Objectives

• Recognize you live and work in the digital world
• Distinguish types of computers
• Identify computer system components
• Compare types of memory
• Summarize types of storage media
• Differentiate between input devices
Objectives

- Examine output devices
- Describe data communications
- Define types of networks
- Assess security threats
- Understand system software
- Describe types of application software
A computer is an electronic device that:

- accepts information and instructions from a user
- manipulate the information according to instructions
- display the information in some way
- store the information for later retrieval
Distinguishing Types of Computers

The categories of computers are:

• Personal computers (PCs)
  • Desktops
  • Laptops
  • Subnotebooks (Ultraportables or Minis)
  • Tablets
• Handhelds
  • Smartphones
  • MP3 players
• Mainframes and supercomputers
Personal computers (PCs) are used for general computing tasks, usually for home or office use.

Handheld computers are small computers that usually have more limited capabilities than traditional PCs.

Mainframes and supercomputers are used by large businesses, government agencies, and in science and education.
Distinguishing Types of Computers

• **Laptop computer**
  - hinged lid contains display
  - lower portion contains keyboard
  - powered by rechargeable batteries

• **Smartphones**
  - used to make and receive phone calls
  - also used to maintain an address book and calendar, send email, connect to the Internet, play music, and take photo or video

• **Tablets**
  - thin computers without an external keyboard or mouse
  - interact with touch screen or stylus
  - ideal for surfing the Web, checking email, reading electronic books, watching video, and creating artwork
Distinguishing Types of Computers

- **Mainframe computers** and **supercomputers** are used by large businesses, government agencies, and in science and education. They provide centralized storage and processing, and can manipulate tremendous amounts of data.

![Supercomputer](image.jpg)
Identify Computer System Components

A computer system is made up of:
• **Hardware**—the physical components
• **Software**—the programs or data routines

**Architecture** or **configuration** is the design and construction of the computer.

**Specifications** are the technical details about each hardware component.
Identify Computer System Components

• **Data**
  • Numbers, words, figures, sounds, and graphics that describe people, events, things, and ideas

• **Processing**
  • Modifying data
Identify Computer System Components

- **Motherboard**
  - located inside the computer
  - the main electronic component of the computer
  - contains the CPU

- **Cards** are removable circuit boards that are inserted into slots in the motherboard
Identify Computer System Components

- **Input** — data you give to a computer

- **Output** — result of the computer processing your input

- **Peripheral devices** — accomplish the input, output, and storage functions
Identify Computer System Components

• Microprocessor
  • also called processor, central processing unit or CPU
  • a silicon chip designed to manipulate data
  • speed determined by:
    • Clock speed
    • Word size
    • Processor type
Compare Types of Memory

• **Memory** stores instructions and data.
• There are five types of memory:
  • Random access memory (RAM)
  • Cache memory
  • Virtual memory
  • Read-only memory (ROM)
  • Complementary metal oxide semiconductor memory (CMOS)
Compare Types of Memory

- **RAM**
  - Temporary memory that constantly changes while computer is on
  - You can upgrade the memory capacity
- **Cache memory**
  - Special high-speed memory on the motherboard or microprocessor
  - Stores frequently and recently accessed data and commands
Compare Types of Memory

• **Virtual memory** is extra memory that simulates RAM if more is needed.

• **Read-only memory (ROM)** is the permanent storage location for a set of instructions the computer uses.

• **CMOS memory** is semi-permanent and stores information such as the date, time, and system parameters.
Summarize Types of Storage Media

- Three types of storage media:
  - Magnetic storage media
  - Optical storage devices
  - Flash memory
Summarize Types of Storage Media

• **Common magnetic storage devices**
  • **hard disks**—several spinning platters usually sealed in a case inside the computer

• **Optical storage devices**
  • CD—stores 700 MB of data
  • DVD—stores 4.7-15.9 GB
  • Blu-ray—stores 25 GB, used for storing high-definition video
Summarize Types of Storage Media

• **Flash memory (solid state storage)** — similar to ROM except that it can be written to more than once.

