

# **Application of Information & Communication Technologies**

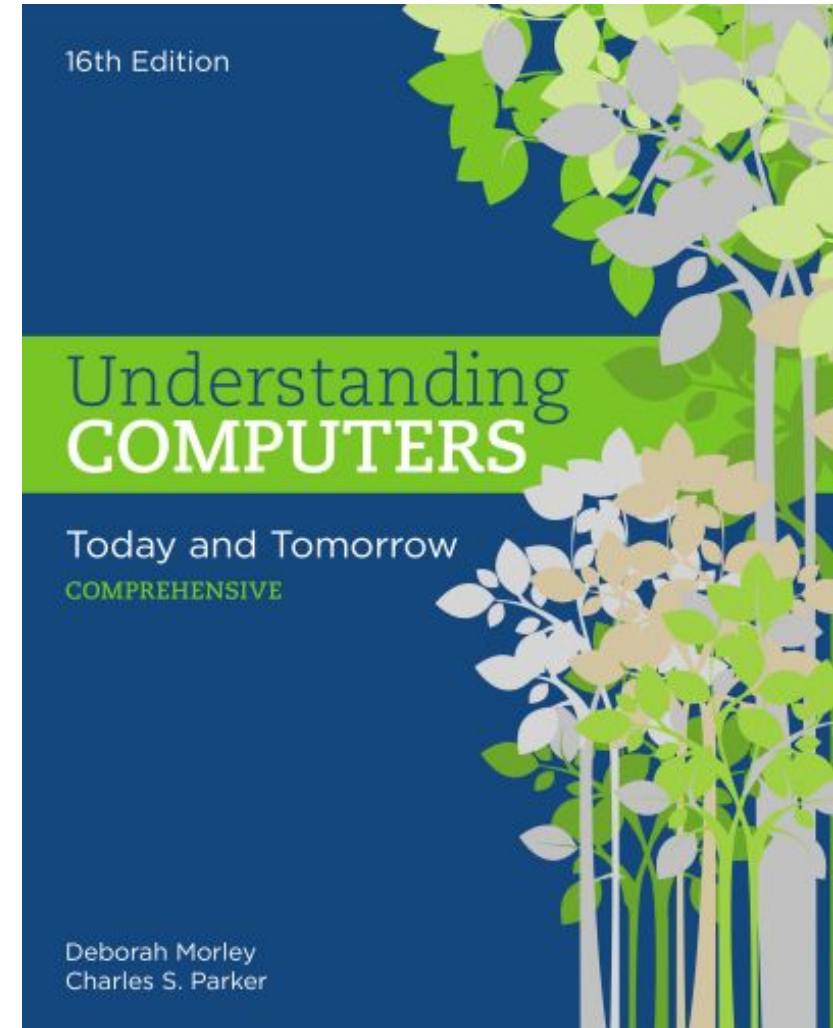
**chapter 01**  
**Ghulam Mustafa**

# Introduction

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# Course Book

1. Deborah Morley, Charles S. Parker, “Understanding Computers: Today and Tomorrow, Comprehensive”, 16th Edition

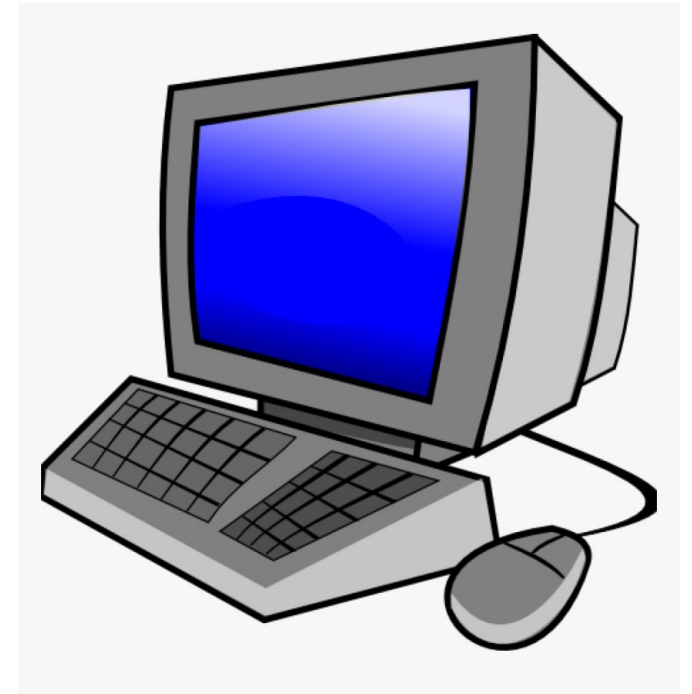


# After this lecture you will be able to explain:

1. What is Computer and how does it work
2. Advantages and Disadvantages of Computers
3. Data vs Information
4. Identify Different components of Computer
5. Explaining what is Software and its different types
6. Describing different categories of Computers
7. Networks and the Internet

