

The American University in Cairo
Computer Science & Engineering Department
CSCE 1001 – Fundamentals of Computer Science

Lab Session 5

Programming of Two-way Selections

Objectives:

- To become familiar with the control structures: sequence and selection.
- To learn how to compare numbers, characters, and strings.
- To learn how to use the relational and logical operators to write expressions that are type bool.
- To learn how to write two-way selection statements.
- To learn how to implement decisions in algorithms using if statement.

Problems:

Write a C++ program or each of the following problems:

1. Draw a Flow chart and write a program in C++ that reads a positive integer number to notify the user with a message whether the integer number **Even** or **Odd**.
2. Draw a Flow chart and write a program in C++ that reads a real number to notify the user with a message whether the real number **Positive**, **Zero**, or **Negative**.
3. Draw a Flow chart and write a C++ program to solve the quadratic equation **$ax^2 + bx + c = 0$** where coefficient **a** is not equal to 0. The equation has two real roots if its discriminator **$d = b^2 - 4ac$** is greater or equal to zero. The program gets the three coefficients **a**, **b**, and **c**, computes and displays the two real roots (if any). It first gets and tests a value for the coefficient **a**. if this value is zero, the program displays an error message and terminates, otherwise it proceeds to get a value for the coefficient **b** and a value for the coefficient **c**. Next it computes and tests the discriminator **$d = b^2 - 4ac$** . If the discriminator **d** is negative, the program displays an error message "No Real Roots!!" and terminates, otherwise it proceeds to compute and display the two real roots **R1** and **R2** according to the following formulas:

$$R1 = \frac{-b + \sqrt{b^2 - 4ac}}{2a} \quad \text{and} \quad R2 = \frac{-b - \sqrt{b^2 - 4ac}}{2a}$$

Instructions:

- The TA solves problems 1 (**20 minutes**)
- The TA asks students to solve and **submit in-Lab** problem 2 (**30 minutes**)
- The TA asks students to solve problem 3 and **submit in the next Lab session**.