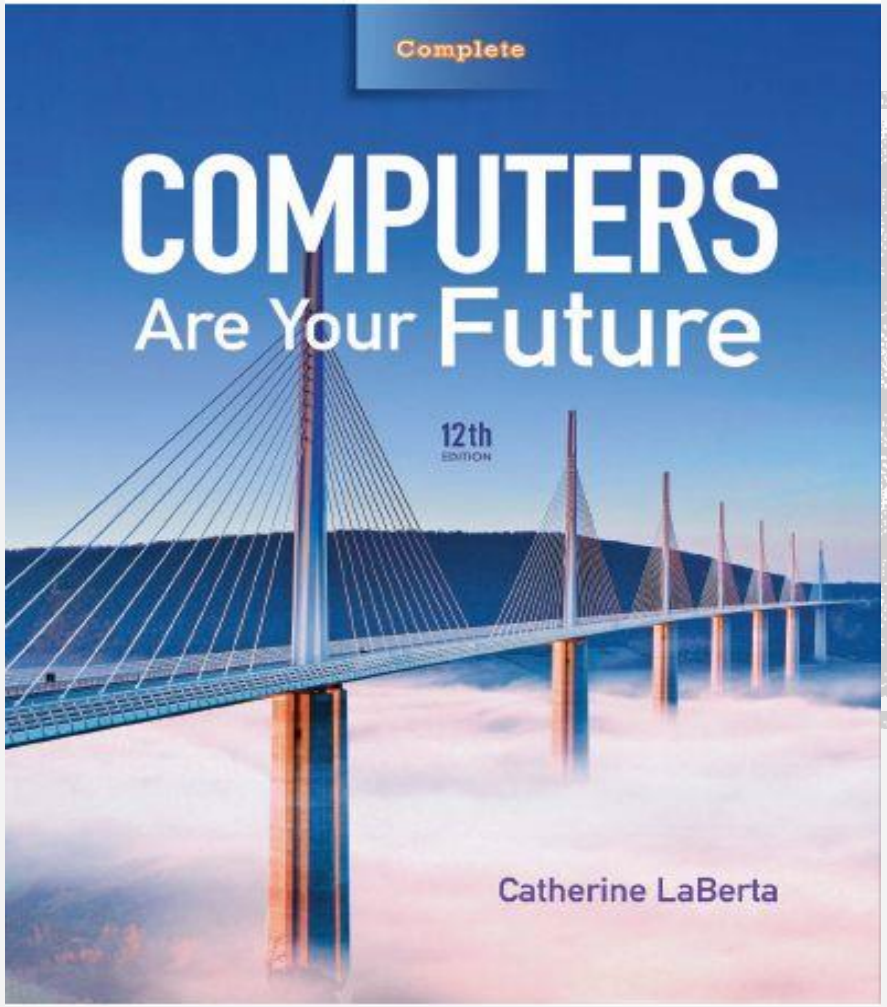


ITCE 101: Computer Technologies

Chapter 1: Computers and You

Content based on Computers Are Your Future Book

Twelfth Edition

Objectives

- Define the word **computer** and name the **four basic operations** that a computer performs.
- Describe the two main components of a computer system: **hardware and software**.
- Provide **examples** of hardware devices that handle **input, processing, output, and storage** tasks.
- Give an example of the **information processing cycle** in action.
- Discuss the two major categories and the various **types of computers**.
- Explain the **advantages** and **disadvantages** of computer use.
- Recognize the **ethical and societal impacts** of computer usage.
- Discuss how computers **affect employment**.
- List ways to **be a responsible** computer user.

Computers: Yesterday, Today, and Tomorrow

- **Computers become:**
  - Integral to our daily lives
  - Millions use computers daily
- **Applications of computers:**
  - Education
  - Health
  - Government
  - Communication
  - Banking
  - Entertainments
  - Business
  - Research

Give examples ?