• **Flash memory cards**
  - small, portable cards encased in hard plastic to which data can be written and rewritten
  - used in digital cameras, handheld computers, video game consoles, and other devices

• **USB flash storage device (USB drive, flash drive)**
  - popular type of flash memory
  - available in a wide range of sizes up to 512 GB of data
  - plug directly into the USB port of a personal computer
Differentiate Between Input Devices

Some input devices are:

- Keyboard
- Pointing device
  - Mouse
  - Trackball
  - Touch pad
- Touch screen
- Microphone
- Scanner
Understanding Assistive Devices

- People who cannot use their arms or hands instead can use foot, head, or eye movements to control the pointer.
- People with poor vision can use keyboards with large keys for input, screen enlargers to enlarge the size of objects on the monitor, or screen readers that speak on-screen content aloud.
Explain Output Devices

- **Monitors and printers** are common output devices.
- **LCD monitors** create an image by modulating light within a layer of liquid crystal
  - Some use LED technology as a backlight

Factors that influence a monitor’s quality are:
- Screen Size
- Resolution
Types of printers

- Laser – high quality
- Inkjet – popular for home use
- Dot matrix – used to print large quantities
Describe Data Communications

**Data communications** is the transmission of data from one computer to another or to a peripheral device.

The four essential components of data communications are:

- Sender
- Channel
- Receiver
- Protocols
Describe Data Communications

• A **sender** is the computer that originates the message.
• The **message** is sent over a **channel**, such as a telephone.
• The **receiver** is the computer at the message’s destination.
• **Protocols** are the rules that establish the transfer of data between sender and receiver.
Describe Data Communications

• **Device driver (or driver)**
  • handles the transmission protocol between a computer and its peripheral devices
  • a computer program that can establish communication because it contains information about the characteristics of your computer and of the device

• **Data bus**
  • data path between the microprocessor, RAM, and the peripherals along which communication travels
Describe Data Communications

PCs have several types

- Parallel
- Serial
- USB
- MIDI
- Ethernet
- Thunderbolt
- HDMI
- DVI
- VGA
Describe Data Communications

• **USB (Universal Serial Bus) port**—a high-speed serial port which allows multiple connections at the same port

• **Ethernet port**—used to connect to another computer, a LAN, a modem, or sometimes directly to the Internet; allows data to be transmitted at high speeds.

• **HDMI (high definition multimedia interface)** and **DVI (digital interface)**—digitally transmits both video and audio

• **VGA (video graphics array)** allows analog transmission of video
Define Types of Networks

• **Network**
  - connects one computer to other computers and peripheral devices

• **Network interface card (NIC)**
  - creates a communications channel between the computer and the network
  - a cable connects the NIC port to the network

• **Network software**
  - establishes the communications protocols that will be observed on the network
  - controls the traffic flow of data traveling through the network
Define Types of Networks

• **Server**
  - acts as the central storage location for programs
  - provides mass storage for most of the data used on the network

• **Client/server network** — a network with a server that acts as the central storage location

• **Peer-to-peer network**
  - a network without a server
  - all of the computers are equal
Define Types of Networks

- **Standalone computer**—a personal computer that is not connected to a network
- **Workstation**—a personal computer that is connected to a network
- **Node**—any device connected to the network
Define Types of Networks

FIGURE A-19: Typical network configuration

- **Server**
- **Workstation**
- **Your workstation**
- **Laptop (connected via WiFi)**
- **Router**
- **Network printer**

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Define Types of Networks

- **LAN (local area network)**
  - Nodes located close to each other

- **WAN (wide area network)**
  - more than one LAN connected together
  - the Internet is the largest example of a WAN

- **WLAN (wireless local area network)**
  - devices connected using radio waves instead of wires
  - **Wi-Fi (wireless fidelity)** describes WLANs connected using a standard radio frequency established by the Institute of Electrical and Electronics Engineers (IEEE)
Define Types of Networks