# What Is a Computer and What Does It Do?

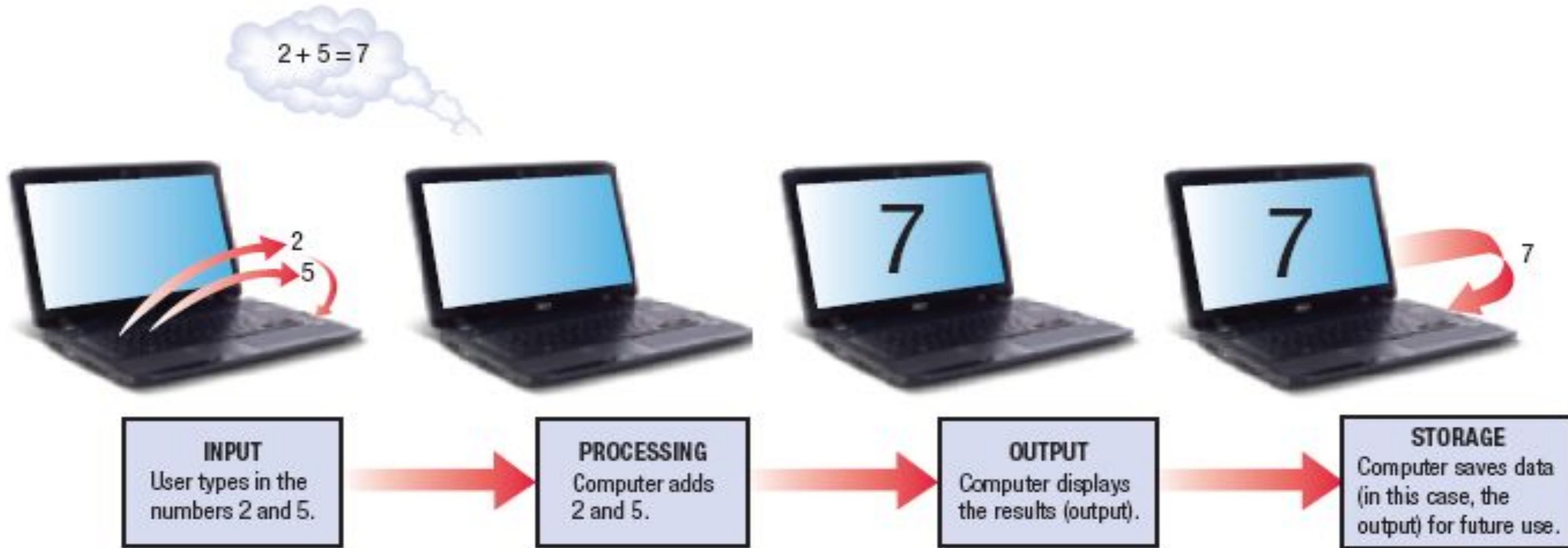
1. ***“An electronic device, operating under the control of instructions stored in its memory, that can accept data, process the data according to specified rules, produce results, and store the results for future use.”***
2. A computer is a computational device.



# What Is a Computer and What Does It Do?

1. **Data** - collection of unorganized facts
2. **Information** - data that is organized
3. **Input** - data entered into a computer
4. **Output** - processed results from a computer
5. **Storage** – holding data and information for future use
6. **Information processing cycle** – the cycle of input, process, output, and storage

# What Is a Computer and What Does It Do?



**FIGURE 1-6**  
The information processing cycle.

# Why learn about computers?

Computers have become an integral part of our lives.

## **Basic computer literacy**

Knowing about and understanding computers and their uses is an essential skill today for everyone.



# Advantages of Computer

1. **Speed:** Billions or trillions of operations in a single second
2. **Reliability:** Computers rarely break or fail
3. **Consistency:** Given the same input and processes, a computer will produce the same results. Computers generate error-free results,
4. **Storage:** Computer can store enormous(a very large) amount of data.
5. **Communication:** Computers allow users to communicate with one another with wire or wirelessly.

# Disadvantages of Computer

1. **Impact on Labor Force:** Skills of millions of employees have been replaced by computers
2. **Health Risks:** Prolonged or improper computer use can lead to health injuries or disorders.
3. **Impact on Environment:** Polluting the environment.

# Data vs Information

## 1. Data

- Raw, unorganized facts
- Can be in the form of text, graphics, audio, or video
- Data is plural for Datum, however in practice Data is accepted as both singular and plural

