherboard has

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❖ power device :UPS

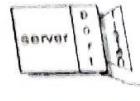
- An uninterruptible power supply (UPS) is a device that allows a computer to keep running for at least a short time when the primary power source is lost.
- UPS devices also provide protection from power surges. A UPS contains a battery that "kicks in" when the device senses a loss of power from the primary source.
- During power surges and failures, UPS devices keep computer systems and equipment safe and operational.
- An UPS provides battery backup power when the flow of electricity drops to an inadequate voltage, or if it stops.
- A UPS is typically used to protect hardware such as computers, data centers, telecommunication equipment or other electrical equipment where an unexpected power ...



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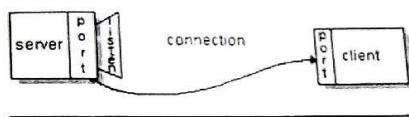
❖ Sockets :

- A network socket is a software object in a computer's network stack that serves as an endpoint for communication over a network.
- The structure and properties of a socket are defined by a programming interface (API) to facilitate communication.
- Sockets are created only during the execution of a program running in the node.



❖ Sockets

- A network socket is a software structure within a network node of a computer network that serves as an endpoint for sending and receiving data across the network.
- The structure and properties of a socket are defined by an application programming interface (API) for the networking architecture.
- Sockets are created only during the lifetime of a process of an application running in the node.

**The Socket Interface**