Activity No. 1	
REVIEW OF C++ PROGRAMMING	
Course Code: CPE010	**Program:** Computer Engineering
Course Title: Data Structures and Algorithms	**Date Performed: September 9, 2024**
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6. Output

Sections	Answer
Header File Declaration Section	#include <iostream> using namespace std;
Global Declaration Section	

Class Declaration and Method Definition Section	class Triangle {
	private:
	  double angleA, angleB, angleC;
	
	public:
	  Triangle(double A, double B, double C);
	  void setAngles(double A, double B, double C);
	  bool validateTriangle() const;
	};

Main Function	int main() {
	  Triangle set1(40, 30, 110);
	  if (set1.validateTriangle()) {
	  cout << "The shape is a valid triangle.\n";
	  } else {
	  cout << "The shape is NOT a valid triangle.\n";
	  }
	  return 0;
	}

Method Definition	Triangle::Triangle(double A, double B, double C) : angleA(A), angleB(B), angleC(C) {}
	
	void Triangle::setAngles(double A, double B, double C) {
	  angleA = A;
	  angleB = B;
	  angleC = C;
	}
	
	bool Triangle::validateTriangle() const {
	  return (angleA > 0 && angleB > 0 && angleC > 0 && angleA + angleB + angleC == 180.0);
	}

7. Supplementary Activity

1. **Create a C++ program to swap the two numbers in different variables.**

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

int main() {
    int z = 11, y = 20;

    cout << "Before swapping: a = " << z << ", b = " << y << endl;

    z = z + y;
    y = z - y;
    z = z - y;

    cout << "After swapping: a = " << z << ", b = " << y << endl;

    return 0;
}
```

```
/tmp/KwUK4k7rRQ.o
Before swapping: a = 11, b = 20
After swapping: a = 20, b = 11


=== Code Execution Successful ===
```

Note: This activity is a bit easy for me since it only includes basic assigning of variables and basic logic.

2. **Create a C++ program that has a function to convert temperature in Kelvin to Fahrenheit.**

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

double k2f(double kelvin) {
    return (kelvin - 273.15) * 9.0 / 5 + 32;
}

int main() {
    double kelvin;

    cout << "Enter temperature in Kelvin: ";
    cin >> kelvin;

    double fahrenheit = k2f(kelvin);

    cout << "Temperature in Fahrenheit: " << fahrenheit << endl;

    return 0;
}
```

```
/tmp/7gyc6Kq6Vu.o
Enter temperature in Kelvin: 876
Temperature in Fahrenheit: 1117.13


=== Code Execution Successful ===
```

Note: This activity is somehow easy as well since

3. **Create a C++ program that has a function that will calculate the distance between two points.**

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

double distance(double x1, double y1, double x2, double y2) {
    return sqrt(pow((x2 - x1), 2) + pow((y2 - y1), 2));
}
int main() {
    cout << "The distance between point a and point b is " <<
        distance(9, 6, 6, 9) << " meters" << endl;
    return 0;
}
```

```
/tmp/QS1ZlpLdtv.o
The distance between point a and point b is 4.24264 meters


=== Code Execution Successful ===
```

4. **Modify the code given in ILO B and add the following functions:**

   a. **A function to compute for the area of a triangle**

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

int main() {
    double triangleBase, triangleHeight, triangleArea;

    cout << "Enter the base of the triangle: ";
    cin >> triangleBase;

    cout << "Enter the height of the triangle: ";
    cin >> triangleHeight;

    // Calculate the area
    triangleArea = 0.5 * triangleBase * triangleHeight;

    cout << "The area of the triangle is: " << triangleArea <<
        endl;

    return 0;
}
```

```
/tmp/WrvG7zlRTc.o
Enter the base of the triangle: 78
Enter the height of the triangle: 64
The area of the triangle is: 2496


=== Code Execution Successful ===
```

   b. **A function to compute for the perimeter of a triangle**

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

double trianglePerimeter(double s1, double s2 , double s3) {
    return s1 + s2 + s3;
}

int main() {
    double s1, s2 , s3;

    cout << "Enter the length of the first side: ";
    cin >> s1;

    cout << "Enter the length of the second side: ";
    cin >> s2 ;

    cout << "Enter the length of the third side: ";
    cin >> s3;

    double perimeter = trianglePerimeter(s1, s2 , s3);

    cout << "The perimeter of the triangle is: " << perimeter << endl;

    return 0;
}
```

```
/tmp/KyryAVAcx5.o
Enter the length of the first side: 67
Enter the length of the second side: 90
Enter the length of the third side: 45
The perimeter of the triangle is: 202


=== Code Execution Successful ===
```

   c. **A function that determines whether the triangle is acute-angled, obtuse-angled or 'others.'**

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

void determineTriangleType(int a, int b, int c) {
    int a2 = a * a;
    int b2 = b * b;
    int c2 = c * c;

    if (a + b <= c || a + c <= b || b + c <= a) {
        cout << "Not a valid triangle" << endl;
        return;
    }

    if (a2 + b2 > c2 && a2 + c2 > b2 && b2 + c2 > a2) {
        cout << "Acute-angled Triangle" << endl;
    } else if (a2 + b2 < c2 || a2 + c2 < b2 || b2 + c2 < a2) {
        cout << "Obtuse-angled Triangle" << endl;
    } else {
        cout << "Right-angled Triangle" << endl;
    }
}

int main() {
    int a, b, c;
    cout << "Enter the sides of the triangle: ";
    cin >> a >> b >> c;

    determineTriangleType(a, b, c);

    return 0;
}
```

```
/tmp/JuMS7ZKvPl.o
Enter the sides of the triangle: 2 3 2
Obtuse-angled Triangle


=== Code Execution Successful ===
```

8. Conclusion

In this activity, I was reminded of my C++ studies from last semester. I still struggle to recall some of the variables needed for various purposes, such as the "double" function when entering numbers with decimals, particularly in this activity where I encountered this function for initializing the sizes or lengths of triangles. I also learned about the proper use of formulas and the importance of being careful when using parentheses in the formulas needed for each task.

9. Assessment Rubric