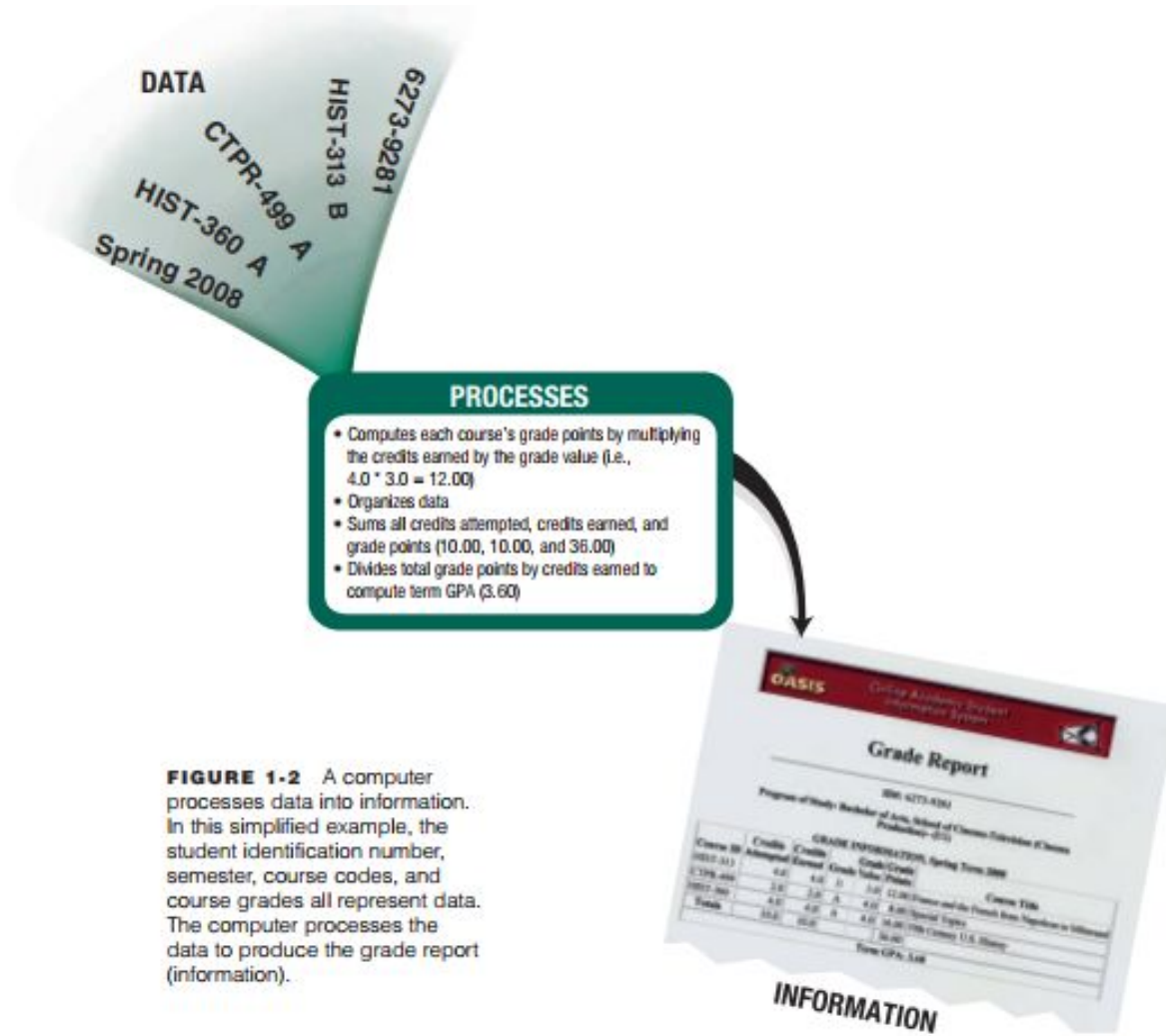
## 2. Information

- Data that has been processed into a meaningful form, and is useful to people.

## 3. Information processing

- Converting data into information

# Data vs Information



**FIGURE 1.2** A computer processes data into information. In this simplified example, the student identification number, semester, course codes, and course grades all represent data. The computer processes the data to produce the grade report (information).

# Components of A Computer

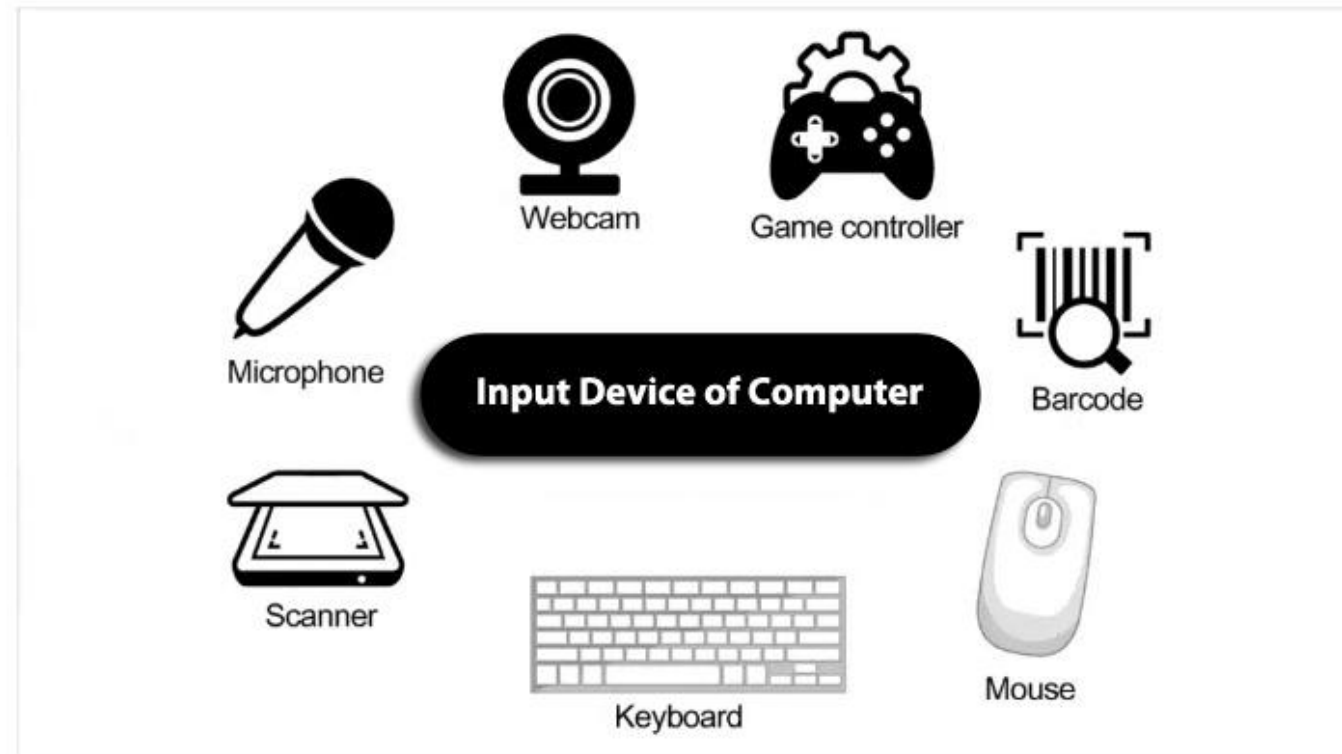
1. A computer contains many electric, electronic, and mechanical components known as **hardware (Internal and External)**.
2. These components include input devices, output devices, a system unit, storage devices, and communications devices.
















