Computer Fundamentals

Lecture 2

Introduction to computers

Generations of Computers

What are the generations of computers?

☐ Generations of computers are mainly divided according to the development of computer technology.

☐ There are **five generations of the computer**.

- ☐ **First Generation (1946 – 1959)**
- ☐ **Second Generation (1959 – 1965)**
- ☐ **Third Generation (1965 – 1971)**
- ☐ **Fourth Generation (1971 – 1980)**
- ☐ **Fifth Generation (1980 to Present)**
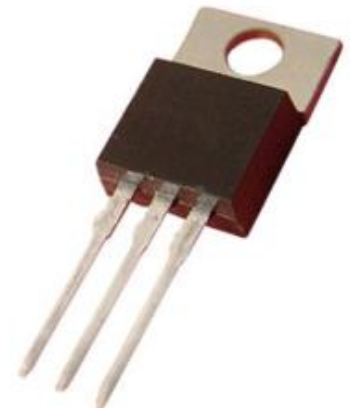
First Generation (1946 – 1959)

- During the first generation, computers were developed using **vacuum tubes** as the core technology.
  صمام كهربي، صمام مفرغ

- Machine language was used for giving the instructions.

- Input was based on punched cards and paper tape

- These computers' weight was about 30 tones.

- Required large room to place it.

- Generates too much heat.

vacuum tubes

Second Generation (1959 – 1965)

- Vaccum tubes are replaced by transistors.

- One transistor replaced the equivalent of 40 vacuum tubes.

- computers used **assembly languages** instead of binary machine languages (allowed programmers to specify instructions in words).

- They are smaller and faster than first generation.

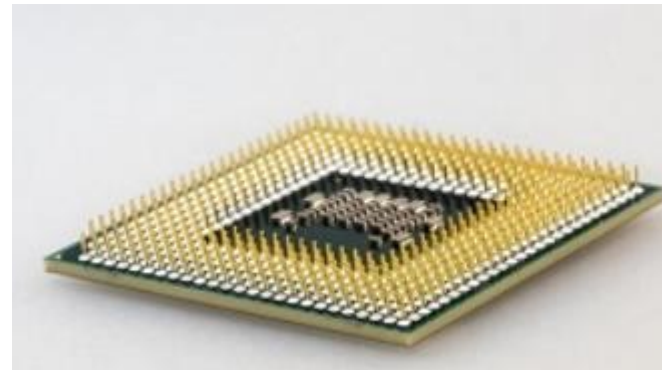Transistor

Third Generation (1965 – 1971)

☐ The 3rd generation computers replaced transistors with Integrated circuit known as chip.

☐ These computers were smaller, faster and cheaper.

☐ mouse, keyboard, and monitor were introduced in this generation.

Integrated circuit (chip)

Fourth Generation (1971 – 1980)

☐ The microprocessor (CPU) was used.

☐ Thousands of integrated circuits were built onto a single silicon chip.

microprocessor

Fifth Generation (1980 to Present)

- Ten million electronic devices are assembled on a single microprocessor chip.

- This generation computers used parallel processing hardware and AI (Artificial Intelligence) software.

- The programming languages used in this generation were C, C++, Java, .Net, etc.

Categories of Computers (by Size)

1) Supercomputers

2) Mainframe computers

3) Minicomputers

4) Microcomputers

   a) **Desktop or Personal Computer (PC)**

   b) **Workstation**

   c) **Laptops / Netbooks**

   d) **Tablets**
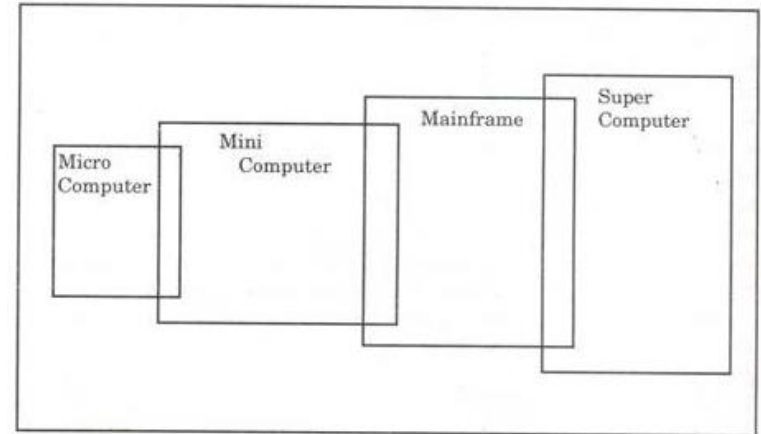
   e) **Smartphone Devices**

