National University of Computer and Emerging Sciences Islamabad Programming Fundamentals Lab FALL 2021

Lab Manual 04
Extraction Operators, Expressions and Precedence

1) Variables: Data Types, sizeOf and Polarity:

Example 1.1:

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

int main(){

        int age = 20;
        cout<<"Size of age (int) is : "<<sizeof(age)<<endl;
        float average = 2.2;
        cout<<"Size of average (float) is : "<<sizeof(average)<<endl;
        char alpha = 'a';
        cout<<"Size of alpha (char) is : "<<sizeof(alpha)<<endl;
        bool flag = 0;
        cout<<"Size of flag (bool) is : "<<sizeof(flag)<<endl;
}
```

```
kainat@kainat:~/Desktop/PF_Lab04$ g++ -o a.out task1.cpp
kainat@kainat:~/Desktop/PF_Lab04$ ./a.out

Size of age (int) is : 4

Size of average (float) is : 4

Size of alpha (char) is : 1

Size of flag (bool) is : 1
```

Example 1.2:

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

int main(){
        unsigned int price = 100;
        cout<<"The value of price is : "<<price<<endl;
        signed int x = -10;
        cout<<"The value of x is : "<<x<<endl;
}
```

```
The value of price is : 100

The value of x is : -10
```

2) Standard Input (cin):

Example 2.1:

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

int main(){
        int age;
        cout<<"Enter the value of age : ";
        cin>>age;
        cout<<"The value of age is : "<<age<<endl;
}
```

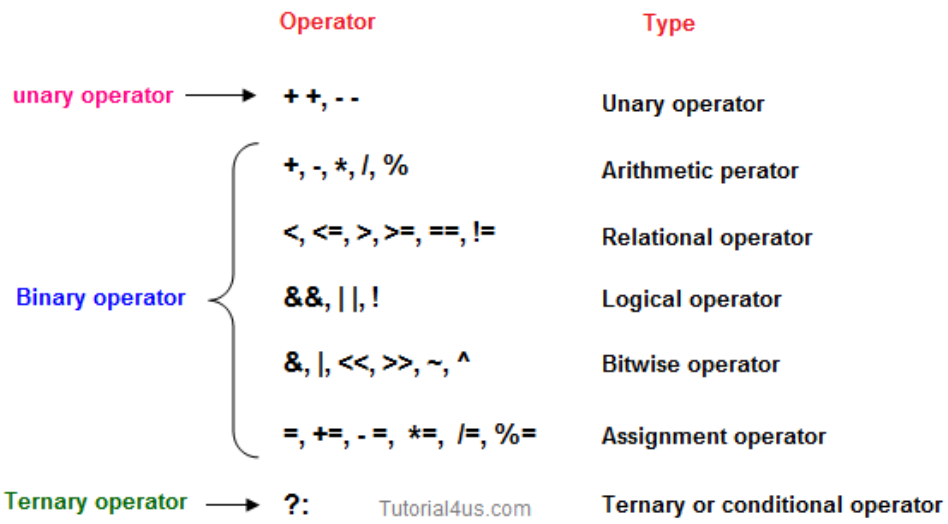
```
Enter the value of age : 23
The value of age is : 23
```

Example 2.2:

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

int main(){
        int age;
        cout<<"Enter the value of age : ";
        cin>>age;
        cout<<"The value of age is : "<<age<<endl;
        cout<<"The double of your age is : "<<age*2<<endl;
}
```

```
Enter the value of age : 20

The value of age is : 20

The double of your age is : 40
```

3) Operators:



Arithmetic Operator

Operator	Symbol	Form	Operation
add	+	x+y	add x and y
subtract	-	x-y	subtract x and y
multiply	*	x*y	multiply x and y
divide	/	x/y	divide x and y
modulus	%	x%y	mod x and y

Example 3.1:

```
#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
```

Lab Tasks

Problem 01

Write a program to find circumference of a circle. The program should take radius input from user and display the circumference.

$circumference = 2\pi r$ (*where PI is a constant value of* 3.1415 *and r is radius*)

Note: Declare PI as constant

Problem 02

Write a program that apply arithmetic operations of Addition, Subtraction, Multiplication, Division and Modulus on these two numbers numOne=20 and numTwo=10. Display the result in following format:

```
Addition of numOne and numTwo is: 30
Subtraction of numTwo from numOne is: 10
Division of numOne by numTwo is: 2
Moduus of numOne with numTwo is: 0
```

Problem 03

Write a program for the following mathematical trick:

- Declare an integer variable
- Take input from user and assign the value to the variable
- Double the value of variable and store in the same variable.
- Add 10 to the value of variable and store in the same variable.
- Now half the value of variable and store in the same variable.
- Then subtract the number entered by user from the current value of the variable and store in the same variable.
- Finally display the value of the variable. The answer must always be five.

Problem 04

Write a program that asks a shopkeeper to input unit price of chocolate mini bar and stores in a variable. It then asks to input the quantity of chocolates sold in a particular day and store in another variable. Now it calculates and displays the total sales amount of chocolates earned by the shopkeeper. Now calculate 10% tax on total sales amount and store in another variable. Display the total sales amount of chocolates after tax deduction.

Problem 05

Write a program to find and display result for whole square of three numbers using following formula in a single expression:

$$\mathbf{a^2 + b^2 + c^2 + 2\ (ab + bc + ca)}$$

Note: Get the values of a, b and c from user. Perform the above task with only one mathematical equation. Keep the concept of operator precedence in mind.

Submission Instructions:

1. Save all **.cpp** files with your roll no and task number
   e.g. i20XXXX_Task04.cpp
2. Now create a new folder/directory with name *ROLLNO_LAB04* **e.g. i20XXXX_LAB04**
3. Move all of your .cpp files to this newly created directory and compress it into **.zip file**.
4. Now you have to submit this zipped file on Google Classroom.

THE END