CAP4630/5605 Project 1 – Python Basics

Due Date: Sunday, 1/27/2019 11:59 PM

Submit the zipped Python program including at least Project1.py and States.csv. The zip file should be named <your last name>_Project1.zip (for example, Liu_Project1.zip). The program should be well documented including inline comments and docstrings. I give some suggestions for docstrings below. More can be found in PEP-8 (https: //www.python.org/dev/peps/pep-0008/) and PEP-257 (https://www.python. org/dev/peps/pep-0257/).

Requirements:

1. Create a class named **State** that will store information about a US state and provide methods to get, and set the data, and compare the states.
    a. Data attributes: State Name, Capital City, State Abbreviation, State Population, Region, US House Seats
    b. Initializer (__init__)
    c. Getter and setter methods for each field
    d. __gt__ method so that two State objects can be compared based on state names
    e. __str__ method so that a state object can be printed like a string
2. Create a program that will:
    a. Read a file (csv) of states and create a list of state objects containing that data.
    b. Offer the user the following options:
        1) Print a state report
        2) Sort by state name (using **Quick** Sort)
        3) Sort by population (using **Radix** sort)
        4) Find and print a given state (using **binary** search if the data is sorted by state name, **sequential** search if not)
        5) Quit
    c. Implement the given option, then prompt again. (deal with invalid choice)

    Your program should have functions for options 1-5.

    d. The State report in option 1 should be in this form:

```
State Name    Capital City  State Abbr  State Population  Region           US House Seats
-------------------------------------------------------------------------------------
Florida       Tallahassee       FL        19,552,860      South              27
Pennsylvania  Harrisburg        PA        12,773,801      Middle Atlantic    18
Massachusetts Boston            MA         6,692,824      New England         9
```

    e. The State report in option 5 should be in this form:

```
State Name:         Florida
Capital City:       Tallahassee
State Abbr:         FL
State Population:   19,552,860
Region:             South
US House Seats:     27
```

CAP4630/5605 Project 1 – Python Basics

Provide docstring comments:

Comments for a module (**must** be at the top):

```
"""
Detailed description of the module.

Author: <your name>
Version: <date you last changed the class>
Email: <your UNF email>
"""
```

Comments for a function definition (**must** be the first thing inside the function):

```
"""
Description of the purpose of the function, the meaning of the
input parameters (if any) and the meaning of the return values
(if any).
:param  parameter  description of the parameter (one for each)
:return description of the return value
:raise exceptions that may be raised in this function
"""
```

Comments for a class definition (**must** be the first thing inside the class)

```
"""
Detailed description of the class.
"""
```

CAP4630/5605 Project 1 – Python Basics

Example Ouput:

```
CAP4640/5605 Project 1
Instructor: Xudong Liu

Enter the file name: States.csv

There were 50 state records read.

1. Print a state report
2. Sort by State name
3. Sort by Population
4. Find and print a given state
5. Quit
Enter your choice: 1

State Name    Capital City  State Abbr  State Population  Region            US House Seats
-------------------------------------------------------------------------------------------
Louisiana     Baton Rouge      LA       4,625,470         South                6
Wisconsin     Madison          WI       5,742,713         Midwest              8
New Mexico    Santa Fe         NM       2,085,287         Southwest            3
. . .

1. Print a state report
2. Sort by State name
3. Sort by Population
4. Find and print a given state
5. Quit
Enter your choice: 3

States sorted by Population.

1. Print a state report
2. Sort by State name
3. Sort by Population
4. Find and print a given state
5. Quit
Enter your choice: 1

State Name    Capital City  State Abbr  State Population  Region            US House Seats
-------------------------------------------------------------------------------------------
Wyoming       Cheyenne         WY       582,658           West                 1
Vermont       Montpelier       VT       626,630           New England          1
North Dakota  Bismarck         ND       723,393           Midwest              1
. . .

1. Print a state report
2. Sort by State name
3. Sort by Population
4. Find and print a given state
5. Quit
Enter your choice: 4

Enter the state name: Florida
```

```
Sequential search

State Name:         Florida
Capital City:       Tallahassee
State Abbr:         FL
State Population:   19,552,860
Region:             South
US House Seats:     27

1. Print a state report
2. Sort by State name
3. Sort by Population
4. Find and print a given state
5. Quit
Enter your choice: 4

Enter the state name: Canada
Sequential search

Error: State Canada not found

1. Print a state report
2. Sort by State name
3. Sort by Population
4. Find and print a given state
5. Quit
Enter your choice: 2

States sorted by State name.

1. Print a state report
2. Sort by State name
3. Sort by Population
4. Find and print a given state
5. Quit
Enter your choice: 1

State Name    Capital City  State Abbr  State Population  Region            US House Seats
-------------------------------------------------------------------------------------
Alabama       Montgomery       AL       4,833,722         South                7
Alaska        Juno             AK       735,132           West                 1
Arizona       Phoenix          AZ       6,626,624         Southwest            9
. . .


1. Print a state report
2. Sort by State name
3. Sort by Population
4. Find and print a given state
5. Quit
Enter your choice: 4

Enter the state name: Kentucky
```

CAP4630/5605 Project 1 – Python Basics

```
Binary search

State Name:         Kentucky
Capital City:       Frankfort
State Abbr:         KY
State Population:   4,395,295
Region:             South
US House Seats:     6


1. Print a state report
2. Sort by State name
3. Sort by Population
4. Find and print a given state
5. Quit
Enter your choice: 23
Invalid choice enter 1-5: 0
Invalid choice enter 1-5: A
Invalid choice enter 1-5: 5

Have a good day!
```