Al Mustaqbal University
College of Medicine

Computer Science

Lecture 1
Introduction to Computers

Dr Mohammed Fadhil mohammed.fadhil1@uomus.edu.iq
Dr Ahmed Janabi Ahmed.Janabi@uomus.edu.iq

Objectives Overview

Discuss the importance of computer literacy in achieving success in today's modern world

Define what a computer is and explain how data relates to information

Explain the five key parts of a computer

Examine the pros and cons that users face when using computers

Define the concept of a network and highlight the advantages of sharing resources within a network

Explore the applications of the Internet and the World Wide Web

Objectives Overview

Differentiate between system software and application software

Distinguish between the various types, sizes, and roles of computers within each category.

Explain the function of each component in an information system

Describe how different types of users, home users, small office/home office users, mobile users, power users, and enterprise users, engage with computers

Discuss how computers are used in education, finance, government, healthcare, science, publishing, travel, and manufacturing

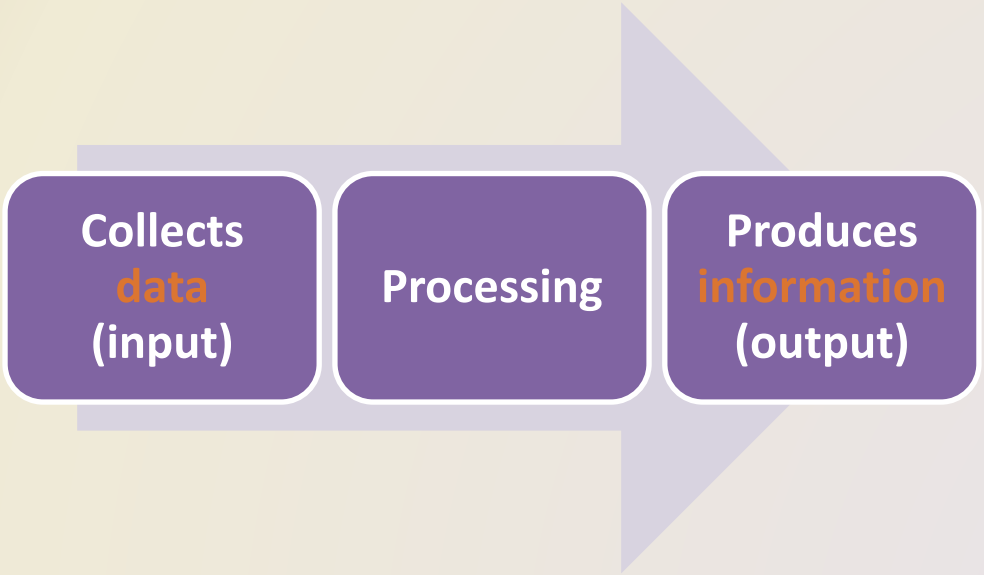
A World of Computers

- Computers are everywhere: at work, at school, and at home.

People use various types and sizes of computers in their everyday tasks.

What Is a Computer?

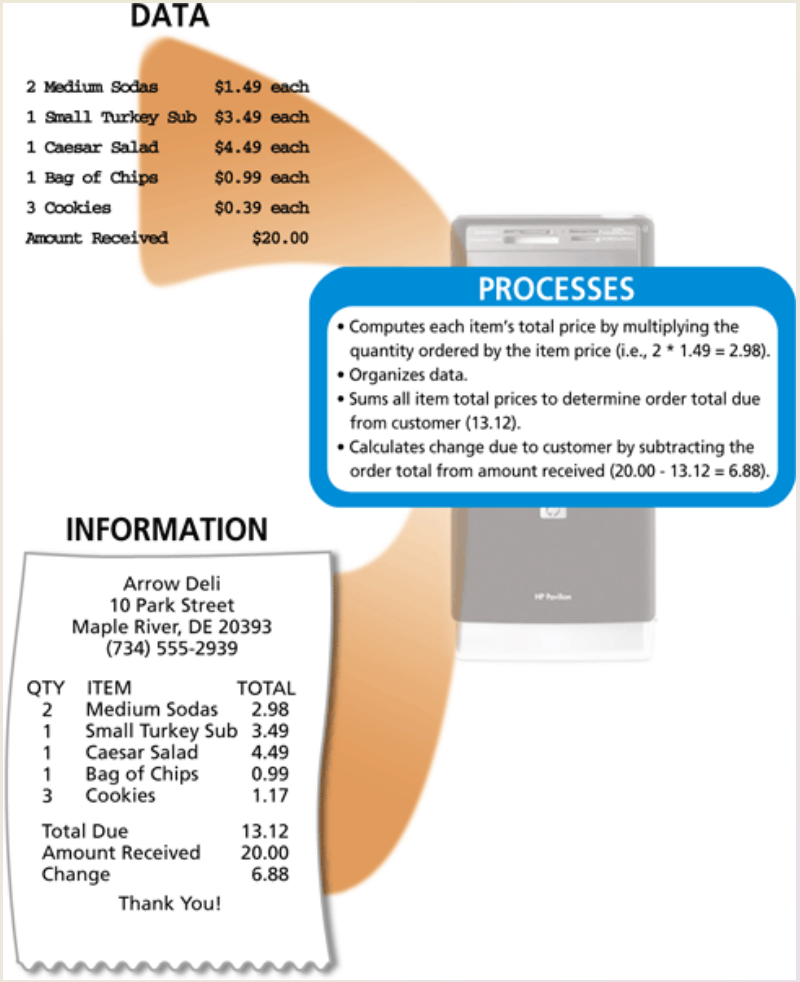
- A **computer** is an electronic device, operating under the control of instructions stored in its own memory, that can **accept** data, **process** the data according to specified rules, **produce** results, and **store** the results for future use.



