CS 110 Lab Sheet 9

Lab cycle starting 26th November 2019, normal deadline two weeks after your lab in this cycle.

Countries and Continents

- This sheet is mainly about classes representing things to do with countries . If you've been paying attention, you'll know that there's one in the videos:-) but this one is slightly different. A country should have:
- A name - which should be an arbitrary string
- A highest point - measured in metres which cannot be negative; as well as a value, the highest point should have a name

For example if we pick Argentina:
Name: Argentina
Highest point: Name: Aconcagua
Height: 6960

You will probably find this web page handy:

https://en.wikipedia.org/wiki/List_of_elevation_extremes_by_country

You should in all cases write some test code to check if what you're doing works. None of your actual class code should read in data from users, or print data directly out to users - your test code should do any of that (remember - do one thing).

Stage 1: The High Point Class

Write a class that represents a geographical High Point above sea level. It should represent the point by its name and height (as a String and int) - no need for latitude and longitude or anything complicated like that. You might want to think about whether it's sensible to be able to change the value of these values, and what you should do about that - i.e. what methods you should have (as before, there is no right answer to this). But you should have a constructor that lets you make a High Point object - for example:

```
HighPoint highestInArgentina = new HighPoint("Aconcagua", 6960);
```

You probably also want to include a `toString()` method that prints things 'nicely' to make Stage 3 onwards easier. Remember that no country has a highest point below sea level…

Assessed Stage 2: The Country Class

Write a class representing a Country that contains a String representing the country's name as well as a High Point object, representing the highest point in that country. Again, a 'nice' `toString()` method is probably a good idea. A good solution to this does not have a constructor that accepts all the 'raw' data as parameters; but instead should accept a string (the name) as well as an already-constructed High Point object. For example, using the Argentina example:

```
HighPoint highest = new HighestPoint(“Aconcagua”, 6960);

Country southAmericanRepublic =
           new Country(“Argentina”, highest);
```

Or

```
Country southAmericanRepublic = new Country(“Argentina”,
                    new HighPoint(“Aconcagua”, 6960));
```

And NOT:

```
Country southAmericanRepublic = new Country(“Argentina”,
                   “Aconcagua”, 6960);
```

which is not nice…

Challenge: The Continent Class

Write a class that represents a Continent. It should have a method to add a country - and should let you add an arbitrary number of countries (not fixed in any way). That is, you should be able to call your `addCountry()` method as many times as you want (so storing countries in a an array is not correct). It should also have a method that prints out all the countries and their highest points (name and height) in a ‘nice’ way; and a method that only prints out the country with the highest point (as well as the name and height of that point).

Challenge Task

Add a method that lets you look up a country in a continent by name, and if you are feeling in a good mood and up for a challenge, lets you look up a high point by name and tells you which country (and maybe continent) it’s in (and it’s height).