Computers can be used in:

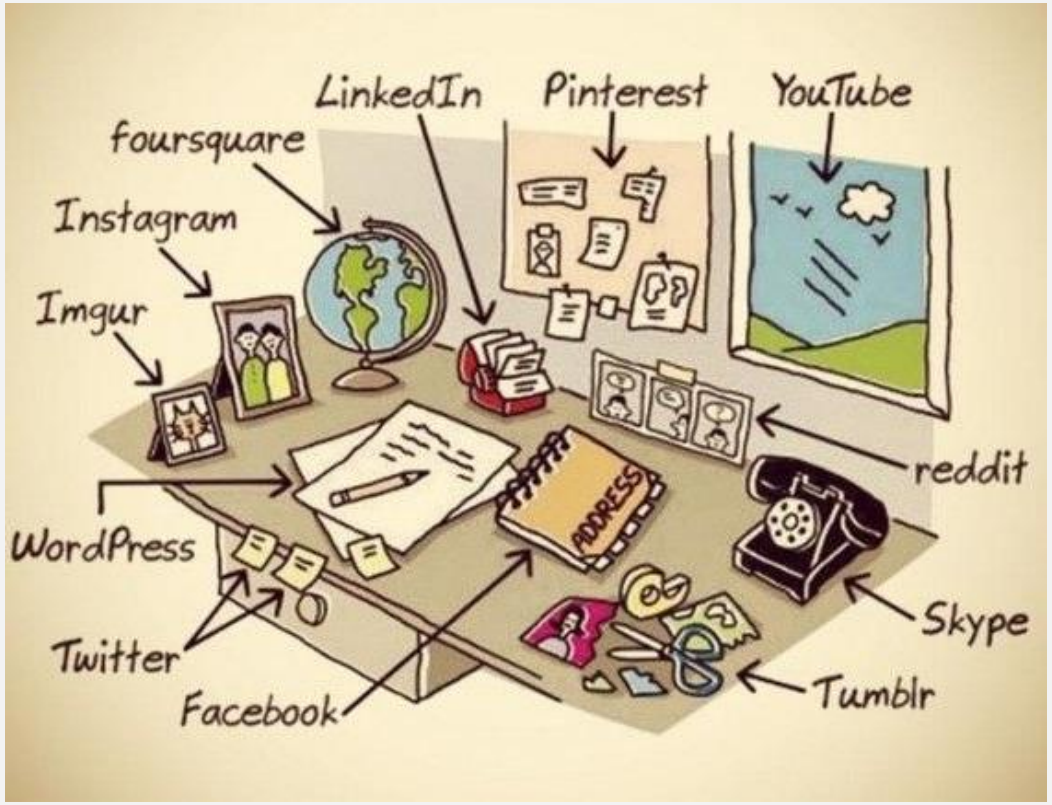
- Home
- School
- work

Embedded into:

- Cars
- Phones
- Cameras
- Toys

Computers: Before and After

- **Before computers:**
  - No telephone answering machines
  - No handheld calculators
  - No fax machines
  - No personal computers
- **People should:**
  - Write letters by hand or with a typewriter
  - Kept track of data and numbers in ledgers
  - Communicated in person or over the telephone
- **Now, after having computers:**
  - Today, it's becoming difficult to find an activity that doesn't involve computers, technology, and sharing information

