**Assignment Title: Ternary Operator and Conditional Statements Instructor Name: Muhammad Bilal Dar**

Marks Distribution [Total marks = 10 ]

**Task Overview:**

Students will use basic operators, input/output (cin/cout), ternary operators, and comparison operators. They will practice using variables, arithmetic operations, and logical decision making to solve real world problems.

**Assignment Tasks:**

The assignment is divided into smaller tasks to be completed over the course of a week. Each day should build upon the previous day's work.

**If Else:**

In C++, if-else statements are used for decision-making, allowing your program to perform different actions based on certain conditions. Here’s the basic structure:

**Syntax:**

**if (condition) {**

**// Code to execute if the condition is true**

**} else {**

**// Code to execute if the condition is false**

**}**

**Example Program:**

**#include <iostream>**

**using namespace std;**

**int main() {**

**int number;**

**cout << "Enter a number: ";**

**cin >> number;**

**if (number > 0) {**

**cout << "The number is positive." << endl;**

**} else {**

**cout << "The number is not positive." << endl;**

**}**

**return 0;**

**}**

**Explanation of the Example:**

* This program prompts the user to enter a number.
* It checks if the entered number is greater than 0 using the if condition.
* If number > 0 is true, it prints "The number is positive."
* Otherwise, it executes the else block, printing "The number is not positive."

**Common Types of Conditional Statements**

1. **If Statement**:

The simplest form of a conditional statement that executes a block of code if the condition is true.

if (condition) {

// Code to execute if condition is true

}

1. **If-Else Statement**:

An extension of the if statement that includes an alternative block of code that executes if the condition is false.

if (condition) {

// Code if condition is true

} else {

// Code if condition is false

}

1. **Else If Statement**:

Allows for checking multiple conditions in sequence. If the first condition is false, it checks the next condition, and so on.

if (condition1) {

// Code if condition1 is true

} else if (condition2) {

// Code if condition2 is true

} else {

// Code if both conditions are false

}

**Is Ternary operator and conditional statements same?**

No, the ternary operator and conditional statements are not the same, although they both perform similar functions. The ternary operator is a shorthand way to write a simple if-else statement in one line. For example, result = condition ? valueIfTrue : valueIfFalse; is the ternary format, while an if-else statement would be written in multiple lines.

Here’s a bit more detail:

* **Syntax:** The ternary operator has a specific syntax (condition ? trueValue : falseValue), making it concise. In contrast, conditional statements (if-else) require more lines and are more flexible for complex logic.
* **Usage:** The ternary operator is typically used for simple conditions where you want to assign a value based on a condition. Conditional statements can handle more complex situations, including multiple conditions and blocks of code.
* **Readability:** While the ternary operator can make code shorter, it may reduce readability if overused or used for complex conditions. Conditional statements are generally clearer for those reading the code.

**Lab Task**

**Practice TASK: Using Ternary Operator**

Objective: Use the ternary operator to make simple decisions.

Description:

1. Take a number as input from the user and check if it is even or odd using the ternary operator.

Steps and Hints:

1. Declare an integer variable.

int num;

2. Take input from the user.

cout << "Enter an integer: ";

cin >> num;

3. Use the ternary operator to check if the number is even or odd.

string result = (num % 2 == 0) ? "Even" : "Odd";

cout << "The number is " << result << endl;

**Using if else:**

int main() {

int number;

cout << "Enter a number: ";

cin >> number;

if (number % 2 == 0) {

cout << "The number is even.\n";

} else {

cout << "The number is odd.\n";

}

return 0;

}

**Task 01:**

**Simple Calculator**

Write a program that takes two numbers and a character (+, -, \*, /) as input. Based on the character, perform the appropriate mathematical operation and print the result. Use if-else statements to determine which operation to perform.

**Task 02:**

Create a program that asks the user to input an integer. The program should determine whether the number is positive, negative, and print the corresponding result.

**Solution:**

int number;

cout << "Enter a number: ";

cin >> number;

if (number > 0)

{

cout << "The number is positive.\n";

}

else {

cout << "The number is zero.\n";

}

**Task 3: Check Voting Eligibility**

Take the user's age as an input and check if the user is eligible to vote (18 years or older) and display a message indicating their eligibility.

**Hint: use if else**

**Task 4: Write a program that ask the user to enter two integers. The program should compare the two numbers and output which one is larger.**

**Task5: Grade Classification Based on Marks**

* **Create a C++ program that prompts the user to enter their marks (out of 100). The program should classify the marks into grades as follows:**
  + **A: 90 and above**
  + **B: 75 to 89**
  + **C: 50 to 74**
  + **F: Below 50**
* **Display the appropriate grade based on the entered marks.**

**Solution:**

int marks;

cout << "Enter your marks: ";

cin >> marks;

if (marks >= 90) {

cout << "Grade: A\n";

} else if (marks >= 75) {

cout << "Grade: B\n";

} else if (marks >= 50) {

cout << "Grade: C\n";

} else {

cout << "Grade: F\n";

}

**Task06:**

**Problem: Traffic Light Action Guidance**

Create a C++ program that helps drivers take the correct action based on the current color of a traffic light. The program should:

* Prompt the user to enter the color of the traffic light as a string ("red", "yellow", or "green").
* Based on the entered color, the program should display the corresponding action:
  + **Red Light**: Display "Stop your vehicle."
  + **Yellow Light**: Display "Get ready to move."
  + **Green Light**: Display "You can go."