   f) **Wearable Computers**

Fig. 6.2   Types of computer systems

Micro Computer

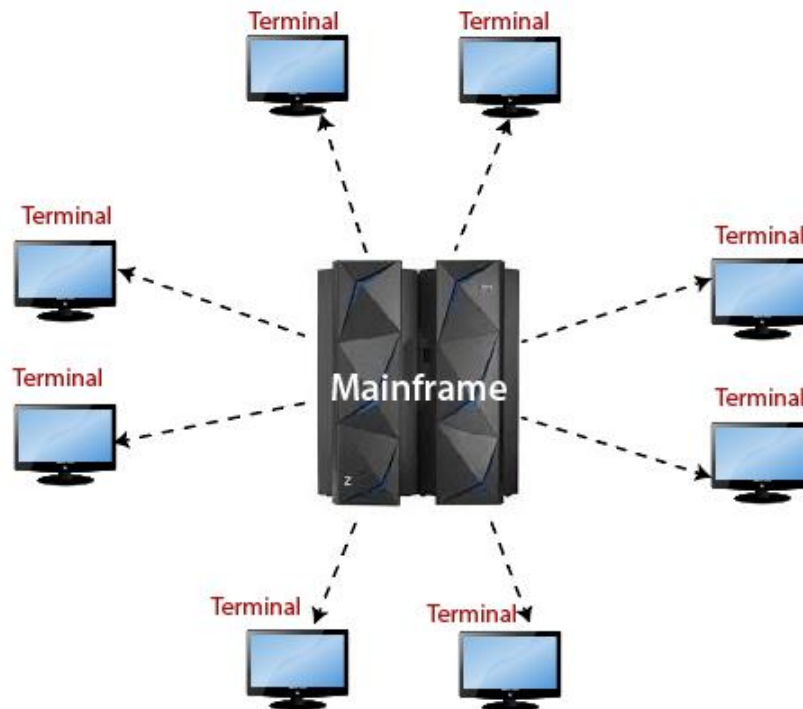Mini Computer

Mainframe

Super Computer

(1) **Supercomputers**

- A supercomputer is the **fastest** computer in the world.
- The supercomputer consists of tens of thousands of processors.
- Very expensive, can be over 100 million dollars.
- Supercomputers are used for complex tasks, such as:
    - Weather forecasting
    - Oil and gas exploration
    - Cryptanalysis

Supercomputer

(2) Mainframe Computers

- A mainframe is a large, **expensive**, **powerful** computer that can handle hundreds or thousands of **connected users** at the same time.

- Modern businesses employ mainframes for various purposes, including **banking**, **insurance**, **healthcare**, and **government.**

(3) Minicomputers

☐ A minicomputer is a multiprocessing system capable of supporting **hundreds users** simultaneously

☐ Minicomputer – a mid-range computer that is intermediate in size, power, speed, storage capacity, etc., **between a mainframe and a microcomputer**.

☐ It used for scientific and engineering computations, and database management.

(4) Microcomputers

- A microcomputer is a small, relatively inexpensive computer with a microprocessor as its central processing unit (CPU)

- Microcomputers are designed to be used by individuals.

