Faculty of Computing

CS110: Fundamentals of Computer Programming

Class: BESE-16B

Lab 03: Conditional Statements-Decision Making

CLO 1	**Understand** the syntax and semantics of different programming constructs
CLO 2	**Solve** given real-world problem by applying appropriate programming concepts and techniques

Date: 23rd September, 2025

Time: 2:00pm-5:00pm

Instructor: Dr. Momina Moetesum
Lab Engineer: Mr. Nadeem Nawaz

Introduction:

This lab focuses on *selection statements* in C++, a fundamental programming construct that enables decision-making within programs. Students will learn how to use `if`, `if-else`, nested conditions, and `switch` statements to control the flow of execution based on specific conditions. By working through guided exercises, students will practice applying relational and logical operators to implement branching logic and solve practical problems. The lab also emphasizes hands-on use of the Visual Studio IDE for compiling, running, and debugging programs, ensuring students gain both conceptual understanding and practical programming experience.

Learning Objectives:

After completing this section, you will be able to:

- **Understand** the syntax and semantics of selection constructs in C++ (`if`, `if-else`, `nested if`, and `switch` statements).
- **Apply** selection statements and logical/relational operators to solve real-world problems by implementing decision-making in programs.

Tools/Software Requirement:

- Microsoft Visual Studio (any version)
- C++ Compiler (integrated within Visual Studio)
- Word Processor (MS Word or equivalent for compiling deliverables)

Task 1 [CLO 1]:

Illustrate the use of nested conditional statements in a C++ program that prompts the user to enter a positive number. The program should:

- Determine whether the number is even or odd using an `if-else` statement.
- If the number is even, evaluate its divisibility by both 4 and 6 using `if` statements.
- If the number is odd, evaluate its divisibility by both 3 and 5 using `if` statements.

Example outputs are provided for reference.

Example outputs:

Input: 9. Output: "The number is odd." Output: "The number is divisible by 3."	Input: 12. Output: "The number is even." Output: "The number is divisible by 4." Output: "The number is divisible by 6."

Task 2 [CLO 1]:

Demonstrate the use of an *if-else-if ladder* by writing a C++ program that **displays** a student's grade based on marks entered from the keyboard. The grading criteria are:

- Marks ≥ 70 → Grade A
- Marks ≥ 60 and < 70 → Grade B+
- Marks ≥ 50 and < 60 → Grade B
- Marks ≥ 40 and < 50 → Grade C
- Marks < 40 → Grade F

Illustrate the program's behavior with the following sample run:

```
Enter student marks: 56
The grade for 56 marks is B.
```

Task 3 [CLO 2]:

Implement a C++ program for *Jerilli's Trading Store* that allows a salesman to **input** a product number (from the provided product table) and the quantity purchased by the customer. The program should then:

- **Use** a `switch` statement to determine the product's rate.
- **Calculate** the total amount based on the quantity purchased.
- **Apply** a 10% discount when the purchased quantity exceeds 5.
- **Display** the final amount owed by the customer.

Product number	Retail price
1	$ 2.98
2	$ 4.50
3	$ 9.98
4	$ 4.49
5	$ 6.87

Task 4 [CLO 2]:

Implement a C++ program using `if-else` statements to calculate and **display** Mary Kettleson's annual bonus based on her annual sales amount. The program should:

- **Prompt** the user to enter the annual sales.
- **Apply** the following bonus rules:
  - If annual sales are **at least $15,000**, calculate a **2% bonus**.
  - Otherwise, calculate a **1.5% bonus**.
- **Output** the bonus amount.

Task 5 [CLO 1]:

Demonstrate the use of an *if-else-if ladder* by writing a C++ program that asks the user to enter a character. The program should then **classify and display** whether the character is:

- A lowercase letter (`a..z`)
- An uppercase letter (`A..Z`)
- A digit (`0..9`)
- A special character (anything else)

Hint: Use the `char` data type to declare the input character.

Deliverables:

Compile a single Word document as displayed in solution/answer part and submit this Word file on LMS.

Lab Rubrics:

Your Lab 3 will be graded out of 5 for each rubric according to the following rubrics.

Lab Rubrics for Lab 3					
Sr. No.	**Assessment**	**Unacceptable (0 Marks)**	**Does Not Meet Expectations (1/2 Marks)**	**Meets Expectations (3/4 Marks)**	**Exceeds Expectations (5 Marks)**
1	**Illustrating the basic understanding of semantics and syntax (CLO1, PLO1)**	The student did not submit any work. OR The student plagiarized the solution and/or used unfair means.	The student is unable to demonstrate the understanding of syntax of C++ language and is unable to write an executable code. The student is not able to understand the structure of a program at all.	The student demonstrates some understanding of syntax of C++ language and is able to write a code with few errors. The student is able to understand the structure but still learning the syntax.	The student demonstrates good understanding of syntax of C++ language and is able to write executable code without help The student is able to understand the structure and is able to identify problems in the code when introduced
2	**Application of Programming Concepts (CLO2, PLO3)**		The student is unable to apply the appropriate programming concepts to solve the given problem thus resulting in an incomplete or ineffective solution. The program flow is messy and incomprehensible. Codes are non-modular and cannot be reused.	The student requires some guidance to apply the appropriate programming concepts to solve the given problem. The program flow requires minor improvements. Codes are semi-modular and semi-reusable.	The student demonstrates a clear ability to apply the appropriate programming concepts to solve the given problem. The program flow is adequate. Codes are modular, reusable, and easily readable.