# Input Device:

A Hardware device which allows you to enter data and instructions into computer

Six widely used input devices are:

1. Keyboard
2. Mouse
3. Microphone
4. Scanner
5. Digital Camera
6. PC video camera



| Input Device                | Image  | Use                                  | Primary Equipment                    | Year of Invention                   |
|-----------------------------|--|--------------------------------------|--------------------------------------|-------------------------------------|
| Keyboard                    |    | Typing                               | Laptop, Desktop                      | 1867                                |
| Mouse                       |    | Moving the cursor                    | Desktop, Laptop                      | 1964                                |
| Touchpad                    |    | Moving the cursor                    | Laptop, Trackpads                    | 1982                                |
| Microphone                  |    | Voice Recording                      | Headsets, Desktop, Laptop            | 1877                                |
| Touch Screen                |    | Direct interaction with the screen   | Tablets, Laptops, Smartphones        | Inception: 1965<br>Adoption: 1980's |
| Scanner                     |    | Document scanning and Image scanning | Scanning Devices                     | 1957                                |
| Digital Camera              |    | Image Capturing                      | Standalone Devices                   | 1975                                |
| Webcam                      |    | Video calling, Live Streaming        | Desktop, Laptop, or External Devices | 1993                                |
| Graphic Tablet              |    | Drawing, Digital Art                 | Standalone Tablets, Desktop          | 1957                                |
| Joystick                    |    | Gaming Control                       | Gaming Consoles                      | 1967                                |
| Light Pen                   |   | Drawing on Screens                   | CRT Monitors                         | 1955                                |
| Biometrics                  |  | Authentication                       | Various Devices                      | Late 20th C.                        |
| Barcode Scanner             |  | Scanning Barcodes                    | Handheld Scanners                    | 1952                                |
| MICR                        |  | Reading Magnetic Ink Characters      | Bank Check Processing                | 1950                                |
| Virtual Reality Controllers |  | Interaction in Virtual Environments  | VR Headsets                          | Late 20th C.                        |

# Output Device:

A Hardware device which convey information to one or more people.

Four commonly used output devices are:

1. printer
2. monitor
3. speakers
4. portable media player







**Dear Students,**

**Please list the names of 10 output devices, including their year of invention and their respective uses.**

# Storage Devices:

- Used to store data on or access data from storage media
- Hard drives, CD/DVD discs and drives, USB flash drives, etc.

## COMPUTER STORAGE OR MEMORY DEVICES



Hard Disk



RAM



ROM



CD/DVD



Floppy



Memory Card



Pen Drive



Tape

# Communication Devices:

- A hardware component that enables a computer to send (transmit) and receive data, instructions, and information to and from one or more computers.
- Modems, network adapters, etc.