- **Types of Microcomputer**
  - **Desktop or Personal Computer (PC)**
  - **Workstation**
  - **Laptops / Netbooks**
  - **Tablets**
  - **Smartphone**
  - **Wearable Computers**

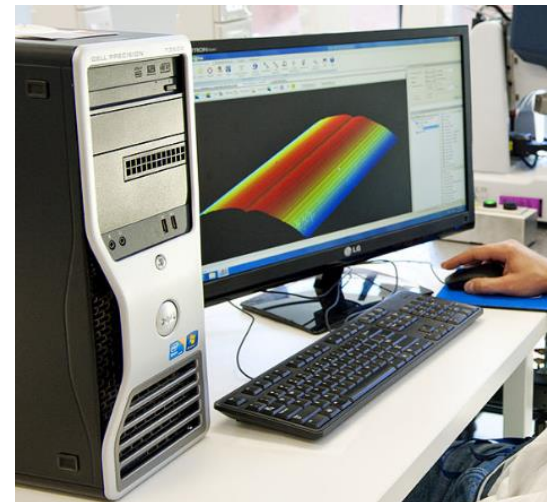# (4) **Microcomputers - Desktop**

Desktop or Personal Computer (PC)

☐ The PC is a general-purpose, cost-effective computer that stands for the personal computer.

☐ fits on or under a desk.

☐ It typically has a monitor, keyboard, mouse, and system unit.

(4) **Microcomputers -** Workstations

Workstations

☐ It usually has more capacity than a personal computer, but is not as high-powered as a **mainframe** computer.

☐ Workstation Usages

- ☐ Small engineering companies
- ☐ Architects
- ☐ graphic designers.
- ☐ Can be used as server.
- ☐ Software development.

(4) **Microcomputers - Laptop**

Laptop computer (or notebook)

☐ Laptop computer (also called **portable** computer or **notebook** computer) (Other terms, such as **ultra book** or **netbook**, refer to specific types of laptop)

☐ Is a portable personal computer that is small enough to rest on the user's lap and can be powered by a battery.

☐ It includes a flip down screen and a keyboard with a touchpad.

(4) **Microcomputers - Tablet**

Tablet

☐ A tablet is a wireless, portable personal computer with a touchscreen interface.

☐ It is slightly smaller and weighs less than the average laptop.

☐ It is approximately the size of a hardcover book (seven inches or bigger), and resembles a large smartphone.
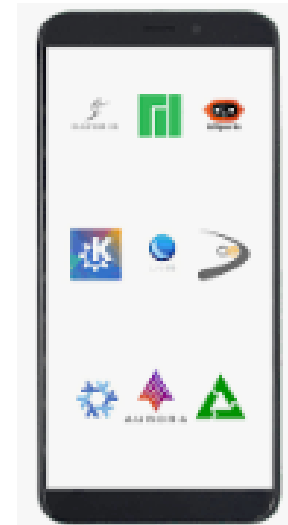
(4) **Microcomputers - Smartphone**

Smartphone Devices

- ☐ A **smartphone** is a portable computer **device** that combines mobile telephone and computing functions into one unit.

Q- What is E-readers?

(4) **Microcomputers - Wearable**

Wearable Computers

☐ A computing device worn on the body.

☐ Examples: ????

List of Top 10 Computer Companies in the World by Market Share

#	Computer Company	Market Share
1.	Lenovo	+20%
2.	HP	+20%
3.	Dell	+17%
4.	Apple	+9%
5.	Acer	+7%
6.	Asus	+7%
7.	Toshiba	<5%
8.	IBM	<5%
9.	NEC	<5%
10.	Fujitsu	<5%

Review Questions

- 1. Define what computer is.

- 2. Which computer generation use the following component:
  - a. Transistor
  - b. Vacuum Tube
  - c. Microprocessor
  - d. Integrated Circuit

- 3. There are five generations of computer. Explain the characteristic of the computer in each generation.

Review Questions

☐ There are two common types of microcomputer: **Desktop** and **Laptop**. Discuss the difference between these two types of computer based on:

  ☐ Ability to upgrade and customize

  ☐ Performance

  ☐ Portability

  ☐ Price

  ☐ Popularity

Review Questions

☐ Define the following terms:

  ☐ Data

  ☐ Information

☐ Write any two features of Supercomputers.

☐ What is the difference between Personal Computers and Minicomputers?

Assignments

☐ List the Top 10 Software Companies of 2022 in the world.