

# CAP4630/5605 Project 1 – Python Basics

**Due Date: Friday, 1/27/2018 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
```

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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.
"""
```

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## 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**

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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**

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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!