

Homework Assignment #5 - Functions

Reading Assignment:

Read Chapter 7 in Programming In C++, by D'Orazio
Exercises 7.1 – 7.7 (not to be submitted, but good practice for tests)

Problem Assignment:

Submit each of the following by the assigned due date. In each case turn in a printout of the main program, any functions, and the output for any test cases indicated.

1. Write a C++ function, CUBES, that will calculate the following summation. The function should have one input (N) and should return the summation. Also write a main program to prompt the user for the value of N, call the function, and display the result. Test the program for N = 1, 5, and 10.

$$Sum = \sum_{i=1}^N i^3$$

2. Write a C++ function with inputs equal to the base and height of a right triangle and outputs equal to the area and perimeter of the triangle. Also write a main program to prompt the user for inputs, call the function, and display the outputs. Test the program for a triangle with a base of 30 and a height of 40.
3. Write a C++ function with inputs equal to four integers and outputs equal to the largest two of the four integers. Also write a main program to prompt the user for four integer inputs, call the function, and display the outputs. Test the program with the following 4 integers: -4, 32, 1, 8.
4. Total resistance in a parallel electric circuit can be calculated for up to N resistors ($N \geq 2$) using the formula (where R = resistance):

$$R_{Total} = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2} + \dots + \frac{1}{R_N}}$$

Write a C++ function, **RParallel**, that calculates total resistance in a parallel electric circuit for between 2 and 5 resistors by using default values for resistors 3, 4, and 5. Write a main program that calls the function for the following cases and displays the result:

R_{Total} = RParallel(20,30); (the answer should be 12)
R_{Total} = RParallel(600,300,200); (the answer should be 100)
R_{Total} = RParallel(100,100,100,100);
R_{Total} = RParallel(60,30,20,10,25);

(continued)

5. Determine the output for each part below by hand (do not compile the programs).

<pre>// Problem 5A #include <iostream> #include <cmath> using namespace std; // Function declarations double Square(double); double Cube(double); // Main function int main (void) { double x = 2.0, y = 3.0; x = Square(x); y = Cube(x); cout << "x = " << x << endl; cout << "y = " << y << endl; system("Pause"); return 0; } // Function definitions double Square(double y) { double x = pow(y,2); return x;} double Cube(double x) { double y = pow(x,3); return y;}</pre>	<p>x = _____</p> <p>y = _____</p>
<pre>// Problem 5B #include <iostream> #include <cmath> using namespace std; // Function declarations void F2(int,int,int,int&,int&,int&); // Main function int main (void) { int X=1,Y=2,Z=3,A=4,B=5,C=6,A1=7,A2=8,A3=9; F2(X,Y,Z,A,B,C); cout << "X = " << X << " Y = " << Y << endl; cout << "Z = " << Z << " A = " << A << endl; cout << "B = " << B << " C = " << C << endl; cout << "A1 = " << A1 << " A2 = " << A2 << endl; cout << "A3 = " << A3 << endl; system("Pause"); return 0; } // Function definitions void F2(int X, int Y, int Z, int& A1, int& A2, int& A3) { X = X+5; A1 = A1*A1; A2 = (Y + Z)/2; A3 = (Y - Z)/2; return;}</pre>	<p>X = _____</p> <p>Y = _____</p> <p>Z = _____</p> <p>A = _____</p> <p>B = _____</p> <p>C = _____</p> <p>A1 = _____</p> <p>A2 = _____</p> <p>A3 = _____</p>