



Al-Mustaqbal University College of Engineering Technology



Department of Cybersecurity Techniques Engineering

Programming Essentials

Lecture 1

Introduction to Computers and Programming

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Introduction

Welcome to University

- ❖ New courses
- ❖ New pressure
- ❖ New way of learning



Objectives Overview

By the end of this lecture, students will be able to:

Define programming and basic computer terms

Explain the difference between application programs and system programs

Describe the main components of a computer

Understand how data is stored in computers

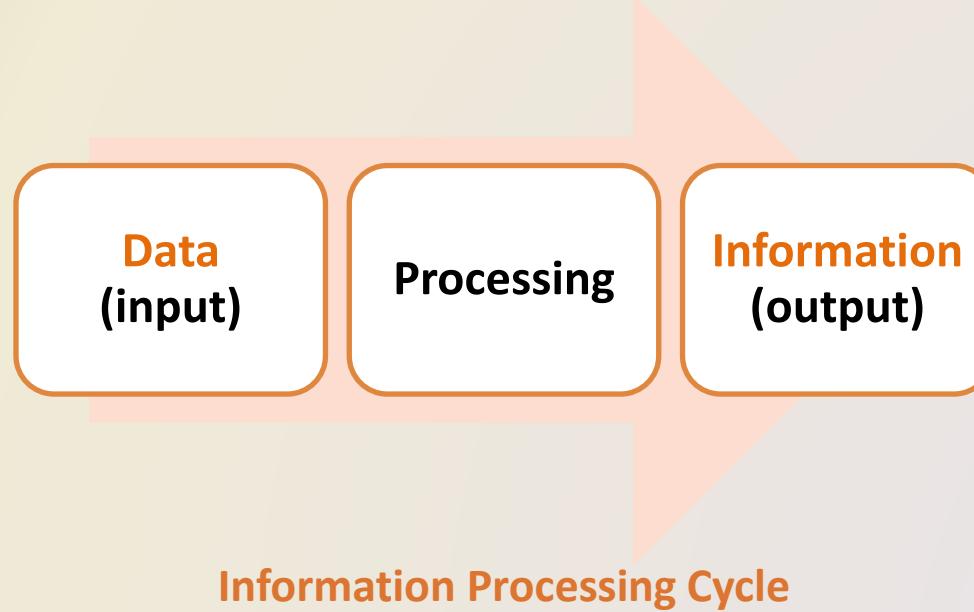
A World of Computers

- Computers are everywhere



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.



Main components of Computer

Software

Hardware

Computer Software

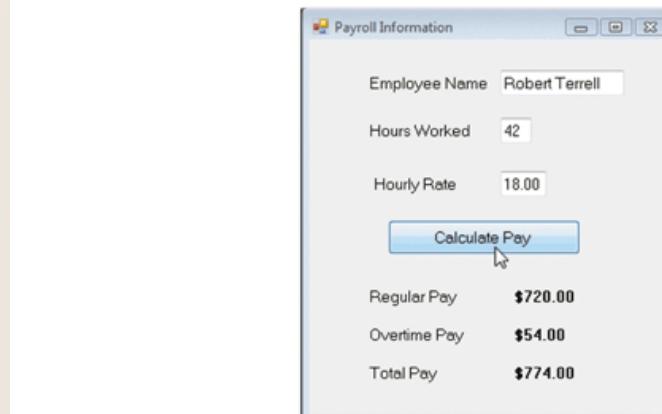
- A programmer develops software or writes the instructions that direct the computer to process data into information

```
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
```



Types of Programs (Software)

1. Application Programs

Used by users

Examples:



Browser



Word



Antivirus



Games

2. System Programs

Control the computer

Examples:



Operating System



Device Drivers



Security Services

The main Components of Hardware

- A computer contains many electric, electronic, and mechanical components known as **hardware**

Input Device

- Allows you to enter data and instructions into a computer

Output Device

- Hardware component that conveys information to one or more people

System Unit

- Case that contains the electronic components of the computer that are used to process data

Storage Device

- Holds data, instructions, and information for future use

Communications Device

- Enables a computer to send and receive data, instructions, and information to and from one or more computers or mobile devices

The main Components of Hardware



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

Categories of Computers



Personal Computers

- A **personal computer** can perform all of its input, processing, output, and storage activities by itself
- Two popular architectures are the PC and the Apple
 - **Desktop computer**



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 hold in your hand

Examples include **smart phones**, **PDAs**, **handheld computers**, **portable media players**, and **digital cameras**

Mobile Computers and Mobile Devices



Notebook computer



Tablet PC



Smart phone



PDA

Mobile Computers and Mobile Devices



Handheld computer



Portable media player



Digital camera

Game Consoles

- A **game console** is a mobile computing device designed for single-player or multiplayer video games



Servers

- A **server** controls access to the hardware, software, and other resources on a network
 - Provides a centralized storage area for programs, data, and information



Mainframes

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



Supercomputers

- A **supercomputer** is the fastest, most powerful computer
 - Fastest supercomputers are capable of processing more than one quadrillion instructions in a single second



Embedded Computers

- An **embedded computer** is a special-purpose computer that functions as a component in a larger product.

Consumer Electronics

- Mobile and digital telephones
- Digital televisions
- Cameras
- Video recorders
- DVD players and recorders
- Answering machines

Home Automation Devices

- Thermostats
- Sprinkling systems
- Security monitoring systems
- Appliances
- Lights

Automobiles

- Antilock brakes
- Engine control modules
- Airbag controller
- Cruise control

Process Controllers and Robotics

- Remote monitoring systems
- Power monitors
- Machine controllers
- Medical devices

Computer Devices and Office Machines

- Keyboards
- Printers
- Faxes
- Copiers

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

- Work with multimedia
- Use industry-specific software

Enterprise User

- Communicate among employees
- Process high volumes of transactions
- Blog

Computer Applications in Society



Education



Finance



Government



Health Care

Computer Applications in Society



Science



Publishing



Travel



Manufacturing

How Computers Store Data

0 → OFF

1 → ON

This system is called Binary.

010110

Summary

Basic
computer
concepts

Components
of a computer

Types of
Computer

How
Computers
Store Data

THANK YOU ☺