THE UNIVERSITY OF ARIZONA.
DEPARTMENT OF COMPUTER SCIENCE

CSc 120: Fall 2019

Assignment 01: Part 3

Start: Thu Aug 29, 2019
Due: 8:00 PM, Fri Aug 30 2019

Important: Follow the directions given *exactly*: your code will be graded by a software script, so any deviation from the program specification can result in a significant loss of credit. If you are unsure about something, ask for clarification in office hours or Piazza (however, see the class's academic integrity policy about sharing your code or using code written by others).

Please pay attention to the programming style guidelines for this class. For this assignment you will be notified of style violations but not penalized for them; style violations will be penalized in subsequent assignments.

Problem 1.

This problem involves the analysis of state-level population data; it is based on data available in https://simple.wikipedia.org/wiki/List_of_U.S._states_by_population. This is the same dataset as for problem 2 in yesterday's problem set, but the data files now contain two population values for each state (see below), and you have to compute which state/territory had the biggest percentage change in population.

Write a program, in a file named **pop_chg.py**, that behaves as follows:

- It prompts the user for a file name using the Python statement

  ```
  input("file: ")
  ```

  processes each line of the file specified as described below, and prints out the data collected.
- **Processing lines:**
  - If a line begins with the character **#** the line is a comment and should be ignored.
  - Otherwise, the line has the following format:

    ```
    name_of_a_state  2019_popn  2010_popn
    ```

    (where `name_of_a_state` can be multiple words, e.g., `New York`). Process these lines as follows:
    - Compute the relative change in population from 2010 to 2019 compared to 2010:

      ```
      chg = (2019_popn - 2010_popn)/2010_popn
      ```
    - keep track of the states that have the highest relative change. If there is a tie, keep track of all of the states that tie for highest relative change.
    - print out the state(s) with highest relative population change using the statement

      ```
      print("{}: {:f}".format(state_name, popn_change))
      ```

If there is a tie and there is more than one state with highest relative population change, print them out in the same order as they were in the input file.

Input file format

The input file is a text file where each line consists of the name of a US state or territory together with its 2019 population (estimated) and its 2010 population, e.g.:

```
# State    pop:2019     pop:2010
Kansas    2911505    2853118
U.S. Virgin Islands  104914 106405
Louisiana    4659978    4533372
Kentucky    4468402    4339367
```

Programming hints and gotchas to watch for:

- Consider using **split()** to break input lines into its components.
- Note that, as in the example shown above, some state/territory names may consist of more than one word. The 2010 population will always be the last entry of each line, and the 2019 population will always be the second-to-last entry on each line..
- Remember that input values read from a file are strings; in order to do arithmetic on them you will have to convert them to numbers where necessary.

Here are a few input files you can use for trying out your code (feel free to also create your own from this master data set):

File name	Expected output
pop1.txt	file
pop2.txt	file
pop3.txt	file
pop4.txt	file
pop5.txt	file