Information Processing Cycle

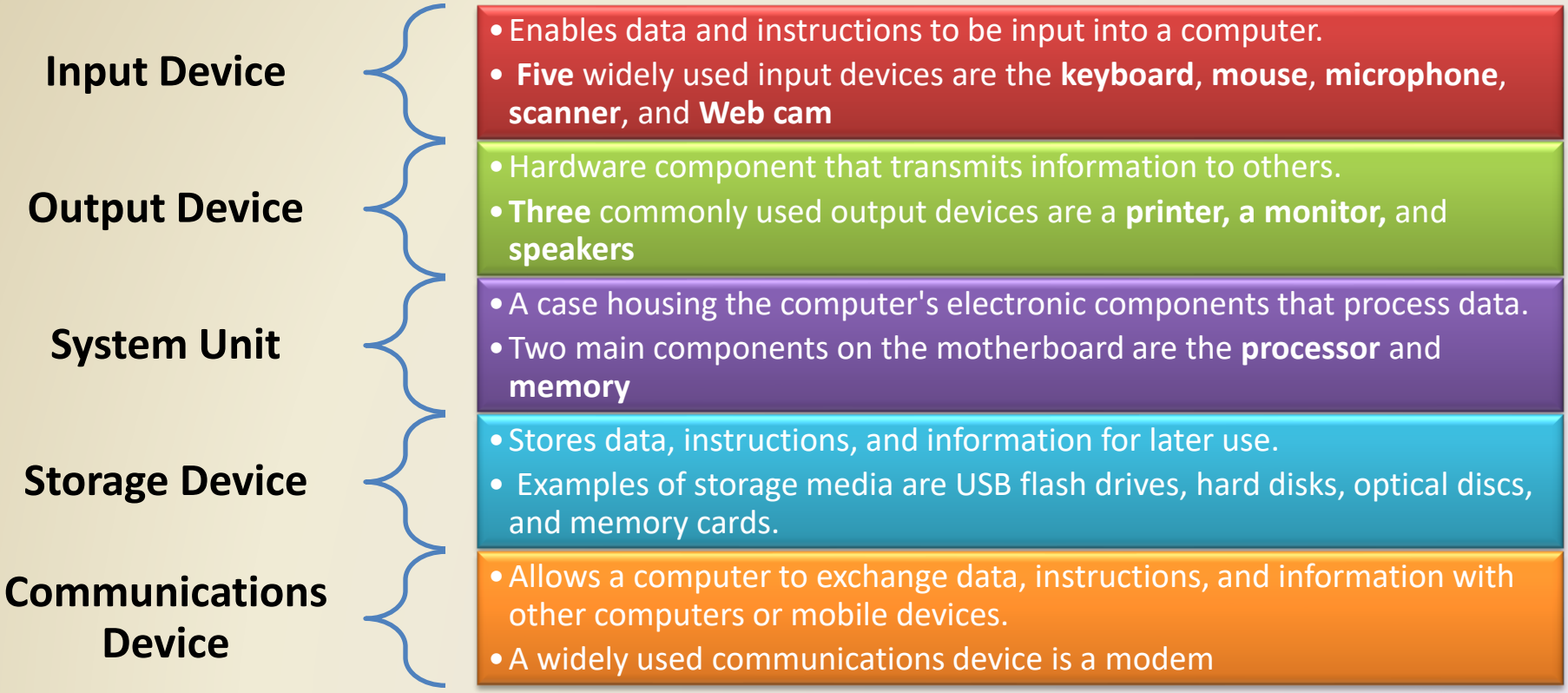
What Is a Computer?

A computer processes **data** into **information**. In this simplified example, the item ordered, item price, quantity ordered, and amount received all represent **data**. The computer processes the data to produce the cash register receipt (**information**).



The Components of a Computer

- A **computer** consists of various electrical, electronic, and mechanical parts called **hardware**.



The Components of a Computer

Advantages and Disadvantages of Using Computers

Advantages of Using Computers

- Speed
- Reliability
- Consistency
- Storage
- Communications

Disadvantages of Using Computers

- Health Risks
- Violation of Privacy
- Public Safety
- Impact on Labor Force
- Impact on Environment

Quiz Yourself!

- **Identify the correct statement below. Then, modify the incorrect statements to make them true.**
  1) A computer is an automated machine that converts output into input.
  2) An output device is any hardware component that lets you input data and commands into a computer.
  3) Three commonly used input devices are a printer, a monitor, and speakers.

Networks and the Internet

- A **network** is a collection of computers and devices connected together, often wirelessly, via communications devices and transmission media.
- **Networks** allow computers to **share resources**, such as hardware, software, data, and information.