## Communication Devices

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**Modem**



**Wireless Access  
Point**



**NIC**



**FIGURE 1-9**  
Typical computer

**INPUT**

Keyboard

Mouse

Microphone

Scanner

Digital camera

Digital pen/stylus

Touch pad/touch screen

Gaming controller

Fingerprint reader

**OUTPUT**

Monitor/display screen

Printer

Speakers

Headphones/headsets

Data projector

**PROCESSING**

CPU

GPU

**STORAGE**

Hard drive

CD/DVD/Blu-ray disc

CD/DVD/Blu-ray drive

Flash memory card

Flash memory card reader

USB flash drive

**COMMUNICATIONS**

Modem

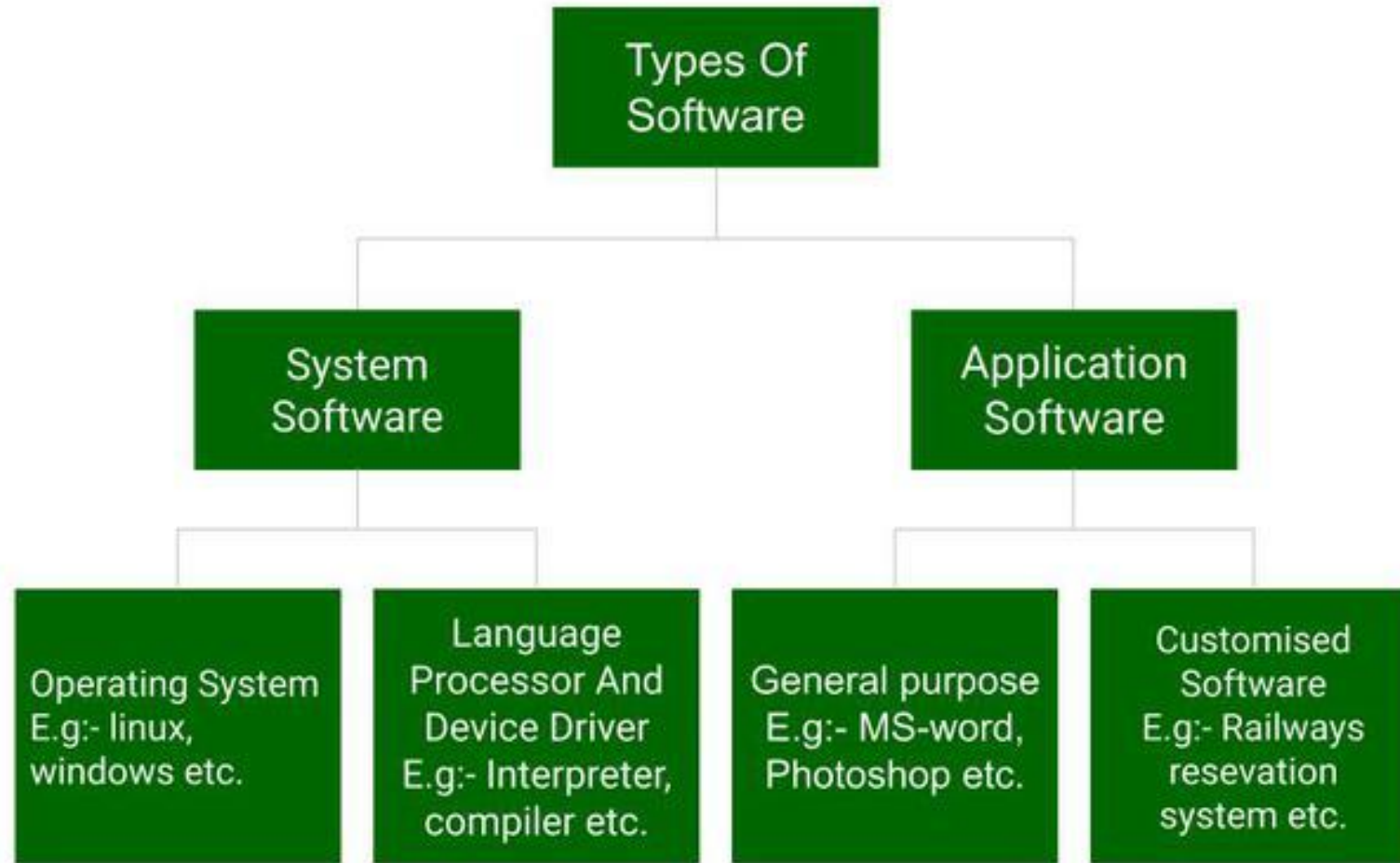
Network adapter

Router

# Computer Software:

- **Software:**

- A computer software also called a program is a series of instructions that tell the computer hardware what to do and how to do it.
- Two categories of software are **system software** and **application software**.



# Categories of Computer Software:

- **System Software:**

- Consists of the programs that control or maintain the operations of the computer and its devices.

- **Types of System Software:**

- **OS** like Windows, Mac OS, Linux, etc When a user starts a computer, portions of the operating system load into memory from the computer's hard disk. It remains in memory while the computer is on.
- **Utilities** allows to perform maintenance type tasks for computer, its devices and its programs.



# Categories of Computer Software:

- **Application Software:**

- Designed to assist users with their personal tasks, It includes but is not limited to:

1. Word processing software
2. Spreadsheet software
3. Database software
4. Presentation graphics software
5. Web Browser

# Interaction with Software:

- **GUI (GRAPHICAL USER INTERFACE):**
  - Text, graphics and visual images such as Icons
  - Easier and user friendly
- **CLI (command line interface):**
  - Interaction using commands
  - Difficult and you have to memorize the commands.