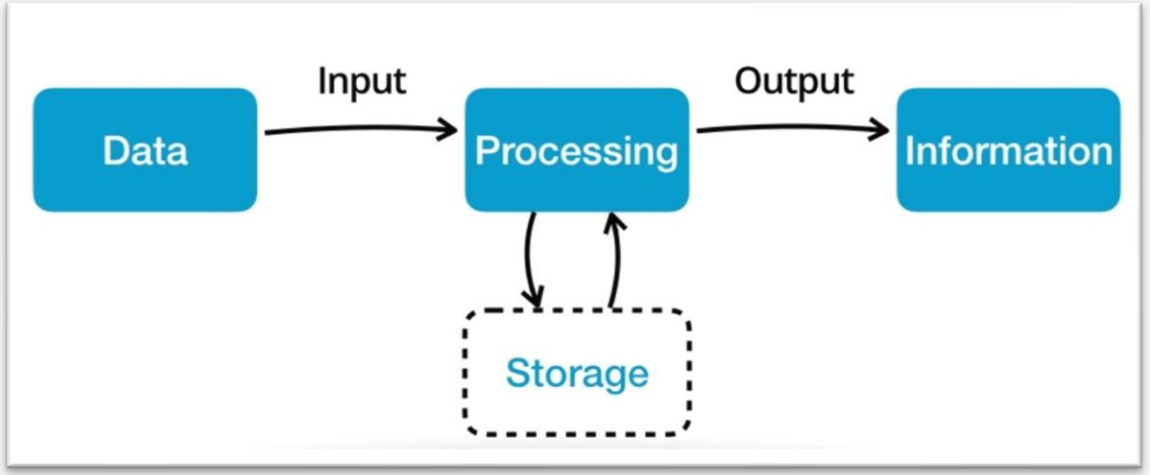


Computer Fundamentals

- **What is Computer:**

  It is a device that performs the information-processing cycle

- **Information-processing cycle**
  - Consists of four basic operations:
    - Input
    - Processing
    - Output
    - Storage



Computer Fundamentals – Processing cycle

Input is the action of receiving data— raw facts.

Processing is the manipulation done on the input by a program (instructions), to convert the input (data) into information (data converted into a meaningful form).

Output is the actual displaying of the information, the processed data. This would be placing the average below the column of grades in the Excel worksheet, or confirming the entry of a valid ID.