Networks and the Internet

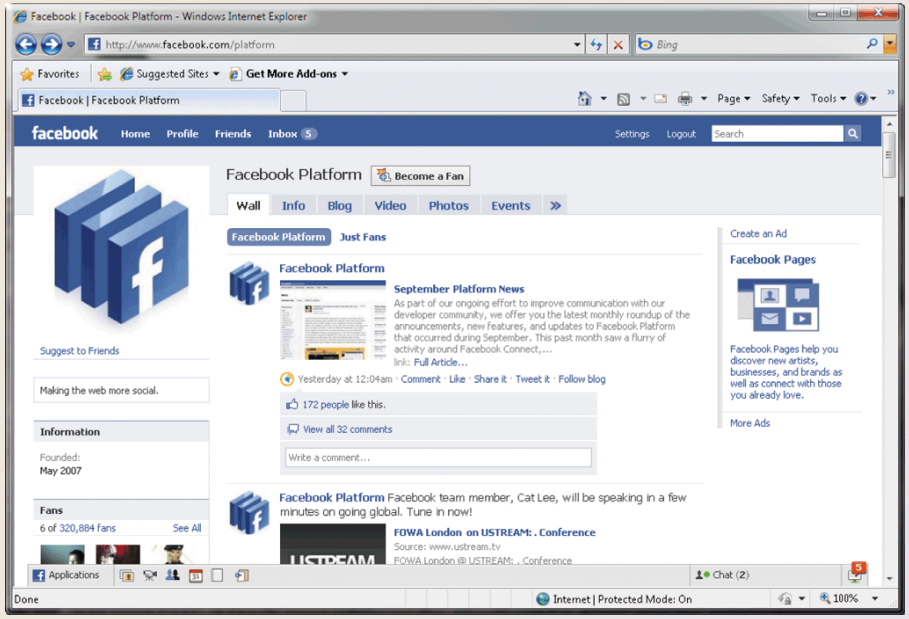
- The **Internet** is a worldwide collection of networks that connects millions of businesses, government agencies, educational institutions, and individuals

Networks and the Internet

- More than one billion people around the world use the Internet daily for a variety of reasons, including the following:

Networks and the Internet

- The **Internet** enables global communication through e-mail, messaging, and web pages.
- A **social networking website** encourages members to share interests, ideas, and media with other registered users.

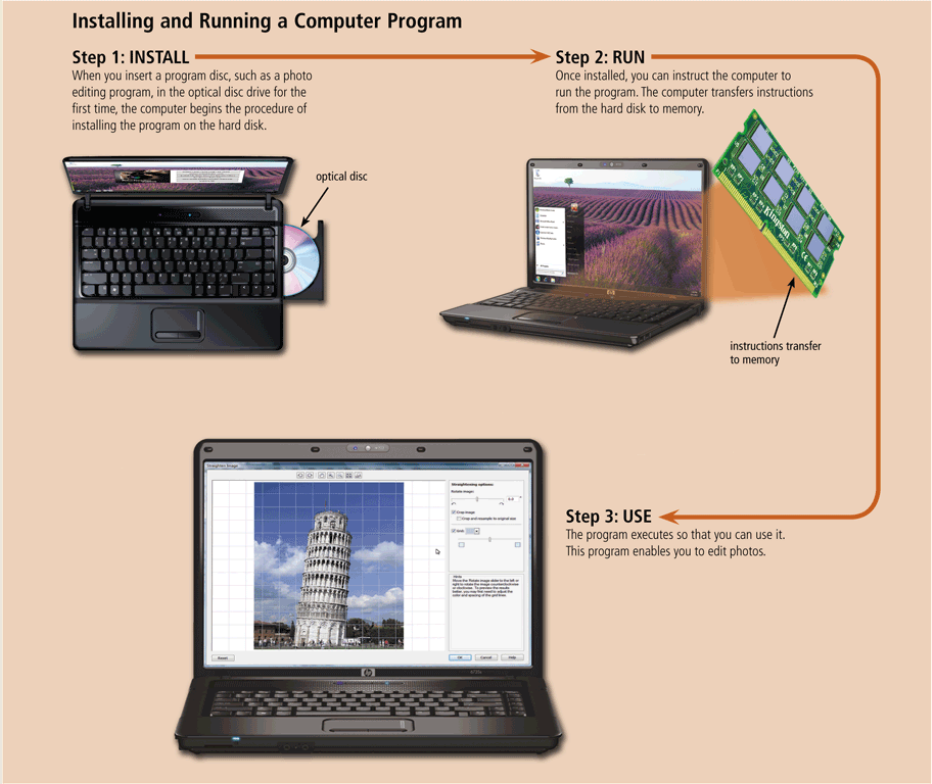


Computer Software

- **Software**, also called a **program**, is a series of related instructions, organized for a common purpose, that tells the computer what task(s) to perform and how to perform them.
- The two categories of software:

