National University of Computer and Emerging Sciences Islamabad Programming Fundamentals Lab FALL 2020

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;
}
```

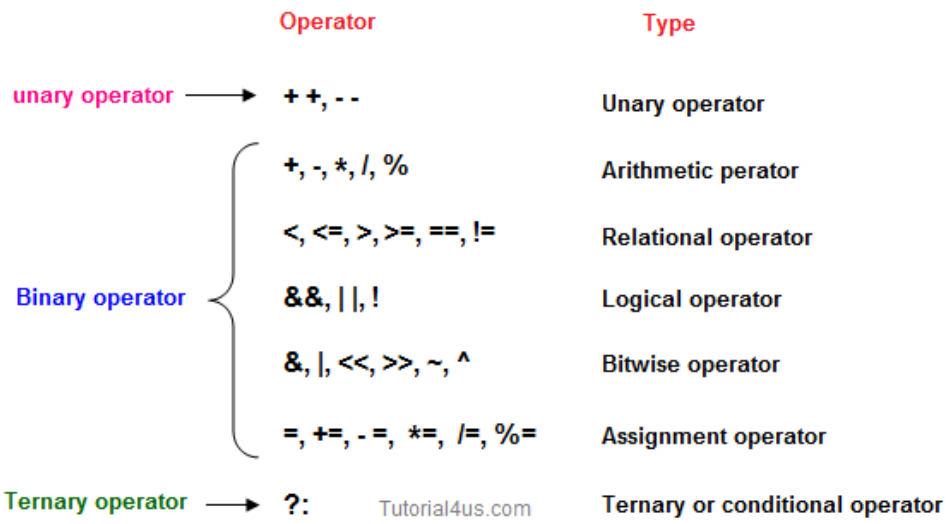
```
Enter the value of age : 23
The value of age is : 23
```

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 that takes mass as an input and calculates the weight of an object using formula:

Weight = mass x 9.8

Choose the data types wisely.

Problem 02

Write a program that converts inches to yards and feet. Prompt the user to enter an integer value i.e. the number of inches, and then make the conversion and output the result in the following format.

03 yards: 20 feet : 45 inches

Note: 1 ft = 12 inches 1 yard = 3ft

Problem 03

Write a program for the following mathematical trick.
Ask user for any number. Double it. Add 10 to it. Now half the number. Then subtract your first number. The answer will be five.

Note: Perform the above task with only one mathematical equation. Keep the concept of operator precedence in mind.

Problem 04

Write a program that takes sales unit price and sales quantity of only two items as input and compute the total sales amount. After that calculates 10% tax on total sales amount. Display the total sales amount before and after tax deduction.

Note: Consider only two items.

Problem 05

Write a program to find whole square of three numbers by the following formula

$$(a + b + c)^2 = a^2 + b^2 + c^2 + 2(ab + bc + ca)$$

Note: Get the values of a, b and c from user.

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 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