CIT 597 – Homework 2

Part 1 – Java to Ruby (30 points)

Pick a Java program that you wrote from an earlier class or personal project. Describe what the program does in 4-5 sentences in the readme.txt file.

Write an implementation for that program in Ruby.

Hint: In terms of complexity, something like 150-200 lines of Java would be ideal.

Part 2 – Jeopardy and the CIA World Factbook (70 points)

The CIA has an excellent collection of detailed information about each country in the world. It's called the CIA World Factbook. You can find it here https://www.cia.gov/library/publications/the-world-factbook/

For this assignment, you'll write a program in Ruby to get and analyze data from the CIA World Factbook website. You should not download any of the information to a local file and read from it. Your program must interact directly with the website. (This way your programs will work even when the CIA updates the Factbook, which is done every year.)

Once you have a basic program that can interact with CIA World Factbook, use it to answer the following questions. Describe in detail the algorithm you used and the answers in your readme.txt file.

1. List countries in *South America* that are prone to *earthquakes*.
2. Find the country with the lowest elevation point in *Europe*.
3. List all countries in the *southeastern* hemisphere.
4. List countries in *Asia* with more than *10* political parties.
5. Find the top *5* countries with the highest electricity consumption per capita. (Electricity consumption / population)
6. Certain countries have one dominant religion (in terms of fraction of the population) whereas other countries don't. List countries (along with the religion) where the dominant religion accounts for more than *80%* of the population. List countries (along with the religions) where the dominant religion accounts for less than *50%* of the population.
7. A landlocked country is one that is entirely enclosed by land. For example, Austria is landlocked and shares its borders with Germany, Czech Republic, Hungary, etc. There are certain countries that are entirely landlocked by a single country. Find these countries.
8. Wild card – come up with an interesting question. List the question and find the answer to it.

Note: For the italicized parts in the above, your code should be able to deal with any similar input (e.g., from a user). This should not be hard coded.

Hint: It might be easier to use the text/low bandwidth version of the website in your program.

Part 2 – Extra Credit (10 points)
In addition to the questions above, answer the following questions:

1. I want to go on a vacation with a friend. Our goal is to visit as many capital cities as we can in as short a geographical distance as possible. To make things easier (and not worry about spherical geometry), we are fine with travelling to capitals that are within *10* degrees of latitude and longitude of each other. Find the lat/long coordinates and the list of countries/capitals so that the number of capitals is maximized.
2. Wild card – come up with an interesting question. List the question and find the answer to it.

For the EC part, you cannot have any help from the TAs/instructor.

Grading Criteria
80% for functionality – Does the code work as required? Does it crash while running? Are there bugs? …
10% for design – Is your code well designed? Does it handle errors well? Do you have a lot of URLs hardcoded? To keep your code flexible, you should hardcode as few URLs as possible in the code.
10% for style – Do you have good comments in the code? Are your variables named appropriately? …

Programming – General Comments
Here are some guidelines wrt programming style for full credit.

Please follow the Ruby style as far as possible. Here's a good coding style guide (with tools) to check your programs.

https://github.com/bbatsov/ruby-style-guide

Submission Instructions
The code should be submitted electronically. Please **do not** print it out.

In addition to the Ruby files, you should also submit a text file titled readme.txt, which should contain a short write-up about your software. How to run your program, any problems you experienced, etc. Think of the readme as a combination of instructions for the user and a chance for you to get partial credit. The readme should also include the description of your Java program for Part 1 and your approach/algorithms and answers for Part 2.

Please create a folder called YOUR_PENNKEY. Places all your files inside this – the ruby files, the original java program files, the readme.txt file. Zip up this folder. It will thus be called YOUR_PENNKEY.zip. So, e.g., my homework submission would be swapneel.zip. Please submit this zip file via canvas.