Computer Software

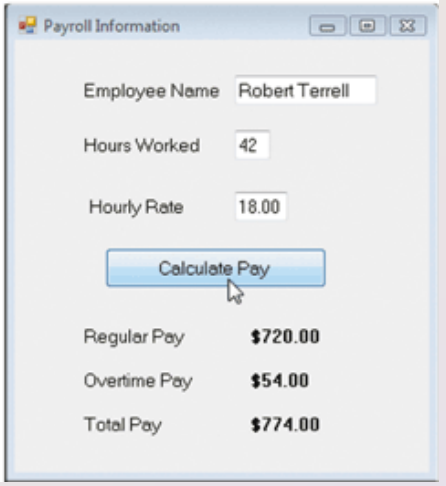
- **Software** can be purchased on optical discs or downloaded from websites.
- **Installing** is the process of setting up software to work with the computer, printer, and other hardware



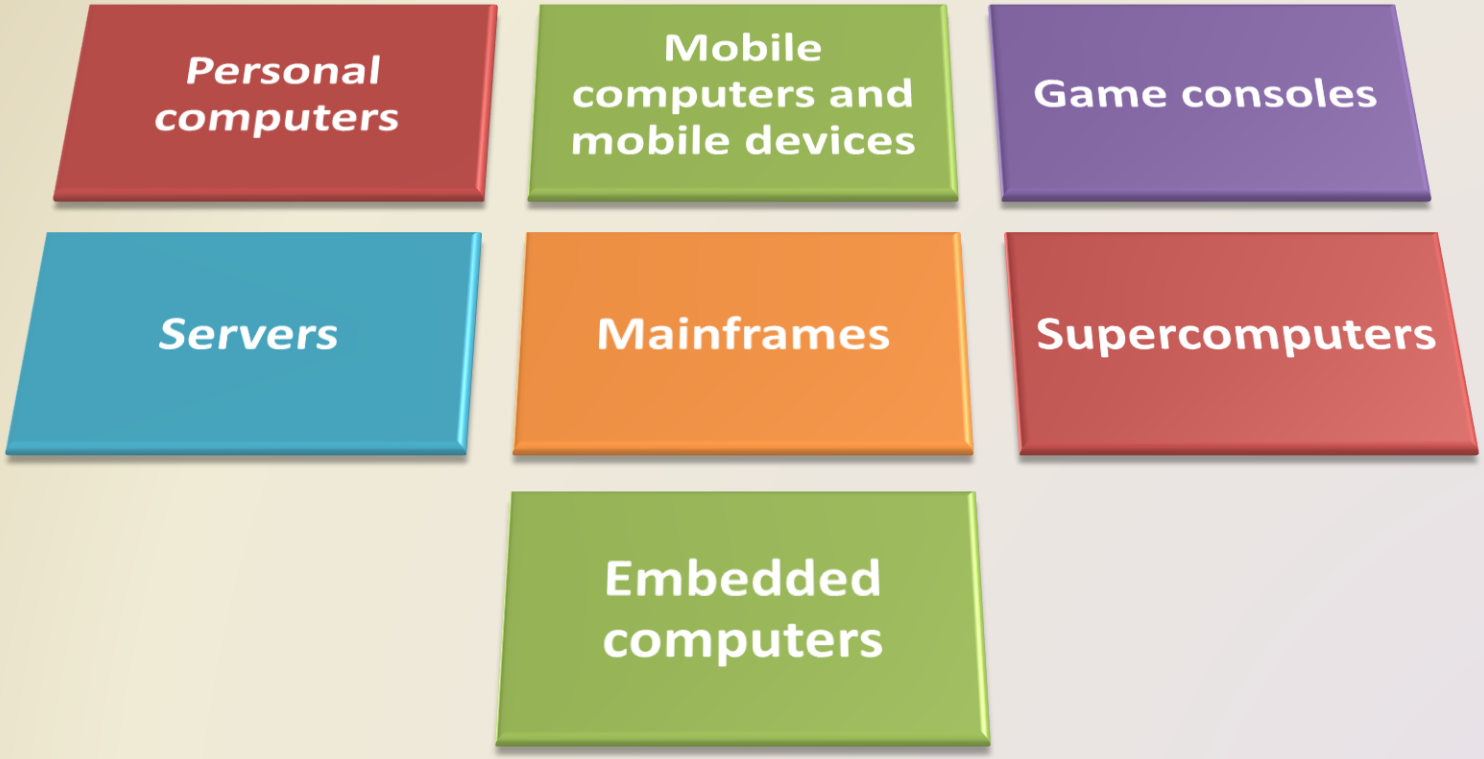
Software Development

- A **programmer**, sometimes called a **developer**, is someone who develops software or writes the instructions that direct the computer to process data into information. Complex programs can require thousands to millions of instructions.
- **Programmers** use a **programming language** or **program development tool** to create computer programs. Popular programming languages include C++, Visual C#, Visual Basic, JavaScript, Python, and Java.

```
Public Class frmPayrollInformation

    Private Sub btnCalculatePay_Click(ByVal sender As System.Object, ByVal e As System.
    EventArgs) Handles btnCalculatePay.Click
        'This procedure executes when the user clicks the
        'Calculate Pay button. It calculates regular
        'and overtime pay and displays it in the window.

        ' Declare variables
        Dim strHoursWorked As String
        Dim strHourlyRate As String
        Dim decHoursWorked As Decimal
        Dim decHourlyRate As Decimal
        Dim decRegularPay As Decimal
        Dim decOvertimeHours As Decimal
        Dim decOvertimePay As Decimal
        Dim decTotalPay As Decimal

        ' Calculate and display payroll information
        strHoursWorked = Me.txtHoursWorked.Text
        strHourlyRate = Me.txtHourlyRate.Text
        decHoursWorked = Convert.ToDecimal(strHoursWorked)
        decHourlyRate = Convert.ToDecimal(strHourlyRate)

        If decHoursWorked > 40 Then
            decRegularPay = 40 * decHourlyRate
            Me.txtRegularPay.Text = decRegularPay.ToString("C")
            decOvertimeHours = decHoursWorked - 40
            decOvertimePay = (1.5 * decOvertimeHours) * decHourlyRate
            Me.txtOvertimePay.Text = decOvertimePay.ToString("C")
            decTotalPay = decRegularPay + decOvertimePay
            Me.txtTotalPay.Text = decTotalPay.ToString("C")
        Else
            decRegularPay = decHoursWorked * decHourlyRate
            Me.txtRegularPay.Text = decRegularPay.ToString("C")
            Me.txtOvertimePay.Text = "$0.00"
