



**Arab Academy for Science and Technology and Maritime Transport**

**College of Engineering and Technology**

**Computer Engineering Department**

# **CC112 Structured Programming**

## **Lecture 1**

# COURSE GOALS

- **Introduce General concepts of Programming**
- **Begin to Think Like a Programmer**
- **Start Programming With C (a powerful, widely-used programming language)**
- **Become Junior C Programmer**

# COURSE OUTLINE:

- Introduction to Programming and problem solving.
- Program structure and simple program.
- Data types
- Assignment statements
- Input / output operations
- Arithmetic operations
- Logical operations
- Conditional and selection control statements
- Loops
- Functions (call by value / reference)
- Arrays ( 1D and 2D)

# COURSE GRADING SYSTEM

Week #	Marks	Marks assigned to	
		Exam	Section
7	30	20-25	5-10
12	20	20	-
7-15	10	-	10
16	40	40	-

## COURSE TEXTBOOK

- C How To Program 7/e  
by:Paul Deitel & Harvey Deitel

## COURSE LECURES/ASSIGNMENTS

- PDF copy on terminals in lab (300 and 312).
- Printed copy in AAST copy centers.
- URL:[https://www.dropbox.com/sh/kpnqizb5o2yu6db/Mu4R\\_2qamo](https://www.dropbox.com/sh/kpnqizb5o2yu6db/Mu4R_2qamo)

# LECTURE 1

## Overview of Computer, Programming and Problem Solving

# LECTURE OUTLINE

- i. **What is a Program?**
- ii. **What is Programming?**
- i. **Programming Life-Cycle Phases**
- ii. **Algorithm Basic Control Structures**
- iii. **Sample problem**

## i. WHAT IS PROGRAM?

- Computers process data under the control of sets of instructions called **computer programs**.
- These programs guide the computer through ordered actions specified by people called **computer programmers**.
- The programs that run on a computer are referred to as **software**.



## ii. WHAT IS PROGRAMMING?

**Given a well-defined problem:**

- Find an algorithm to solve a problem.
- **Programmers** take this algorithm to write a **program** using any **programming language**.

### iii. PROGRAMMING LIFE CYCLE PHASES

#### Analyze

- This involves identifying the data you have to work with it, the desired results, and any additional requirements or constraints on the solution.

#### Design

- An algorithm is a step-by-step procedure for solving a problem in a finite amount of time.

#### Implement

- Each algorithm is converted into one or more steps in a programming language. This process is called PROGRAMMING.

### iii. PROGRAMMING LIFE CYCLE PHASES

#### Test and verify

- Run the program several times using different sets of data, making sure that it works correctly for every situation in the algorithm .
- if it does not work correctly, then you must find out what is wrong with your program or algorithm and fix it--this is called **DEBUGGING**.

#### Maintain and update

- maintenance begins when your program is put into use and accounts for the majority of effort on most programs.
- **MODIFY** the program to meet changing requirements or correct errors that show up in using it.

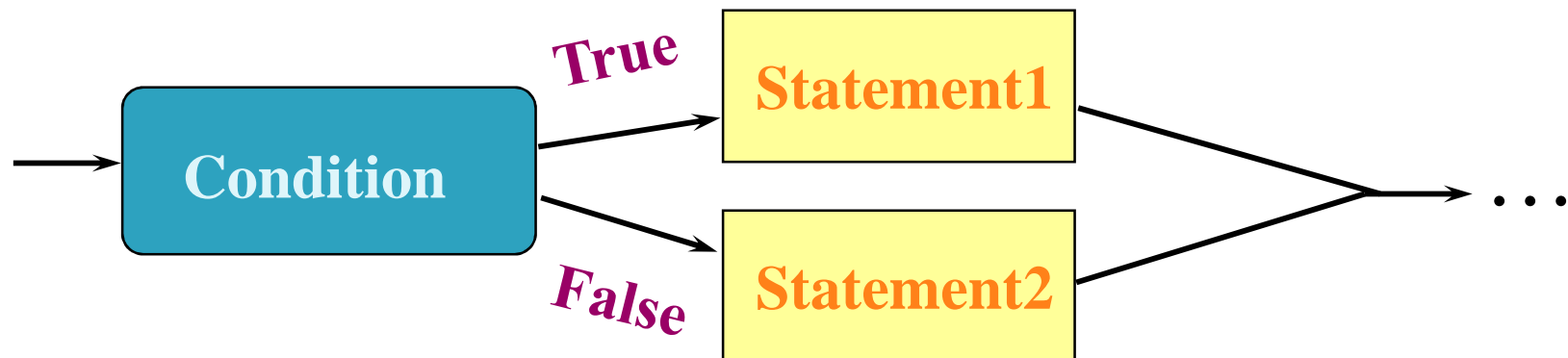
## iv. ALGORITHM BASIC CONTROL STRUCTURES