Storage is saving the information for later use

Information Processing cycle example

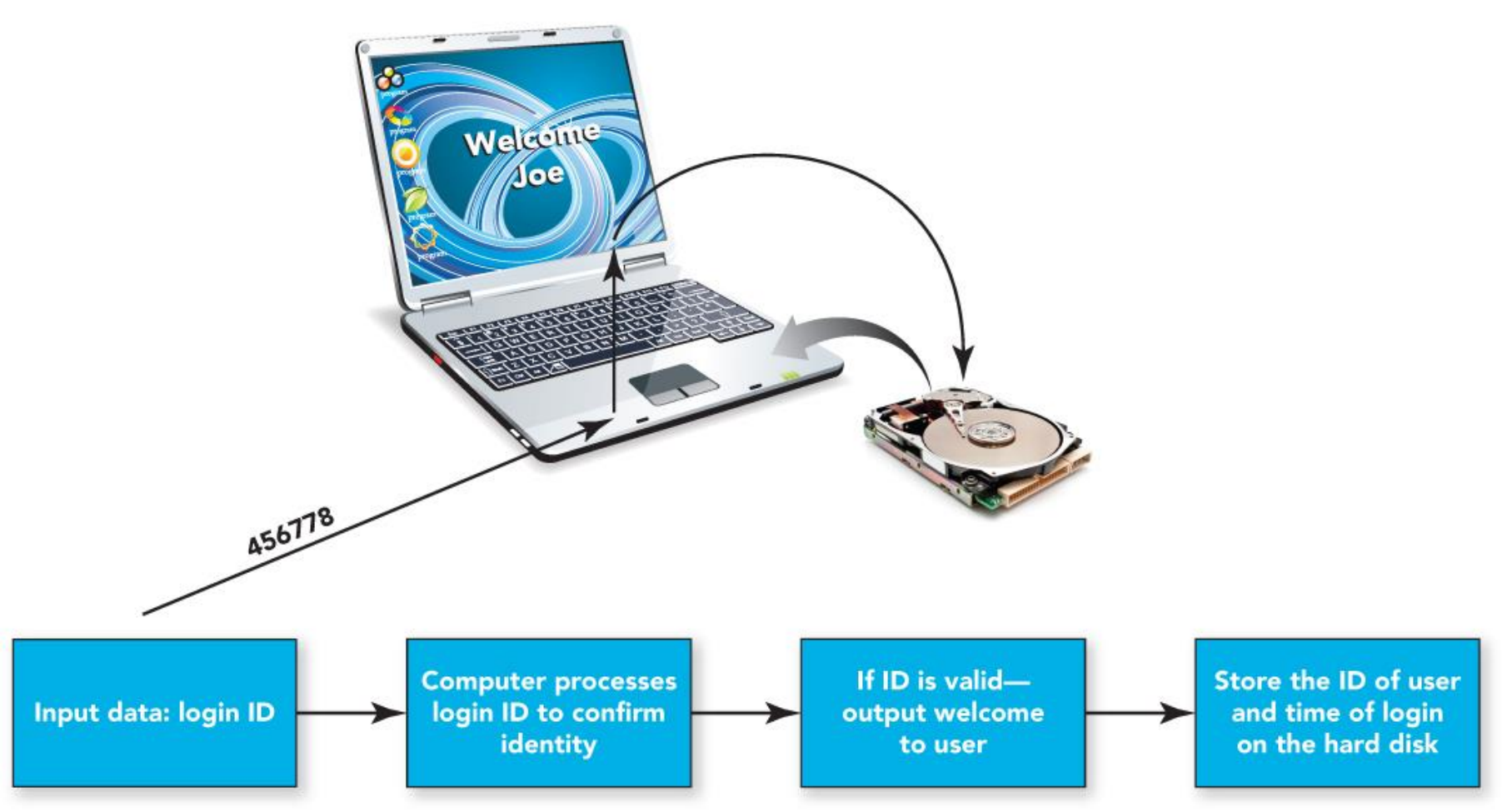


FIGURE 1.6 Get to know your system. A typical com-

Computer Fundamentals

Computer system is a group of associated components that work together: **Hardware & Software**

- **Hardware:**

Which includes all the physical parts of the computer and its related devices as the system unit, monitor, keyboard, and printer.

- **Software:**

All the programs that give the computer its instruction and perform the four basic operation to accomplish a task

Computer Fundamentals - Software

Program: is a set of instructions that tells the hardware how to perform an operation on the input data in the processing phase of the information processing cycle.

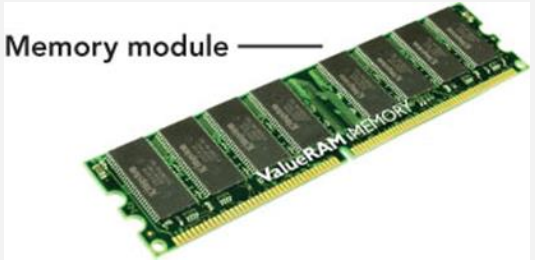
- **System software:** is the collection of programs written and configured to provide the infrastructure, basic services, and hardware control that let other programs function properly.
  - Examples of system software include **operating system**, **system utility programs** that aid in system maintenance, such as backup programs, cleanup tools, and antivirus software.
- **Application software:** is sitting on top of the operating system and provide instructions that direct the computer's hardware to perform a task for the user.
  - Examples of: **word processing**, spreadsheet, **database**, presentation, e-mail, Web **browser**, and communication software

Information processing cycle

- **Input**
  - First operation of the information-processing cycle, enables the computer to accept **data**
  - **Data:**
    - Facts that are raw and unorganized
    - Entered into the computer for processing through the use of input devices such as a keyboard or mouse

Information processing cycle

- **Processing:** It is the second operation of the information-processing cycle, converts data into information
  - Information refers to consolidated, organized, processed data.
  - The central processing unit (CPU) processes data into information.
  - Random access memory (RAM) temporarily stores programs and data needed by the CPU.