            Me.txtTotalPay.Text = decRegularPay.ToString("C")
        End If
    End Sub
End Class
```



Categories of Computers



Personal Computers

- A **personal computer** is a computer that can perform all of its input, processing, output, and storage activities by itself
- A personal computer contains a processor, memory, and one or more input, output, and storage devices. Personal computers also often contain a communications device.
- **Two types of personal computers** are desktop computers and notebook computers.

Mobile Computers and Mobile Devices

Mobile Computer

- Personal computer you can carry from place to place
- Examples include **notebook computers, laptop computers, notebooks, ultra-thins, and Tablet PCs**

Mobile Device

- Computing device small enough to carry in a pocket
- Examples include **smart phones and PDAs**, **Ultra-Mobile PC**, **portable media players**, and **digital cameras**

Game Consoles

- A **game console** is a mobile computing device designed for single-player or multiplayer video games.
- Standard game consoles use a handheld controller(s) as an input device(s); a television screen as an output device; and hard disks, optical discs, and/or memory cards for storage.

Servers

- A **server** controls access to the hardware, software, and other resources on a network and provides a centralized storage area for programs, data, and information.
- **Servers** support from two to several thousand connected computers at the same time. People use personal computers or terminals to access data, information, and programs on a server

Mainframes

- A **mainframe** is a large, expensive, powerful computer that can handle hundreds or thousands of connected users simultaneously.
- **Mainframes** store huge amounts of data, instructions, and information. Most major corporations use mainframes for business activities.

Supercomputers

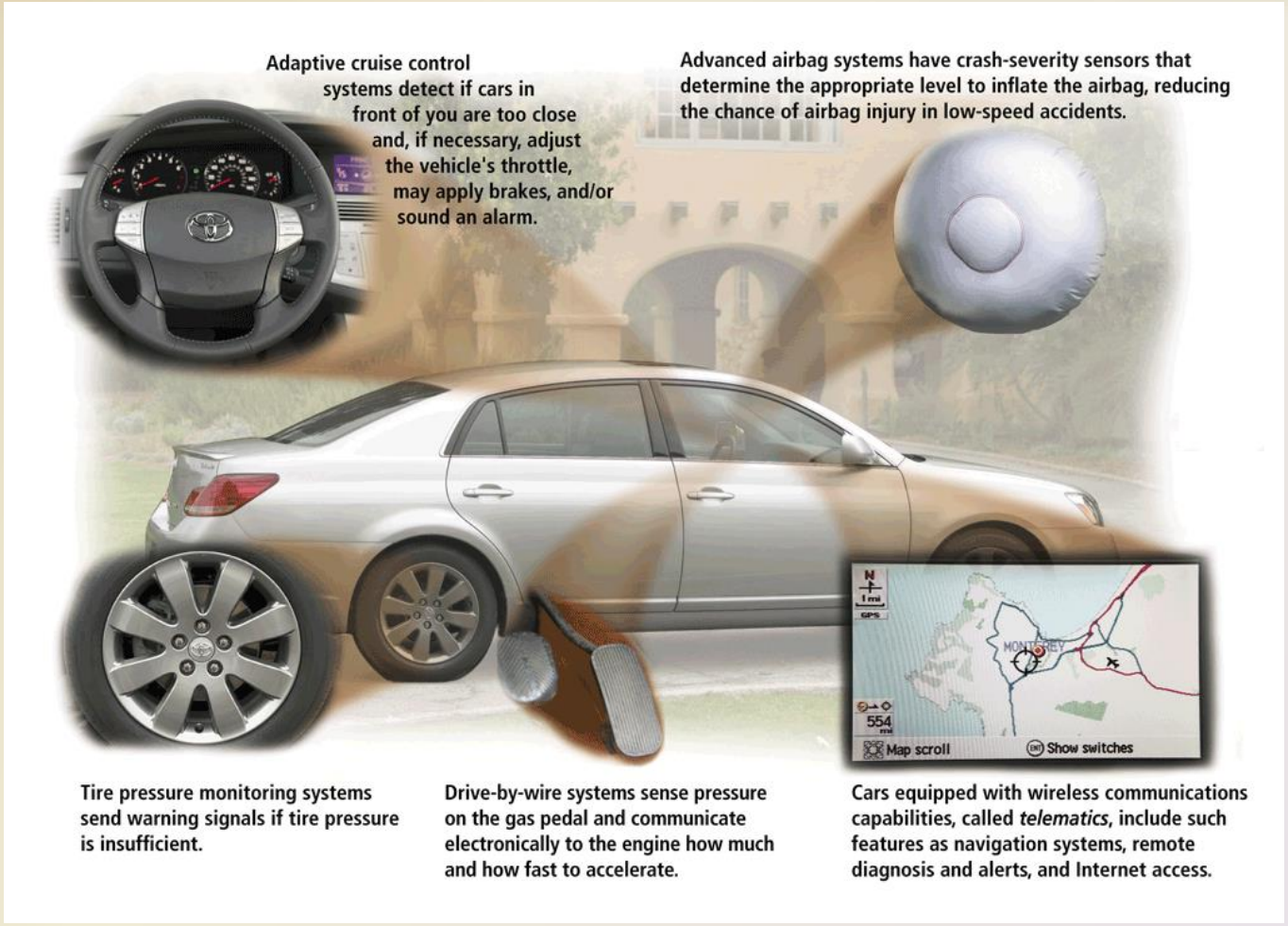
- A **supercomputer** is the fastest, most powerful computer. The fastest supercomputers are capable of processing more than one quadrillion instructions in a single second
- **Supercomputers** handle complex calculations and large-scale simulations in fields like medicine, aerospace, automotive design, banking, weather forecasting, and energy research.