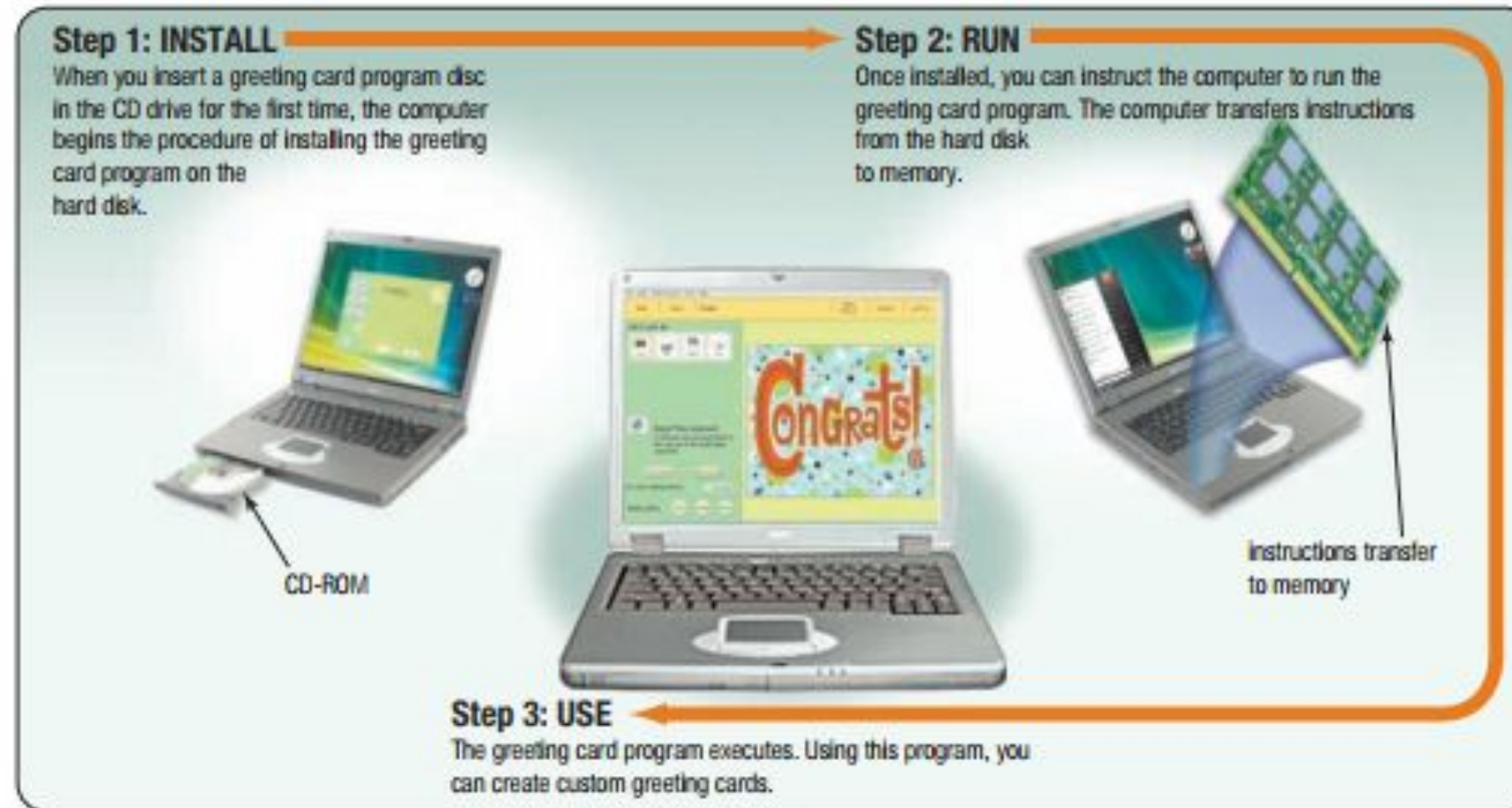


# Who Develops Software?

- A computer Programmer using any programming language like C,C++,java, python etc develops a software and the whole process that is followed is called Software Development.

# Installing and Running Software?

**FIGURE 1-10 INSTALLING AND RUNNING A COMPUTER PROGRAM**



# Categories of Computers

- Industry experts have classified computers into seven categories to fit variety of needs.
- A computer's size, speed, processing power, and price determine the category it best fits.

# Categories of Computers

- **Personal computer:**

- A small computer designed to be used by one person at a time, also called a microcomputer.



TOWER COMPUTERS



MINI DESKTOP COMPUTERS



**FIGURE 1-14**

Desktop computers.

Source: Hewlett-Packard Development Company, L.P.; Apple, Inc.

# Categories of Computers

- **Embedded computer:**

- Embedded into a product and designed to perform specific tasks or functions for that product
- Often embedded into:
  - Household appliances
  - Thermostats
  - Sewing machines
  - A/V equipment
  - Cars





# Categories of Computers

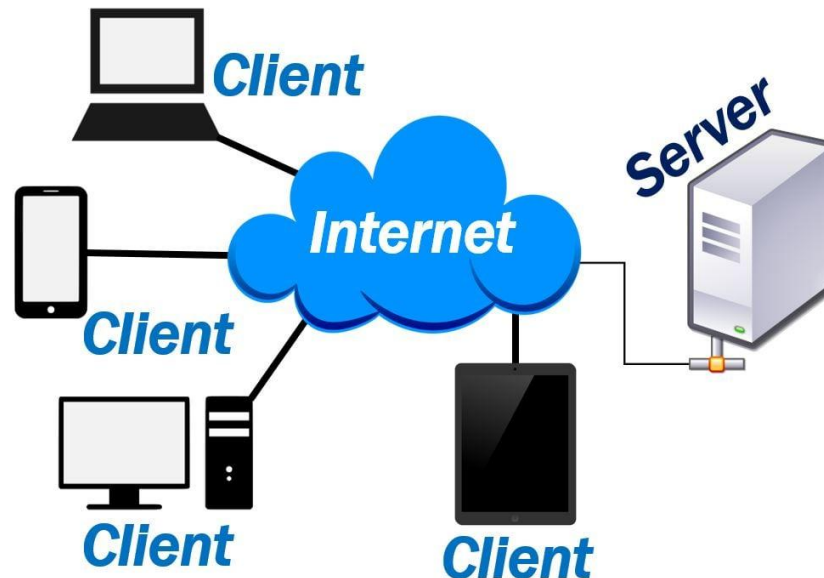
- **Mobile device:**
  - A very small device with some type of built-in computing or Internet capability
- Examples:
  - Smartphones
  - Handheld gaming devices
  - Portable digital media players