Information processing cycle

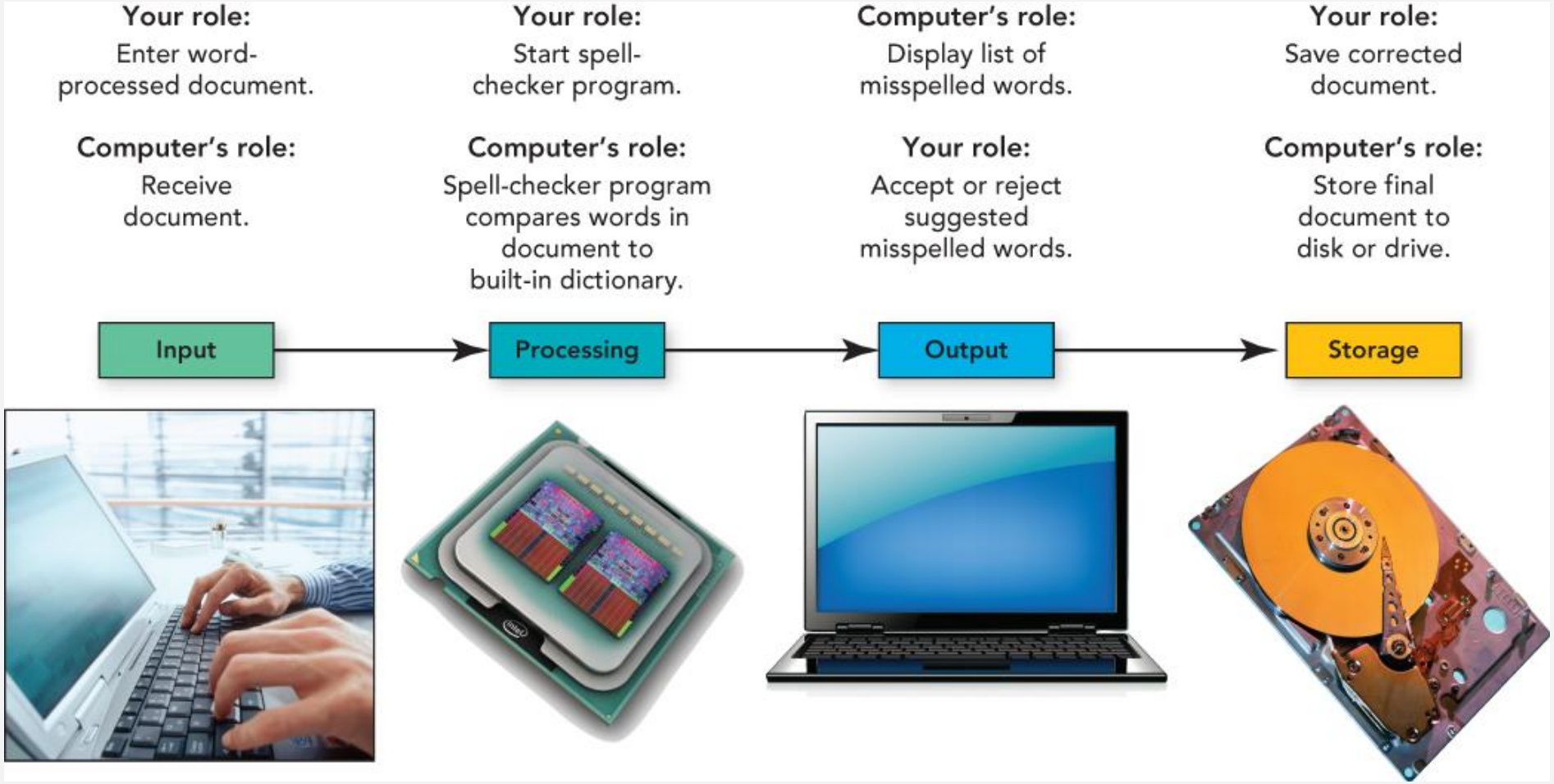
- **Output**

  Third operation of the information-processing cycle, requires output devices, such as monitors and printers to display results for people to see or hear

Information processing cycle

- **Storage**
  - Fourth operation of the information-processing cycle, holds programs, software, and data that the computer system uses
  - **Storage devices**
    - Hard drives, CD and DVD drives, and media card readers—used with USB drives and flash memory cards

Information Processing cycle example

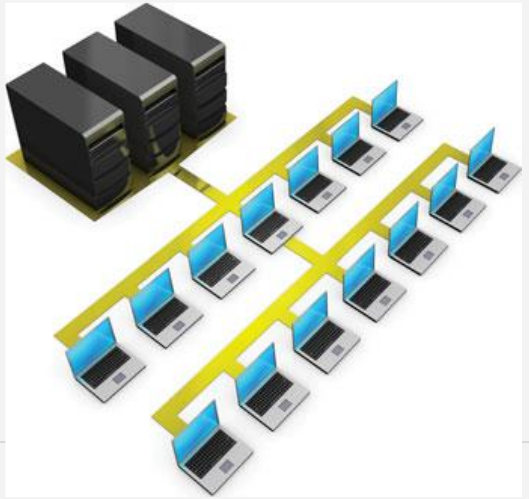


Types of Computers – Number of users

- Computers can be separated into two main types based on the number of users:
  - **Individual —**designed for one user at a time (Client)
  - **Organization (Server)—**designed to be used by many people at the same time (allow them to access hardware, programs, or data)