• **PAN (personal area network)**— a network that allows two or more devices located close to each other to communicate or to connect a device to the Internet
  - **Infrared technology**—uses infrared light waves to beam data from one device to another
  - **Bluetooth**—uses short range radio waves to connect a device wirelessly to another device or to the Internet
Assess Security Threats

• **Security**
  • the steps a computer user takes to prevent unauthorized use of or damage to the computer
Assess Security Threats

• **Malware**
  • any program intended to cause harm or convey information to others without the owner’s permission

• **Viruses**
  • harmful programs that instruct your computer to perform destructive activities, such as erasing a disk drive
  • **Antivirus software** *(virus protection software)* searches executable files for the sequences of characters that may cause harm and disinfects the files by erasing or disabling those commands

• **Spyware**
  • secretly gathers information from your computer and sends this data back to the company or person that created it
  • usually installed without the computer user’s permission or knowledge
  • **Anti-spyware software** detects spyware and deletes it
Assess Security Threats

- **Firewall**
  - prevents other computers on the Internet from accessing a computer and prevents programs on a computer from accessing the Internet without the computer user’s permission
  - can be either hardware or software
  - Hardware firewalls provide strong protection from incoming threats
    - Many routers come with built-in firewalls
  - Software firewalls track all incoming and outgoing traffic
Assess Security Threats

- **Spoofed site**
  - a website set up to look like another website, but which does not belong to the organization portrayed in the site
  - has a **URL** (address on the web) that looks similar to a URL from the legitimate site
  - usually set up to try to convince customers of the real site to enter personal information

- **Phishing**
  - the practice of sending email to customers or potential customers of a legitimate website asking them to click a link in the email
  - the link leads to a spoofed site

- **Pharming**
  - when a criminal breaks into a **DNS server** (a computer responsible for directing Internet traffic) and redirect any attempts to access a particular website to the criminal’s spoofed site
Protecting Information with Passwords

• **Logging in / Logging on**
  • signing in with a username and password

• **Strong password**
  • at least eight characters
  • consists of upper- and lowercase letters and numbers
  • does not include common personal information
Understand System Software

System software helps the computer carry out its basic operating tasks.

The four types of system software are:
- Operating systems
- Utilities
- Device drivers
- Programming languages
Understand System Software

• **Operating system**
  • allocates system resources
  • controls the **input and output (I/O)**
  • manages files on storage devices
  • guards against equipment failure

• **Operating environment**
  • provides a **graphical user interface (GUI)**
    that acts as a liaison between the user and the computer
Understand System Software

- **Utility software**
  - helps analyze, optimize, configure, and maintain a computer

- **Device drivers**
  - handle the transmission protocol between a computer and its peripherals
  - when you add a device to an existing computer, part of its installation includes adding its device driver to the computer’s configuration

- **Programming languages**
  - used by a programmer to write computer instructions
Describe Types of Application Software

• **Application software**
  • enables you to perform specific computer tasks
• **Document production software**
  • includes word processing software and desktop publishing software
  • has a variety of features that assist you in writing and formatting documents, including changing the **font** (the style of type), **spell checking** to help you avoid typographical and spelling errors, and adding simple drawings called **clip art**
• **Spreadsheet software**
  • a numerical analysis tool
  • used to create a **worksheet** composed of a grid of columns and rows
  • you type data into the cells, and enter mathematical formulas into other cells that reference the data
Describe Types of Application Software

- **Database management software**
  - lets you collect and manage data

- **Database**
  - a collection of information stored on one or more computers organized in a uniform format of fields and records
  - **field**—one piece of information in the record
  - **record**—a collection of data items in a database
  - An example of a database is the online catalog of books at a library; the catalog contains one record for each book in the library, and each record contains fields that identify the title, the author, and the subjects under which the book can be classified.
Describe Types of Application Software

- **Presentation software**
  - Allows you to create a visual slide show to accompany a lecture, demonstration, or training session

- **Multimedia authoring software**
  - allows you to record digital image files, audio files, and video files

- **Information management software**
  - Keeps track of schedules, appointments, contacts and to-do lists

- **Website creation and management software**
  - allows you to create websites and mobile apps