- a **sequence** is a series of statements that execute one after another.



## iv. ALGORITHM BASIC CONTROL STRUCTURES

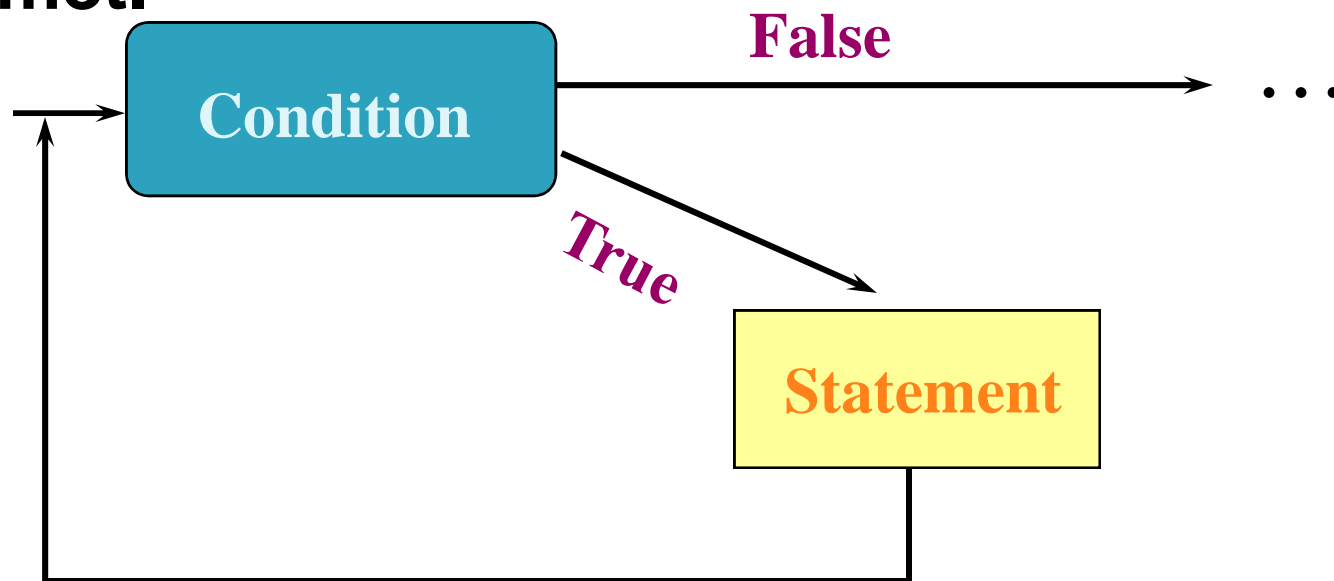
- **selection (branch)** is used to execute different statements depending on certain conditions.



