CECS 277 – Lab 4 – File IO

State Capitals Quiz

Create a program that quizzes the user on the state capitals. Use the file (StateCapitals.txt) provided on Canvas to create the quiz questions.

Create the following functions:
1. `read_file_to_dict(file_name)` – each line in the file is in the format: `state,capital`. Read in each line, separate the state and the capital, and store them as a key:value pair in a dictionary. Return the filled dictionary.
2. `get_random_state(states)` – pass in the states dictionary. Convert the dictionary to a list of key:value pairs, then choose a random key:value pair from the list and return it. This returned value will be used as the correct state:capital pair for each question.
3. `get_random_choices(states, correct_capital)` – pass in the states dictionary and the capital of the correct answer. Convert the dictionary to a list of values and choose 3 incorrect choices from this list. These incorrect choices should be different from the correct capital and also different from each other. Place the three incorrect capitals and the correct capital in a list. Shuffle and then return the list.
4. `ask_question(correct_state, possible_answers)` – pass in the name of the correct state and the list of 4 possible answers. Display the question to the user and the four possible answers. Take in the user's selection and check that it is an A, B, C, or D. If it isn't, then display an 'Invalid' message and repeat until the user enters a valid choice. If it is, then convert the input to 0-3 (A=0, B=1, C=2, D=3) and return the value.

Your main should read in the file then have a loop that repeats 10 times, one for each of the quiz questions. For each quiz question, choose a random state (repeats are allowed) as the correct answer, generate the possible answers, get the correct choice by searching the possible answer list for the correct capital, display the question number, and then ask the quiz question. Compare the user's selection (0-3) against the location of the correct capital (0-3). If the user was correct, display a congratulatory message and give them a point, otherwise, tell them that they were incorrect and display the correct answer. After all 10 questions are finished, display the total points they received.

Partial Example Output (user input is in italics)**:**

```
- State Capitals Quiz –
1. The capital of New Mexico is:
     A. Phoenix   B. Lansing   C. Santa Fe   D. Cheyenne
Enter selection: G
Invalid input. Input choice A-D.
Enter selection: B
Incorrect!  The correct answer is: Santa Fe.
2. The capital of Florida is:
     A. Tallahassee   B. Dover   C. Honolulu   D. Sacramento
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Enter selection: A
Correct!
...
10. The capital of California is:
     A. Hartford   B. Sacramento   C. Montgomery   D. Juneau
Enter selection: B
Correct!
End of test.  You got 8 correct.
```

Notes:
1. You will need to use several list and dictionary functions, so it would be a good idea to review those lectures.
2. Use the random module to randomly choose from a list and to shuffle a list. You can review the reference document for random numbers on Canvas.
3. Do not create any extra functions or add any extra parameters or return values.
4. Please do not create any global variables, instead pass variables as arguments to the functions and return values back when needed.
5. You don't need the `check_input` module, but your `ask_question` function should be similar in that it always returns a valid input. It should repeatedly check the input until a valid input is entered.
6. Follow the guidelines in the Coding Standards reference document on Canvas.
7. Use docstrings to document each of your functions.
8. Place your name, date, and a brief description of the program in a comment block at the top of your program. Place brief comments throughout your code.
9. Thoroughly test your program before submitting.
   a. Make sure that you read in all 50 states and their capitals into the dictionary.
   b. Make sure that you choose a random state for every question.
   c. Make sure that your choices list always has 4 answers, one of them is the correct answer, and the others are random capitals that are not the correct one and are different from each other.
   d. Make sure that the questions are correctly numbered.
   e. Make sure that the question displays in the correct format.
   f. Make sure that the user can only input A-D and it converts it properly into 0-3.
   g. Make sure that the user's answer is checked properly.
   h. Make sure that the user's points are counted properly.
   i. Make sure the final total is correct.

State Capitals Quiz Rubric – Time estimate: 4 hours

State Capitals Quiz 10 points	Correct. 2 points	A minor mistake. 1.5 points	A few mistakes. 1 point	Several mistakes. 0.5 points	No attempt. 0 points
read_file_to_dictionary function: 1. Passes in string for file name. 2. Opens file. 3. Reads in each state with its capital. 4. Stores each line as a key-value pair. 5. Stores each pair in the dictionary. 6. Returns the filled dictionary.					
get_random functions: 1. get_random_state passes in dictionary and returns a random state/capital pair (as a tuple). 2. get_random_choices passes in dictionary and correct capital (string). 3. Randomly selects 3 other capitals to populate list of choices. 4. All capitals in list are different from each other. 5. Correct answer is in the list. 6. Returns a shuffled list of choices.					
ask_question function: 1. Passes in the correct state as a string and the list of choices. 2. Displays the question to user. 3. Prompts user for choice (A-D). 4. Validates user input. 5. Returns user input as an integer 0-4.					
main function: 1. Initializes dictionary. 2. Repeats 10 times for 10 questions. 3. Uses functions to generate and ask questions. 4. Compares answer to user's choice to display if correct or incorrect. 5. Counts questions the user got correct and displays at the end of the quiz.					
Code Formatting: 1. Correct documentation (docstrings). 2. Correct spacing. 3. Meaningful variable names. 4. No global variables. 5. Main code in main function.					