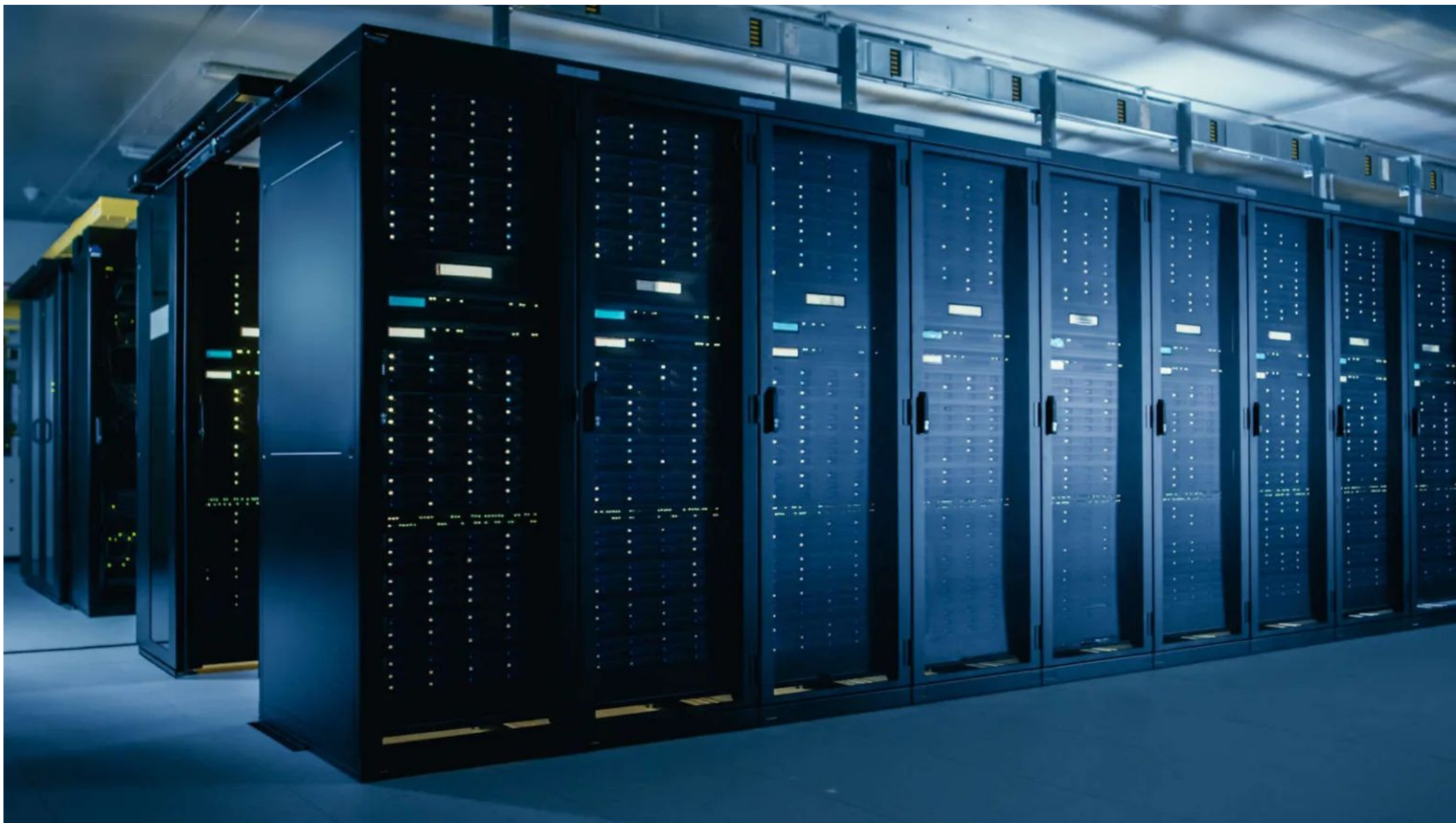


# Categories of Computers

- **Server:**

- A server is a powerful computer that provides **data, resources, or services to other computers (called clients) over a network**. Servers can store files, host websites, run applications, and manage network resources, allowing multiple users to access and share information efficiently.





# Categories of Computers

- **Mainframe computer:**
- Powerful computer used by several large organizations to manage large amounts of centralized data
  - Standard choice for large organizations, hospitals, universities, large businesses, banks, government offices
  - Also called high-end servers or enterprise-class servers





# Categories of Computers

- **Supercomputer:**
- Fastest, most expensive, most powerful type of computer
  - Generally run one program at a time, as fast as possible
  - Commonly built by connecting hundreds of smaller computers, supercomputing cluster
  - Used for space exploration, missile guidance, satellites, weather forecast, oil exploration, scientific research, complex Web sites, decision support systems, 3D applications, etc.



