Higher Diploma in Information Technology

Introduction to Programming (C++)

Year 1 Semester 1 – 2023

Worksheet 03 – Operators in C++

Intended Learning Outcomes:

At the end of the class the students should be able to:

- Use simple arithmetic operators in a C++ program
- Use increment and decrement arithmetic operators in a C++ program
- Use relational and logical operators in a C++ program
- Use `sizeof()` operator in C++ program
- Use `cmath` header file for calculations in C++ program

Exercise 01:

Variable Declaration and Arithmetic operators. Save the program with the name of **Ex01.cpp.**

```
//To learn variable declaration and arithmetic operators

#include <iostream>
using namespace std;

int main()
{
      //declare variables
      int no1, no2, sum;

      //assign values to the variables
      no1 = 100, no2 = 20;

      //calculate the sum of two numbers
      sum = no1 + no2;

      //print the sum
      cout << "Sum is " << sum << endl;

      return 0;
}
```

Exercise 02:

Now modify your program to calculate subtraction, multiplication, division and modulus of two numbers. Save the program with the name of **Ex02.cpp**

Exercise 03:

Write a C++ program to convert inches to feet and inches. The user needs to enter an integer value corresponding to the number of inches, then make conversion and output the result. Consider the following relationship between feet and inches.

1 feet = 12 inches

```
Sample Output:
Enter the distance in inches: 77.
The distance in feet is 6 feet and 5 inches.
```

Save the program with the name of **Ex03.cpp**

Exercise 04:

Writing a simple C++ program to observe the difference between increment and decrement arithmetic operators.

Save the program with the name of **Ex04.cpp.**

```
//This program is to observe the difference between increment and
//decrement operators

#include <iostream>
using namespace std;

int main()
{
      int x = 10, y = 20;
      cout << "The value of x is " << x << endl;
      cout << "The new value of x is " << x++ << endl;
      cout << "Now the value of x is " << ++x << endl;
      cout << "The value of y is " << y << endl;
      cout << "The new value of y is " << y-- << endl;
      cout << "Now the value of y is " << --y << endl;
      return 0;
}
```

Exercise 05:

Writing a C++ program to learn relational operators and logical operators. Save the program with the name of **Ex05.cpp.**

```
//This program is to learn relational and logical operators

#include <iostream>
using namespace std;

int main()
{
  int x = 5, y = 10;

  cout<<"Prints 1 if x>=5 and 0 if x<5 answer is "<<(x<5)<<endl;
  cout<<"Prints 1 if y==10 and 0 if y!=10 answer is "<<(y==10)<<endl;
  cout<<"Prints 1 if y>=10 and 0 if y<10 answer is "<<(y<10)<<endl;
  cout<<"Prints 1 if x>=5 and 0 if x<5 answer is "<<(x>=5)<<endl;
  cout<<"Prints 1 if x>=5 and y==10 answer is "<<((x>=5)&&(y==10))<<endl;
  cout<<"Prints 1 if x<5 or y==10 answer is "<<((x<5)||(y==10))<<endl;
  return 0;
}
```

Exercise 06:

A simple C++ program to learn `sizeof()` operators. Save the program with the name of **Ex06.cpp.**

```
//This program is to learn sizeof() operator
#include <iostream>
using namespace std;

int main()
{
      cout << sizeof(8) << endl;
      cout << sizeof(8.0f) << endl;
      cout << sizeof(8.0) << endl;
      cout << sizeof(8+5.0) << endl;
      cout << sizeof('c') << endl;
      cout << sizeof("c") << endl;
      return 0;
}
```

Exercise 07:

Write a C++ program to read the number of units of length (a float) and print out the area of a circle of that radius. Assume that the value of pi is 3.14159 and is a constant value.

Your output should take the format:

`The area of a circle of radius ..... units is ..... units.`

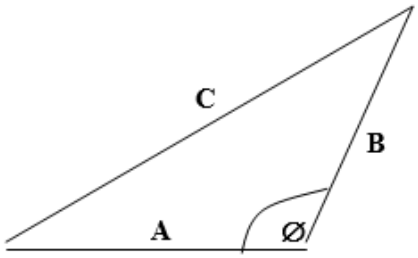
Save the program with the name of **Ex07.cpp.**

Exercise 08:

Modify the above program using `pow()` in `cmath` header. Save the program with the name of **Ex08.cpp.**

Exercise 09:

Write a C++ program to calculate the length C of a triangle. Save the program with the name of **Ex09.cpp.**



$$C = \sqrt{A^2 + B^2 - 2AB.\cos(\phi)}$$

Note: *You can make use of the following mathematical functions defined in the cmath header file.*

sqrt(N) - return square root of a function, where N is a double data type

cos(T) - returns the cosine of an angle given in radians.

If *Ang* is an angle given in degrees you can convert this to radians using the following formula:

T = Ang / 180 * PI;

Sample Output:

```
Enter the Angle:130
Enter the length of A side:2
Enter the length of B side:5
length of c is:6.46824
```