This will allow us to build *network-based structure* called

- **Client/server network**



Types of Computers - Size

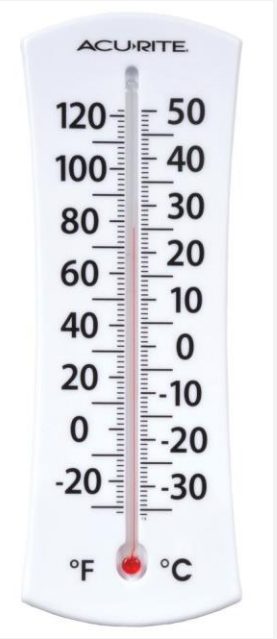
- Computers can be separated into two main types based on the size:
  - **Supercomputer:** able to perform extremely high-speed processing and show underlying patterns
  - **Mainframe:** very large processing jobs to meet the needs of large companies or agencies of the government
  - **Miniframe or Minicomputer:** designed to meet the needs of smaller companies or businesses
  - **Microcomputer or PC**: It is a general-purpose computer that is designed for individual use (Desktop, laptops, smartphones, tablets etc.)
  - **Workstation:** It is a single user computer that is designed for technical or scientific applications (faster CPU, Big RAM, high speed GPU)

Servers

Individual

Types of Computers – Data type

- Computers can be separated into two main types based on the type of data can handle:
  - **Digital Computers:** It is designed to perform operations at high speed. It accepts the raw data in the form of binary numbers (0 and 1) and processes it with programs stored in its memory to produce the output.
  - **Analogue Computers**:It is designed to process analogue data. No conversion to digital is needed.
    (For temperature and voltage / engineering applications)
  - **Hybrid computers:** It has features of both analogue and digital computers (medical devices and scientifics reasearch)



Social Networking

- **Examples of Web-based applications:**
  - **Internet messaging (IM) and video conferencing**.
  - **Social networks apps**: Facebook, Twitter (X), Instagram etc.
  - **Collaborative work:** Google Docs, Teams, GitHub, Wiki,

Computer Advantages and Disadvantages

Advantages:

- **Speed and accuracy:** Computers can complete tasks quickly and with high accuracy.
- **Storage:** Computers can store huge amounts of data in a small space.
- **Connectivity:** Computers allow us to connect and communicate with people around the world.
- **Automation:** Computers can automate tedious tasks.
- **Multitasking:** Computers can handle multiple tasks at once.
- **Reliability:** Computers can perform the same sort of work repeatedly without throwing up errors

Computer Advantages and Disadvantages

Disadvantages:

- **Cost:** Computers can be quite expensive.
- **Security & Privacy concerns:** Hackers can access computers and steal sensitive information.
- **Maintenance:** Computers require regular maintenance and upgrades.
- **Human error:** Computers can be exposed to human error and.
- **Social isolation:** Overuse of computers can lead to a lack of social interaction.
- **Reduction in employed opportunity**: Computers to replace people