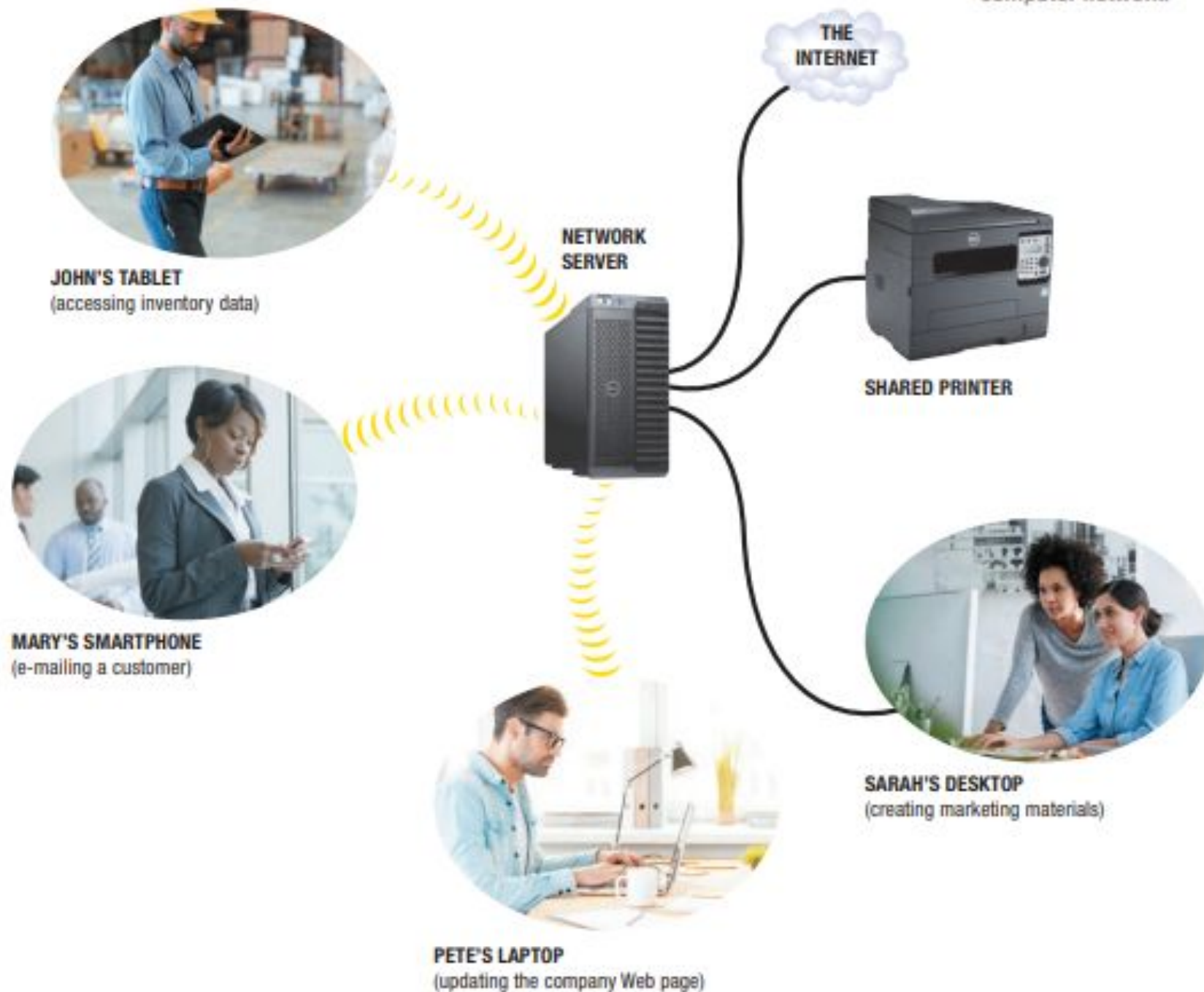
## CATEGORIES OF COMPUTERS

| Category                            | Physical Size                            | Number of Simultaneously Connected Users | General Price Range                                     |
|-------------------------------------|--|--|---|
| Personal computers (desktop)        | Fits on a desk                           | Usually one (can be more if networked)   | Several hundred to several thousand dollars             |
| Mobile computers and mobile devices | Fits on your lap or in your hand         | Usually one                              | Less than a hundred dollars to several thousand dollars |
| Game consoles                       | Small box or handheld device             | One to several                           | Several hundred dollars or less                         |
| Servers                             | Small cabinet                            | Two to thousands                         | Several hundred to a million dollars                    |
| Mainframes                          | Partial room to a full room of equipment | Hundreds to thousands                    | \$300,000 to several million dollars                    |
| Supercomputers                      | Full room of equipment                   | Hundreds to thousands                    | \$500,000 to several billion dollars                    |
| Embedded computers                  | Miniature                                | Usually one                              | Embedded in the price of the product                    |

**FIGURE 1-12** This table summarizes some of the differences among the categories of computers.

# Networks and The Internet

A **computer network** is a collection of computers and other devices that are connected in order to enable users to share hardware, software, and data, as well as to communicate electronically with each other. For instance, home networks are commonly used to allow home computers to share a single printer and Internet connection, as well as to exchange files.





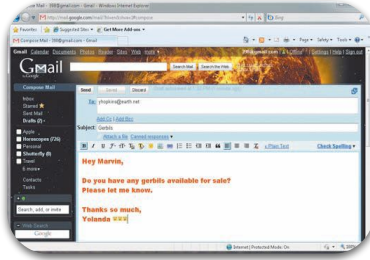
# The Internet

- The **Internet** is a worldwide collection of networks that connects millions of businesses, government agencies, educational institutions, and individuals.

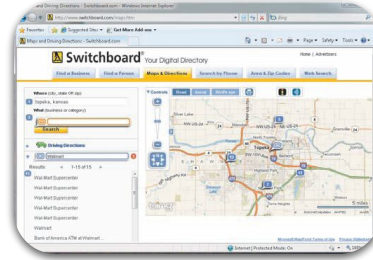


# Networks and The Internet

- People use the Internet for a variety of reasons:



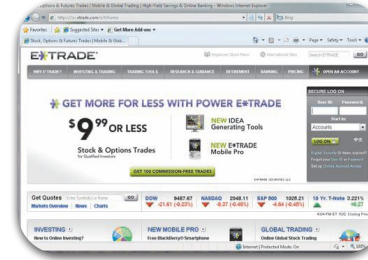
**Communicate**



**Research and  
Access Information**



**Shop**



**Bank and Invest**



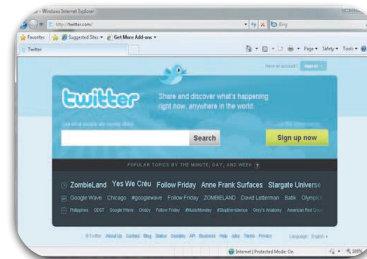
**Online Trading**



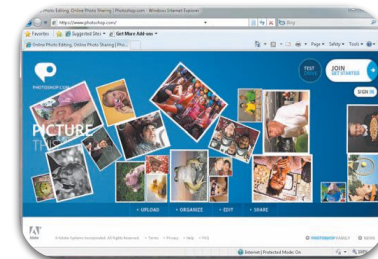
**Entertainment**



**Download Videos**



**Share Information**



**Web Application**

