Homework 7 –Functions #1

Goal

In this project (just like the in-class exercise), you write several of your own functions. This assignment consists of prompting for and reading several different input values and calling various functions on the input.

Learning Objectives

- The importance of matching the actual and formal parameters and of data types in function parameters
- How to write your own functions
  - To write function prototypes
  - Make function calls
  - Write function implementation code

Program Features

You need to **write** the following functions yourself. We can provide lots of help with the code that goes ***inside*** the functions so that you can focus on ***calling*** and *setting up* the functions, I,.e. prototype, call, and definition. Don't forget to put a prototype at the top of the file after your `using namespace std;` statement.

1.bool sorted(int a, int b, int c)

- Prompt and read 3 integers in main()
- a ,b, and c are incoming value parameters
- Sort the 3 integers according to the ascending order, using several **`if`** statements
- Use boolalpha in your cout stream to print true and false, i.e.
  `cout << boolalpha <<` …
- Return true for "in ascending order" and false if they are not in order

2. double calcTerm (double a, double b)

- Prompt and read 2 double in main()
- a and b are incoming value parameter
- Calculate the result of both a^2-b and b^2-a and return the bigger one. If they are equal, it doesn't matter which you return
- Return the larger of (a^2-b) or (b^2-a)

3. string concatString(string a, string b)

- Prompt and read 2 strings in main()
- a and b not changed
- Return connected a and b in a string with a space between them

4.int lowcaseNum(string a)

- Prompt and read 1 string (an entire line) in main()

- Count the lower case letters in the string a, e.g. how many lower case letter are in “Here we are!”, which is 8
- You should use the string library functions length() and at(position), as in strLine.length() and strLine.at(i), in a for loop to access and count each character in the string. The example at http://www.cplusplus.com/reference/string/string/at/ uses both of these functions! You **may** alternatively use [i , instead of strLine.at[i], to access each character in the string.
- Return the count number

5. long multiplyDigits (int val)
    - Multiply the digits of the int val parameter
    - Prompt and read in a positive int number and pass that value as a parameter to multiplyDigits ()
    - Access each digit using % 10, and 'cut off' the last digit using / 10
    - Return the value of the digits multiplied together, e.g. for input 3219, you output 54 (because 3 * 2 * 1 * 9 = 54)

Sample Input & Output – 2 runs

```
Enter 3 ints to see if they are sorted: 8 2 10
Sorted? false

Enter 2 numbers you want to calculate: 1 2
The result is: 3.00

Enter the first string: aaa
Enter the second string: bbb
The result string is: aaa bbb

Enter the string you want to count: AbcDe
The number of lower case letters in this string is: 3

Enter int value to multiply digits: 28315
Multiplied digits equals: 240

==========
Enter 3 ints to see if they are sorted: 1 6 89
Sorted? true

Enter 2 number you want to calculate: .8 .6
The result is: 0.04

Enter the first string: tab
Enter the second string: space
The result string is: tab space
```

```
Enter the string you want to count: aaaaa
The number of lower case letters in this string is: 5

Enter int value to multiply digits: 11111
Multiplied digits equals: 1
```

Submit your program to Web-CAT

For this assignment, Web-CAT will not only check the output of your program against the required output, the testing code will **call your functions**, check the return values, and check the output. If you do not correctly write the functions **with the required parameters** and return values, then your code may not even compile on Web-CAT ***even though your program runs perfectly fine on your computer***. That is because my test code is expecting (and requiring) the functions to match the assignment. If your code does not match the assignment, then my code and Web-CAT cannot compile, let along run your incorrect functions; it cannot "find" them.

Starter main() Code

To get your going on this (and make the assignment a reasonable size!), here is the main() program. You need to add only the 3 function parts: prototypes, calls, and function definitions. You do not need to (and should NOT) change other parts of the code.

```
#include <iostream>
#include <iomanip>
#include <string>

using namespace std;

// put prototypes here -  do NOT put the function definitions here

int main()
{
    int i1, i2, i3, ret4 ;
    double in1, in2, ret2;
    bool ret1;
    string ret3, s1, s2, str4;

    cout << boolalpha << fixed << setprecision(4);

    cout << "Enter 3 ints to see if they are sorted: ";
    cin >> i1 >> i2 >> i3;
    ret1 =                  ;          // function call
    cout << "Sorted? " << ret1 << endl;

    cout << "Enter 2 number you want to calculate: ";
    cin >> in1 >> in2;
    ret2 =                   ;         // function call
    cout << "The result is: " << ret2 << endl;

    cout << "Enter the first string: ";
    cin >> s1;
    cout << "Enter the second string: ";
```

```
    cin >> s2;
    ret3 =                      ;     // function call
    cout << "The result string is: " << ret3 << endl;

    cout << "Enter the string you want to count: ";
    getline(cin, str4);
    ret4 =                      ;     //function call
    cout << "The number of lower case letters in this string is: "
         << ret4 << endl;

    cout << "Enter int value to multiply digits: ";
    cin >> int5;
    ret5 =                        ; // call function
    cout << "Multiplied digits equals: " <<
// You write the rest of this statement


    return 0;
}

// put your function definitions here
```

Make sure you have all of the header code you need: header includes, using namespace, and prototypes. Then, append the required functions below the main() function.