COSC 1437 (DL) - Fall 2016
Program Set #5

See 1437 Grading /Program Guide Sheet for directions and grading/submission information.

1. Implement Programming Exercise #13-Chapter 15 (Gaddis), pp.968-69. Use all the member variables/functions as mentioned in the text. Place all code into one file. Output should look similar to below.

Sample Run:

```
Please enter the x coordinate of the circle's center: 0
Please enter the y coordinate of the circle's center: 6
Please enter the radius of the circle: 12
The area of the circle is 452.389.

Please enter the length of the rectangle: 20
Please enter the width of the rectangle: 10
The area of the rectangle is 200.
```

Name the program: TestABCXX.cpp, where XX are your initials.

2. Create a class named MusicalComposition that contains fields for title, composer, and year written. Include a constructor that requires all three values and an appropriate display function. The child class NationalAnthem contains and additional field that holds the name of the anthem's nation. The child class constructor also contains a display function. Write a C++ test program that instantiates objects of each class and demonstrates that the functions work correctly. Place all code into one file. Output should look similar to below.

Sample Run:

```
Symphonie Fantastique was written by Berlioz in 1780
Star Spangled Banner was written by Key in 1778
It is the national anthem of U.S
```

Name the program: TestMusicCompXX.cpp, where XX are your initials.

3. Write a C++ program that uses the following function to check if the elements in the array are sorted.

```
template<typename T>
bool isSorted(const T list[], int size)
```

Test the function with an array of int, double, and string (class) values. Use array initialization lists. Output should be user friendly.

Name the program: SortedTemplateXX.cpp, where XX are your initials.

4 (**). Telephone numbers in the US and Canada are organized into various three-digit area codes. A single area code will not cross a state or provincial boundary. This rule makes it possible to list the geographical locations of each area code in a data file. Write a C++ program that reads the file into a STL Map<int, string> where the key is the area code and the value is the location. Let the user enter the name of the state or providence from the keyboard and have the program list all the area codes that serve that area. Text file will be provided by the instructor. Let the user enter the file name from the keyboard. Output should look similar to below.

Sample Run:

```
Enter the file name: areacodes.txt

Enter the state name: Oregon
458
503
541
971
```

Name the program: AreaCodeSTLMapXX.cpp, where XX are your initials.