Programming Project 05

This assignment is worth 80 points (8.0% of the course grade) and must be **completed and turned in before 11:59 on Monday, June 22.**

Assignment Overview

The goal of this project is to gain more practice with functions, files, exception handling, and dictionaries.

Let's tackle a political question. It is standard political dogma that Democrats "want big government" and that Republicans "create jobs." Let's see if data supports the dogma. The official source of employment statistics is the U.S. Bureau of Labor Statistics (http://www.bls.gov/data/#employment) and we have collected data for private employment and government employment. Our assumption is that if a party is creating jobs, then private employment will increase, and if a party is creating bigger government, then government employment will increase. Your job is to extract that information from the files provided.

Project Specification

There are two employment data files provided. Both have comma-separated data. Look at the headings to understand their format. Numerical values are in thousands. The data for 2015 is, of course, incomplete.
- *government_employment.txt*
- *private_employment.txt*

There is also a comma-separated file on presidents, their years, and their political party.
- *presidents.txt*

Since the transition from one term to another occurs partway through January, the last year listed for any president is the same as the first year of the next president. To keep things simple let's count January entirely for the incoming president. That is, in the file the last year listed for a president will not count. For example, George W. Bush's last year is listed as 2009 but he was president for only a few weeks that year so we will not count him as being president in 2009. Also, watch out for the "Jr." for President Carter when you are reading the file—there is an extra comma. Finally, we will consider only the full years for each president so for Obama we will not count any data from 2015 (especially since the data for March and April is preliminary, not final data).

1. Your program will prompt for the file names. Use exceptions to check that each file was opened without an error.
2. All president data can only come from the presidents.txt file, i.e. you cannot code specifics about presidents into your program. We will test your program using a file of that format, but with different entries, for example we may test on a file that has three of the lines of that file.
3. **As an academic requirement your program must define and use two functions in a meaningful way.** (Feel free to use more functions; I did.)
4. Calculate and display in columns (see sample below):
    1. the average monthly private employment for each political party
    2. the average monthly government employment for each political party
    3. the private employment of the first month and last month of each president
    4. the change in private employment from the first month to the last month of each president; report the change as both a difference and as a percentage

5. the government employment of the first month and last month of each president
6. the change in government employment from the first month to the last month of each president; report the change as both a difference and as a percentage
5. **Write a paragraph on your conclusions** of the validity of the political dogma that "Democrats want big government and Republicans create jobs." Refer to your program output as evidence for your conclusion. Put the paragraph in a separate document (either as proj05.txt, proj05.tex or proj05.doc) and hand it in. Feel free to be creative.

Deliverables

proj05.py and (proj05.txt, proj05.tex or proj05.doc) – your source code solution, and your paragraph.

1. Please be sure to use the specified file names, e.g. "proj05.py"
2. You will electronically submit a copy of the file using the "handin" program:

Hints

1. A dictionary is a good candidate for storing the employment data.
2. There is a useful formatting type for printing percentage
   ```
   print("{:6.2%}".format(1/3))
   33.33%
   ```
3. There is a useful formatting type that puts commas in numbers (either int or float):
   ```
   print("{:,}".format(123456})
   123,456
   ```

Sample Output
(note that we will test on the provided president's file as well as a subset of the file)

```
Government employment average per month (millions)
Republican:     19,019
Democratic:     19,676

Private employment average per month (millions)
Republican:     94,750
Democratic:     98,416
```

Private Employment by president (millions)

President	First Month	Last Month	Difference	Percentage
Carter	65,636	74,570	8,934	13.6%
Reagan	74,677	89,170	14,493	19.4%
Bush	89,394	90,617	1,223	1.4%
Clinton	90,904	111,919	21,015	23.1%
Bush	111,861	112,217	356	0.3%
Obama	111,398	118,690	7,292	6.5%

Government Employment by president (millions)

President	First Month	Last Month	Difference	Percentage
Carter	15,056	16,373	1,317	8.7%
Reagan	16,360	17,736	1,376	8.4%
Bush	17,774	18,878	1,104	6.2%
Clinton	18,901	20,804	1,903	10.1%
Bush	20,835	22,556	1,721	8.3%
Obama	22,579	21,902	-677	-3.0%