National University of Computer & Emerging Sciences

CL1002-Programming Fundamentals– FALL 2023

LAB 04

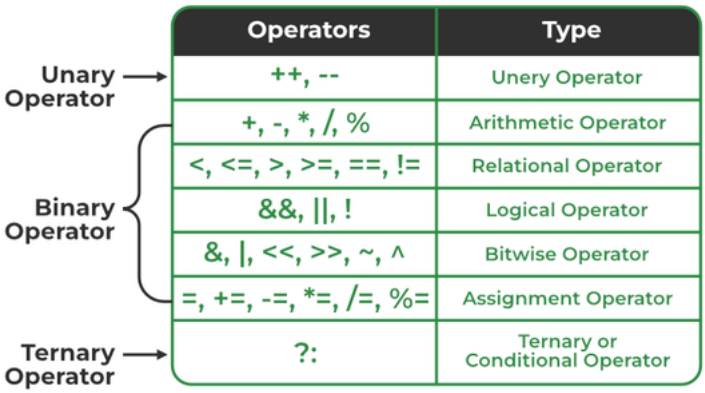
Arithmetic Operators

Learning Outcomes

In this lab you are expected to learn the following:

- Write and execute basic C++ programs following coding conventions using Fundamental Programming Concepts
- The use of arithmetic operators

Operators



Operators	Type
++, --	Unery Operator
+, -, *, /, %	Arithmetic Operator
<, <=, >, >=, ==, !=	Relational Operator
&&, ||, !	Logical Operator
&, |, <<, >>, ~, ^	Bitwise Operator
=, +=, -=, *=, /=, %=	Assignment Operator
?:	Ternary or Conditional Operator

Arithmetic Operators

Operator	Operation
+	Addition
-	Subtraction
*	Multiplication
/	Division
%	Modulo Operation (Remainder after division)

Example 4.1

```
#include<iostream>
using namespace std;

int main(){
        int a, b, c, d, e;
        cout<<"Enter the value a : ";
        cin>>a;
        cout<<"Enter the value b : ";
        cin>>b;
        cout<<"Enter the value c : ";
        cin>>c;
        cout<<"Enter the value d : ";
        cin>>d;
        cout<<"Enter the value e : ";
        cin>>e;
        cout<<"The output is of the expression (a/b+c*d-e) is : "<< a/b+c*d-e<<endl;
        cout<<"The output is of the expression a/(b+c)*(d-e) is : "<< a/(b+c)*(d-e)<<endl;

}
```

```
Enter the value a : 5
Enter the value b : 4
Enter the value c : 3
Enter the value d : 2
Enter the value e : 1

The output is of the expression (a/b+c*d-e) is : 6

The output is of the expression a/(b+c)*(d-e) is : 0
```

Submission Instructions:

1. Create a single cpp file containing all the functions of the problems and main function.
2. Save the **cpp** file with the roll no and task number
   e.g. i230001_Q1.cpp
3. Now create a new folder with *ROLLNO_LAB01_SEC* **e.g. i23XXXX_LAB04_A**
4. You need to display your roll no and name before the output of each question.
5. Now you have to submit this zipped file on Google Classroom.
6. If you don't follow the above-mentioned submission instructions, you will be marked **zero.**
7. Plagiarism in the Lab Task will result in **zero** marks in the whole category.

Lab Tasks

Problem 01

Write a program that takes two numbers as input and applies arithmetic operations of Addition, Subtraction, Multiplication, and Division on those two numbers.

For example: If num_1 = 20 and num_2 = 10 then the result will be:

```
Addition: 30
Subtraction: 10
Multiplication: 200
Division: 2
```

Problem 02

A car holds 15 gallons of gasoline and can travel 375 miles before refueling. Write a program that calculates the number of miles per gallon the car gets. Display the result on the screen.

Hint: Use the following formula to calculate miles per gallon (MPG):

MPG = Miles Driven / Gallons of Gas Used

```
MPG = 25
```

Problem 03

Write a program that reads the radius of a circle as an integer and prints the circle's diameter, circumference, and area.

Circumference = 2πr (where PI is a constant value of 3.1415 and r is radius)
Diameter = 2r
Area = πr²

Note: Declare PI as constant

```
Enter radius of a circle
10
Diameter: 20
Circumference: 62.8
Area: 314
```

Problem 04

Write a program to find all the roots of a quadratic equation. The quadratic equation is of the form **$ax^2+bx+c = 0$** (where a, b, and c are coefficients). You need to take **inputs** for three **float** variables referring to a, b, and c respectively. The roots of the equation are calculated using the following formula:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

```
Enter coefficients a: 4
Enter coefficients b: 5
Enter coefficients c: 1
Roots are:
x1 = -0.25
x2 = -1
```

Problem 05

Write a program that inputs a four-digit integer and sums the first and last digits of the number.

For example, if the user types in 4233, the sum should be 4+3=7.