HW 4 –Closest Cities

Problem: Given a list of world cities with their latitudes and longitudes, find the cities closest to a selected city.

Your assignment: Write and test a Swift console application that will allow the user to select a city from a list, and then will list the five cities (from the same list) that are closest to the selected city.

Discussion: The shortest distance between two points on the surface of a sphere is called the Great Circle Distance (GCD). Given the latitude and longitude of any two points, the GCD can be calculated by use of a publicly-available formula. Consider the following ideas in preparing your solution to this problem.

- Develop a user-defined struct or class named City that stores and manages information about a single city, including its name, country, and location. Provide initializers and appropriate methods to manage this information.
- Read and save the contents of the worldcities.csv file into a collection of 125 City instances.
- Repeat the following until the user enters "Quit".
    - Ask the user to pick a city, by name or by index, from a list of available cities.
    - Calculate the Great Circle Distance from the selected city to each of the other cities.
    - Find the five closest cities to the one selected, based on the calculated distances.
    - Display the list of five cities, along with the great circle distance to each in miles.

Coding

- Each class must be defined within its own .swift file.
- All user input must be case-insensitive and allow embedded blanks. So the user can enter "hong konG" or "La Paz" and get a correct match to the named city.
- Validate all inputs and do not proceed until valid values are entered.
- Format your source code according to the style guide presented in class.

Bonus:

Extend the program to also display the five cities that are farthest from the selected city.

Reference: http://www.movable-type.co.uk/scripts/latlong.html

Data file: worldcities.csv

Turn in a single zip file containing only your source code in one or more ".swift" files. Name the zip file "First Last HW4", where "First Last" is replaced with your First and Last names.

Rubric:

Issue	Poss.	Earned
BASICS		
Program compiles without warnings (-5pts per warning)	0	0
Program compiles without errors (5pt deduction per syntax error)	0	0
Program runs without errors (5pt deduction per run-time error)	0	0
CODING STYLE		
Every if has a matching else; Every switch as a default case	3	3
Single return from functions and methods	3	3
No magic numbers (-5pts per magic number)	3	3
Proper Naming Conventions	3	3
Proper indentation (body of every if, switch, do, while, for, try/catch)	3	3
Proper use of Comments	3	3
FUNCTIONALITY		
One user-defined City struct or class	8	8
City class contains a function or method to calculate the Great Circle Distance from itself to another point identified by Latitude and Longitude	8	8
Read contents of worldcities.csv file into a collection of City instances	10	10
Repeat the following till user enters “Quit” or “quit”	3	3
Prompt user to select a city from the list, and read that city name or city index from the console	5	5
Use the City class’s distance method to calculate great circle distances to every other city in the collection	10	10
Pick the five closest cities to the selected one (omit the selected city)	8	8
Display names and distances to each of the 5 closest cities	5	5
BONUS		
Also find the five cities that are farthest away from the selected city. Display this list in the same form as the five closest cities.	10	0
DEBITS		
Submitted file in wrong format (not .zip)	-10	0
Submitted file named wrong	-10	0
Assignment turned in late	-10	0
Total	**75**	**75**