

Activity No. 1.2	
Hands-on Activity 1.1 Basic C++ Programming	
Course Code: CPE010	Program: Computer Engineering
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6. Output	
Section	Answer
Step#1 Header File Declaration Section	#include <iostream>
Step#2 Global Declaration Section	class Triangle{ private: double totalAngle, angleA, angleB, angleC;
Step#3 Class Declaration and Method Definition Section	public: Triangle(double A, double B, double C); void setAngles(double A, double B, double C); const bool validateTriangle(); };
Step#4 Main Function	Triangle::Triangle(double A, double B, double C) { angleA = A; angleB = B; angleC = C; totalAngle = A+B+C; } void Triangle::setAngles(double A, double B, double C) { angleA = A; angleB = B; angleC = C; totalAngle = A+B+C; }const bool Triangle::validateTriangle() { return (totalAngle <= 180); }
Step#5 Method Definition	int main(){ //driver code Triangle set1(40, 30, 110); if(set1.validateTriangle()){ std::cout << "The shape is a valid triangle.\n"; } else { std::cout << "The shape is NOT a valid triangle.\n"; } return 0; }

```
#include <iostream>

class Triangle{
private:
    double totalAngle, angleA, angleB, angleC;
public:
    Triangle(double A, double B, double C);
    void setAngles(double A, double B, double C);
    const bool validateTriangle();
};

Triangle::Triangle(double A, double B, double C) {
    angleA = A;
    angleB = B;
    angleC = C;
    totalAngle = A+B+C;
}

void Triangle::setAngles(double A, double B, double C) {
    angleA = A;
    angleB = B;
    angleC = C;
    totalAngle = A+B+C;
}

const bool Triangle::validateTriangle() {
    return (totalAngle <= 180);
}

int main(){
    //driver code
    Triangle set1(40, 30, 110);
    if(set1.validateTriangle()){
        std::cout << "The shape is a valid triangle.\n";
    } else {
        std::cout << "The shape is NOT a valid triangle.\n";
    }
    return 0;
}
```

The shape is a valid triangle.

7. Supplementary Activity

C++ program to swap the two numbers in different variables.

```
1 #include <iostream>
2
3 int main() {
4     int a, b;
5
6     std::cout << "Enter two numbers: ";
7     std::cin >> a >> b;
8
9     std::cout << "Before swapping: a = " << a << ", b = " << b << std::endl;
10
11     int temp = a;
12     a = b;
13     b = temp;
14
15     std::cout << "After swapping: a = " << a << ", b = " << b << std::endl;
16
17     return 0;
18 }
```

Enter two numbers: 25 63
Before swapping: a = 25, b = 63
After swapping: a = 63, b = 25

--- Code Execution Successful ---

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

```
#include <iostream>

double kelvinToFahrenheit(double kelvin) {
    return (kelvin - 273.15) * 9/5 + 32;
}

int main() {
    double kelvin;

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

    double fahrenheit = kelvinToFahrenheit(kelvin);

    std::cout << kelvin << " K is equal to " << fahrenheit << " F" << std::endl;

    return 0;
}
```

Enter temperature in Kelvin: 32
32 K is equal to -402.07 F

--- Code Execution Successful ---

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

```
1 #include <iostream>
2 #include <cmath>
3
4 double calculateDistance(double x1, double y1, double x2, double y2) {
5     return sqrt(pow(x2 - x1, 2) + pow(y2 - y1, 2));
6 }
7
8 int main() {
9     double x1, y1, x2, y2;
10
11     std::cout << "Enter coordinates of first point (x1 y1): ";
12     std::cin >> x1 >> y1;
13
14     std::cout << "Enter coordinates of second point (x2 y2): ";
15     std::cin >> x2 >> y2;
16
17     double distance = calculateDistance(x1, y1, x2, y2);
18
19     std::cout << "The distance between the points is: " << distance << std::endl;
20
21     return 0;
22 }
23
```

Enter coordinates of first point (x1 y1): 6 9
Enter coordinates of second point (x2 y2): 4 20
The distance between the points is: 11.1803

--- Code Execution Successful ---

a. A function to compute for the area of a triangle
b. A function to compute for the perimeter of a triangle
c. A function that determines whether the triangle is acute-angled, obtuse-angled or 'others.'

```
#include <iostream>
#include <cmath>

double kelvinToFahrenheit(double kelvin) {
    return (kelvin - 273.15) * 9/5 + 32;
}
```

```

double fahrenheitToKelvin(double fahrenheit) {
    return (fahrenheit - 32) * 5/9 + 273.15;
}

double calculateTriangleArea(double base, double height)
{
    return 0.5 * base * height;
}

double calculateTrianglePerimeter(double a, double b,
double c) {
    return a + b + c;
}

std::string determineTriangleType(double a, double b,
double c) {
    double angles[3];

    angles[0] = acos((pow(b, 2) + pow(c, 2) - pow(a,
2)) / (2 * b * c)) * 180 / M_PI;
    angles[1] = acos((pow(a, 2) + pow(c, 2) - pow(b,
2)) / (2 * a * c)) * 180 / M_PI;
    angles[2] = 180 - angles[0] - angles[1];

    bool acute = angles[0] < 90 && angles[1] < 90 &&
angles[2] < 90;
    bool obtuse = angles[0] > 90 || angles[1] > 90 ||
angles[2] > 90;

    if (acute) return "Acute-angled";
    if (obtuse) return "Obtuse-angled";
    return "Right-angled or Other";
}

int main() {
    int choice;
    double temperature, result;

    std::cout << "Choose conversion:" << std::endl;
    std::cout << "1. Kelvin to Fahrenheit" << std::endl;
    std::cout << "2. Fahrenheit to Kelvin" << std::endl;
    std::cout << "Enter your choice (1 or 2): ";
    std::cin >> choice;

    if(std::cin.fail() || (choice != 1 && choice != 2)) {
        std::cerr << "Invalid choice!" << std::endl;
        return 1;
    }

    std::cout << "Enter the temperature: ";

```

```

std::cin >> temperature;

if(choice == 1) {
    result = kelvinToFahrenheit(temperature);
    std::cout << temperature << " K is equal to " <<
result << " F" << std::endl;
} else if(choice == 2) {
    result = fahrenheitToKelvin(temperature);
    std::cout << temperature << " F is equal to " <<
result << " K" << std::endl;
}

double a, b, c, base, height;

std::cout << "Enter the lengths of the three sides
of a triangle (a b c): ";
std::cin >> a >> b >> c;

std::cout << "Enter the base and height of the
triangle (base height): ";
std::cin >> base >> height;

double area = calculateTriangleArea(base,
height);
double perimeter = calculateTrianglePerimeter(a,
b, c);
std::string type = determineTriangleType(a, b, c);

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

return 0;
}

```

8. Conclusion

I feel I did a good job refining the triangle validation logic and making the code more efficient. I learned a lot about ensuring that geometric conditions are checked accurately and how to use const to clarify which methods should not change the object's state. Updating TotalAngle only when needed made the code cleaner and more reliable. In the future, I want to focus on testing edge cases and making sure all parts of the code handle unexpected inputs gracefully. Overall, this exercise was a great learning experience and helped me improve my coding practices.