

Computer Science 010: Design and Implementation of Solutions to Computational Problems

Assignment 8

This is an assignment that may be done individually or as a pair. If you would like to work in a pair, you are responsible for finding a partner. If you work with a partner only one person should turn in an answer and the comments should reflect both people whose work it represents.

Program #1 (95%)

Background:

You may find it surprising that one of the best sources of public information about statistics related to the health of various countries doesn't come from the U.N. but from the U.S.'s Central Intelligence Agency or C.I.A. In fact much of Wikipedia's data on countries is clearly taken from the CIA's world factbook (<https://www.cia.gov/library/publications/the-world-factbook/>).

Among the many kinds of data that you can obtain from the CIA are measures related to geography, national spending on education and military, childhood obesity and population. We are going to consider two measures. The first is life expectancy at birth. This is the expected age that someone who is born in a country will live to. This number varies widely among different countries based on access to health care, presence of war and civil disorders and income. The second is the Gini coefficient. The Gini coefficient measures the level of income inequality in a country. If everyone had exactly the same income, the score would be 0. If two people were in a country and one had all the income and the other none the country's score would be 100. Haiti has a very unequal distribution of family income and receives a score of 60.8. Sweden has a much smaller level of inequality and scores a 24.9.

Assignment:

Your assignment is to write a program which reads in life expectancy and Gini scores for countries from data provided by the CIA and creates a user interface that lets a person query for the data from a particular country.

Details:

Here is an example of the output of a run of the program you should write:

```

Please enter a country ("q" to quit): Haiti
  Life Expectancy is 63.8 years at birth
  Gini Value is 60.8

Please enter a country ("q" to quit): United States
  Life Expectancy is 79.8 years at birth
  Gini Value is 45.0

Please enter a country ("q" to quit): morocco
  No Life Expectancy Data
  No Gini Data

Please enter a country ("q" to quit): Somalia
  Life Expectancy is 52.4 years at birth
  No Gini Data

Please enter a country ("q" to quit): Fake Country
  No Life Expectancy Data
  No Gini Data

Please enter a country ("q" to quit): q

```

Let's look at some of the characteristics of this program:

- It is getting data from two files, but the user isn't entering the filenames. Instead they are "hard-coded" in the program.
- The program automatically opens, parses, and stores the data from those files
- The input is taken from the user in a loop
- The input is a country name
- The loop has a sentinel value of "q"
- After the user enters a country name the program looks up what the related data is
- The country name has to be exact. In the case of "morocco" the lowercase "m" isn't handled by the program. Nonetheless the program is able to handle that.
- In the case of "Somalia" there is no Gini data, but the program is able to print what it can.
- In the case of "Fake Country" there isn't any data at all. The program is able to handle that as well.
- When I grade this I want to see the exact same formatting:
 - The exact same prompt
 - A space after the colon
 - Two space indents for the data that is output

Challenge Problem #2 (5%)

Assignment:

If the user types an unknown country name, suggest all the countries that have the same first letter.

Details:

When you run this version of the program the output looks like this:

```
Please enter a country ("q" to quit): Haiti
Life Expectancy is 63.8 years at birth
Gini Value is 60.8

Please enter a country ("q" to quit): kowabungaville
No Life Expectancy Data
No Gini Data
Maybe you meant:
  Kazakhstan
  Kenya
  Kiribati
  Korea, North
  Korea, South
  Kosovo
  Kuwait
  Kyrgyzstan

Please enter a country ("q" to quit): Kuwait
Life Expectancy is 78.0 years at birth
No Gini Data

Please enter a country ("q" to quit): Kosovo
No Life Expectancy Data
Gini Value is 30.0

Please enter a country ("q" to quit): q
```

Here are things to notice:

- The recommendations can handle the fact that “kowabungaville” starts with a lower case, but the recommendations start with upper-case “K”s
- The recommendations don’t repeat
- The recommendations are alphabetical
- The recommendations include countries that are only in the life expectancy data (e.g, “Kuwait”) and only in the Gini data (e.g., “Kosovo”) and in both (e.g., “Kenya”)
- The recommendations are indented an additional one space