Embedded Computers

- An **embedded computer** is a special-purpose computer that functions as a component in a larger product. A variety of everyday products contain embedded computers:

Consumer Electronics	Home Automation Devices	Automobiles	Process Controllers and Robotics	Computer Devices and Office Machines
• Mobile and digital telephones • Digital televisions • Cameras • Video recorders • DVD players and recorders • Answering machines	• Thermostats • Sprinkling systems • Security monitoring systems • Appliances • Lights	• Antilock brakes • Engine control modules • Airbag controller • Cruise control	• Remote monitoring systems • Power monitors • Machine controllers • Medical devices	• Keyboards • Printers • Faxes • Copiers

Embedded Computers



Embedded Computers in Medicine

Pacemakers: Monitor and regulate heartbeats.

Insulin Pumps: Deliver insulin to diabetic patients.

Blood Pressure Monitors: Track and display blood pressure.

Elements of an Information System

Hardware

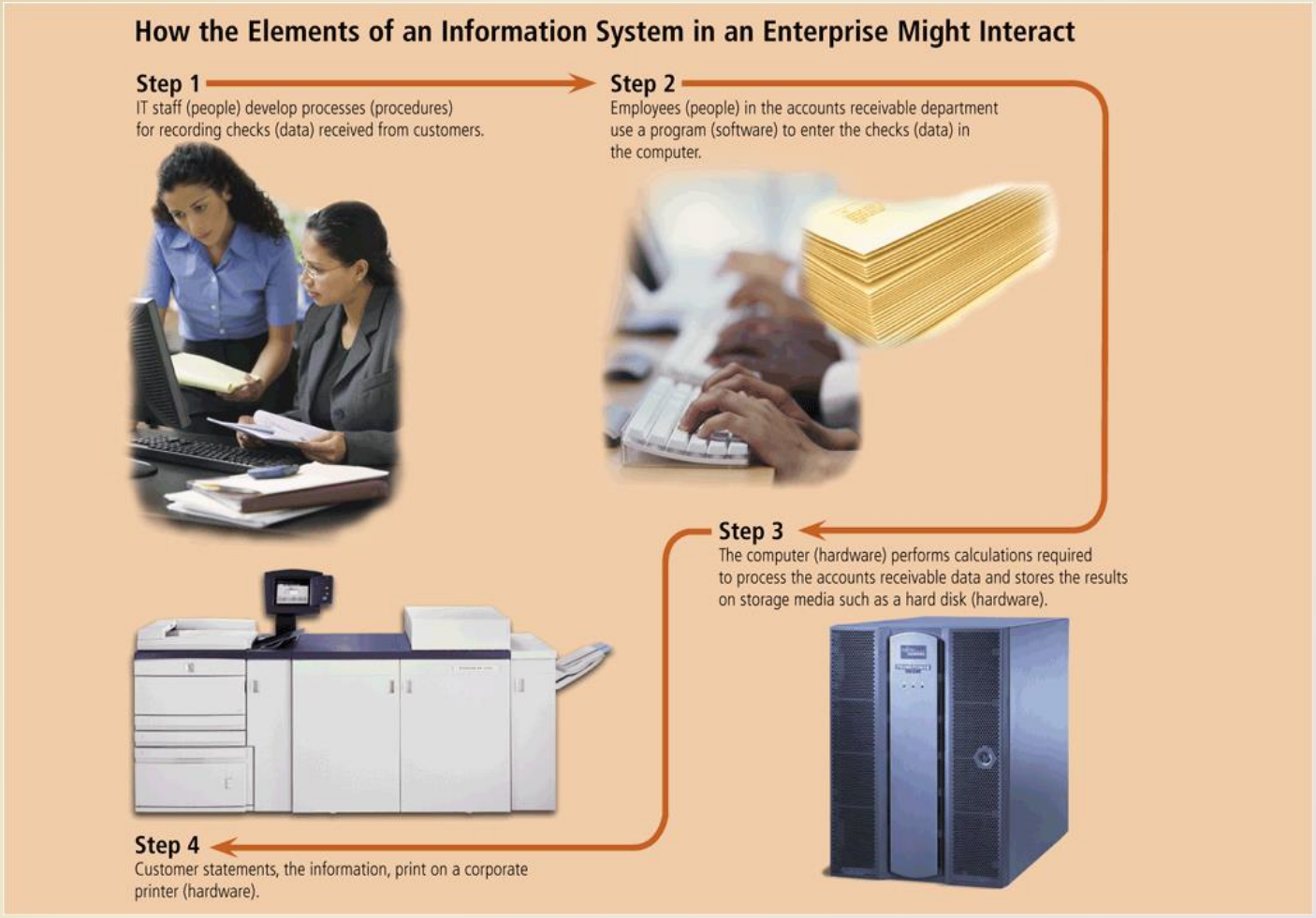
Software

Data

People

Procedures

Elements of an Information System



Examples of Computer Usage

Home User

- Personal financial management
- Web access
- Communications
- Entertainment

Small Office/Home Office User

- Look up information
- Send and receive e-mail messages
- Make telephone calls

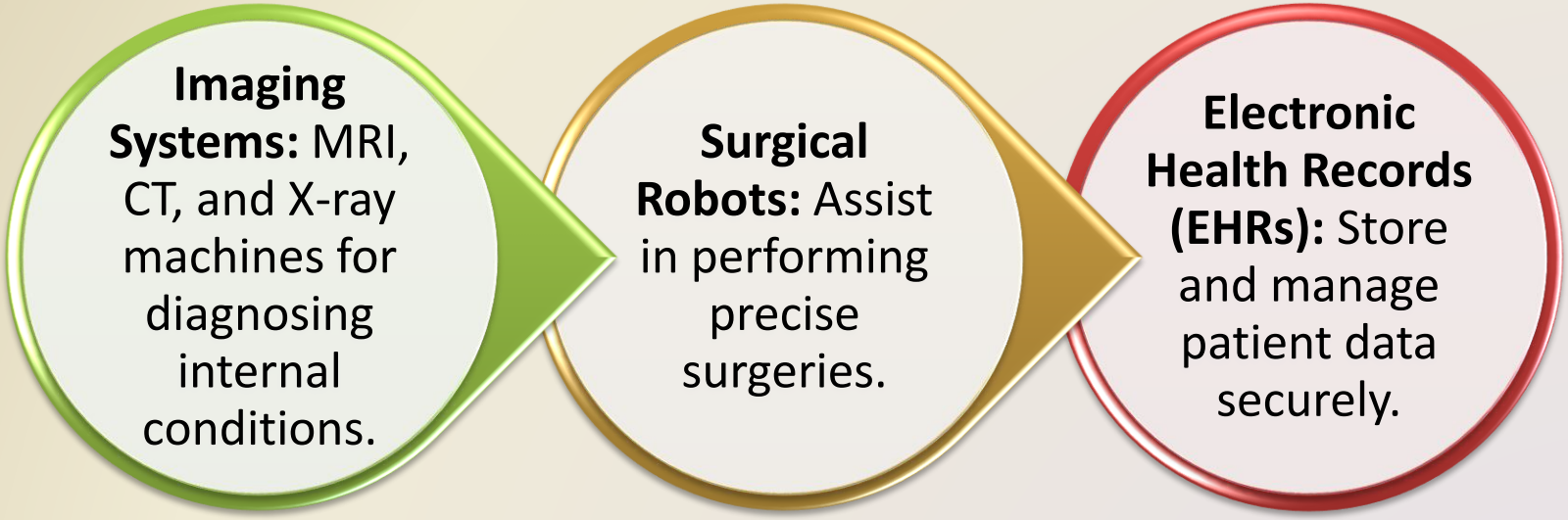
Mobile User

- Connect to other computers on a network or the Internet
- Transfer information
- Play video games
- Listen to music
- Watch movies

Examples of Computer Usage

Power User	Enterprise User
• Work with multimedia • Use industry-specific software	• Communicate among employees • Process high volumes of transactions • Blog