**IF Condition THEN Statement1 ELSE Statement2**

## iv. ALGORITHM BASIC CONTROL STRUCTURES

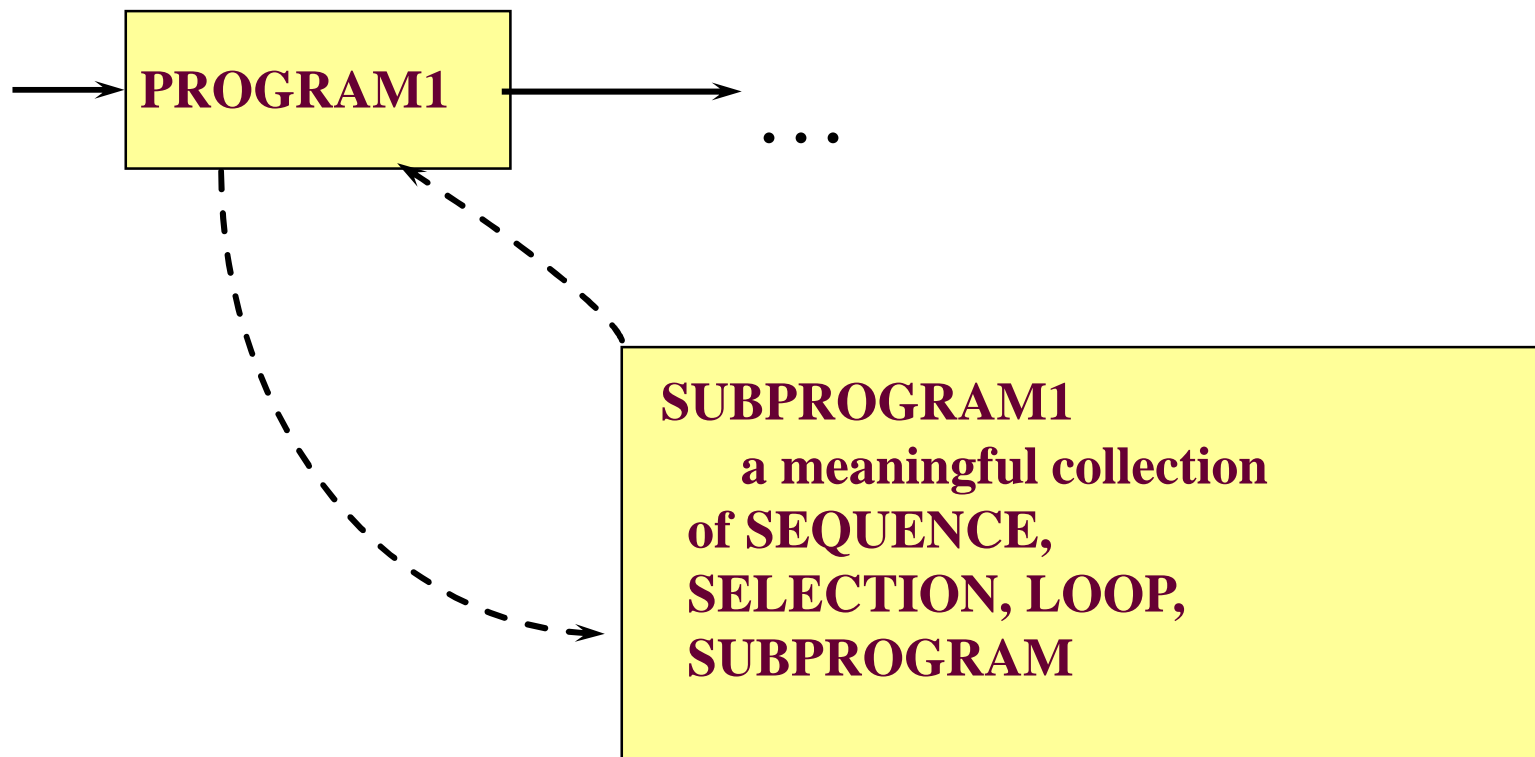
- **Looping (repetition)** is used to repeat statements while certain conditions are met.



**WHILE Condition Statement1**

## iv. ALGORITHM BASIC CONTROL STRUCTURES

- a subprogram is used to break the program into smaller units



## v. Sample Problem

Finding the area and circumference of a circle.

1. Analyze the problem.

- ❖ The problem input is the radius of the circle.
- ❖ There are two outputs requested: the area and the circumference.
- ❖ From our knowledge of geometry, we know the relationship between the radius of the circle and its area and circumference.



## v. Sample Problem

### 2. DESIGN THE ALGORITHM TO SOLVE THE PROBLEM.

- 1) **Get circle radius**
- 2) **Calculate area using the following equation:**  
$$\text{area} = r^2$$
- 3) **Calculate area using the following equation:**  
$$\text{circumference} = 2 r$$
- 4) **Display area and circumference values.**

## v. Sample Problem

### 3. IMPLEMENT THE ALGORITHM.

- 1) Convert this algorithm into program instructions using a programming language.
- 2) Our desired programming language is C.

**THANK YOU**