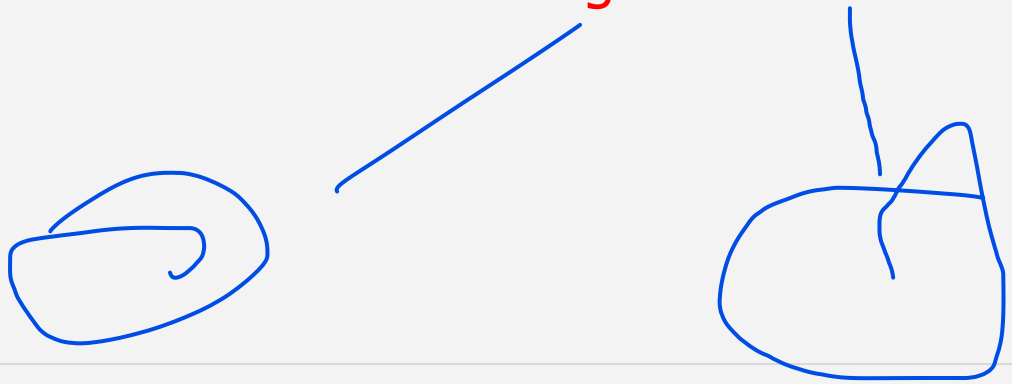
Computer related vocabularies

- **Computer ethics:** Moral dilemmas relating to computer usage
- **Digital piracy:** Unauthorized reproduction and distribution of computer-based media
- **Unethical behavior:** Sending viruses, stealing credit card information, computer stalking, and installing illegitimate copies of software on computers
- **Automation:** Replacement of people by machines and computers
- **Outsourcing:** Subcontracting of portions of a job to a third party to reduce cost, time, and energy.
- **E-learning:** Learning without requiring students to be at a specific location at a specific time

Computer software bugs

- **Software programs bugs:** software flaws
  - Errors cause programs to run slowly or miscalculate.
  - Bugs are almost impossible to eliminate completely.
- **Solution**:
  - Upgrade software to obtain the latest software features and updates

- What is the different between bugs and flaws ?

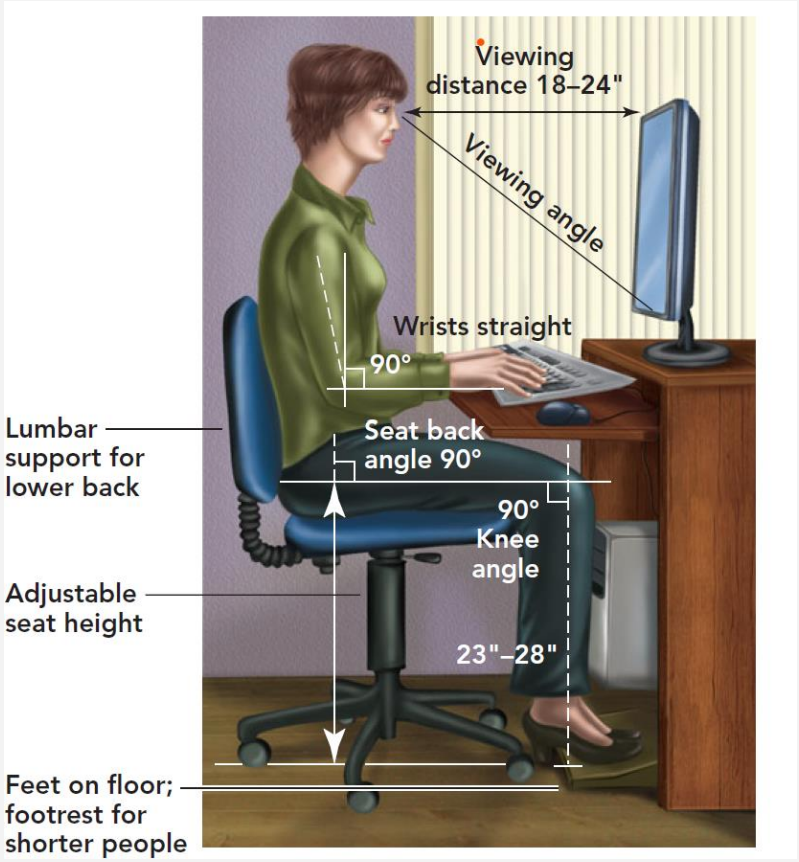


When using computer hardware:

- Do not plug too many devices into electrical outlets.
- Use surge protectors.
- Place hardware where it can't fall or be damaged.
- Provide adequate space for air circulation around hardware.
- Securely fasten computer cables, cords, and wires.

Promote safety and comfort

- Position top of your monitor at eye level
- Tilt the monitor back 10 to 20 degrees
- Place it at least 20” from your eyes
- Keep your wrists flat—use a wrist rest if needed
- Rest your eyes often by focusing on an object 20 or more feet away
- Stand and stretch periodically



Research-based Learning

- Conduct a research to identify and explore the following related keywords:
    1. Smart Devices
    2. Internet of Things (IoT)
    3. Troubleshooting
    4. Remote Access
    5. Cloud computing