Medical Applications of Computers



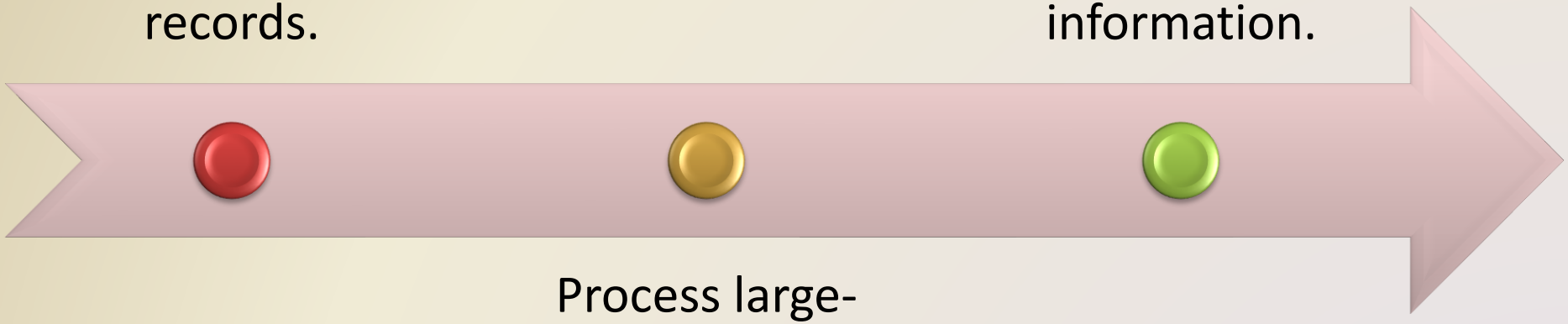
Supercomputers in Medicine

Genomic Research: Analyze DNA for personalized medicine.

Drug Discovery: Simulate how drugs interact with the body.

Pandemic Response: Model virus spread and aid vaccine development.

Mainframes in Medicine



Benefits of Medical Computers

Computer Applications in Society

Education

Finance

Government

Health Care

Computer Applications in Society

Science

Publishing

Travel

Manufacturing

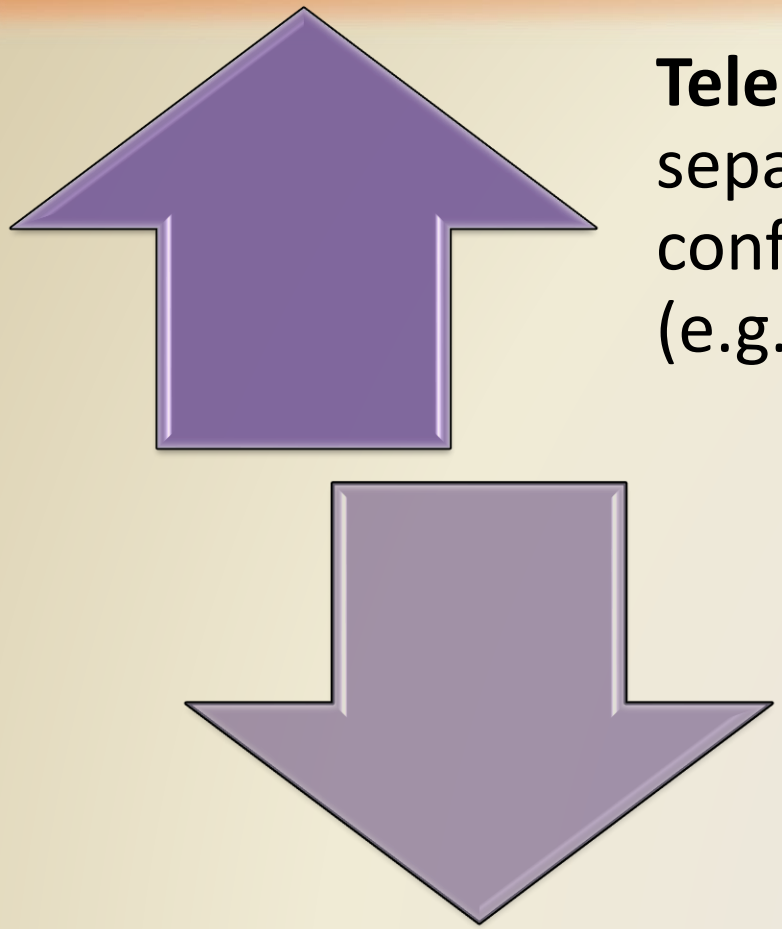
The Role of Computers in Healthcare

- **Computers** are integral in nearly all areas of healthcare.
- **Medical staff** use computers for diagnosis, treatment, and patient management.
- Examples:
  - Doctors use the web and medical software for research and diagnosis.
  - E-mail is used for communication with patients.
  - Pharmacists file insurance claims, and robots deliver medication to nurse stations.
  - Computers and mobile devices manage and access patient records.

Computers in Medical Procedures

- **Medical Tests & Monitoring**
  - Computers help monitor vital signs and assist doctors and technicians in medical tests.
- **Surgical Precision**
  - Surgeons use computer-controlled devices for greater precision (e.g., laser eye surgery, robot-assisted heart surgery).
- **Implanted Devices**
  - Surgeons implant computerized devices like pacemakers to improve patients' quality of life.

Long-Distance Healthcare



Telemedicine: Doctors in separate locations conduct live conferences for consultations (e.g., reviewing bone X-rays).

Telesurgery: Surgeons perform operations remotely using robots controlled by computers via high-speed networks.

Summary

- Basic computer concepts
- Parts of a computer
- Networks, the Internet, and computer software
- Various types of computers, computer users, and computer applications in society
- Examples of using computers in Medicine

THANK YOU ☺