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W200: Introduction to Data Science Programming

Overview

For Project 1, I plan on expanding on the Scrabble homework and making it a fully functional game (I have received permission from Prof. Benoit to reuse the code from homework). It will be a two player game with the following details:

- Players will each have a rack of letters
- Players can spell words based on their letters
- The game will validate players' words
- The game will keep track of score

Classes

BoardGUI

- Description: GUI that draws the board and instantiates the playing area
- Attributes
    - Window Size - width of the GUI in pixels
- Methods
    - Initialize board - draws the Scrabble board and gives it a title
    - Update board - updates the Scrabble board when a player plays a word
    - Initialize letter racks - draws the letter racks for Players 1 & 2
    - Update rack - updates the rack when players play their letters or draw new ones
    - Initialize score box - draws the outline of the score box
    - Update score - updates the score box as players play words

Board

- Description: the actual board that contains empty spaces and spaces occupied by letters
- Attributes:
    - Scrabble Board - a 15 x 15 matrix that holds all the spaces on the board and whether each space is occupied by a letter or not
- Methods:
    - Add word to board - ensures that the user is able to add the word they spelled to the board. If so, it is added to the Scrabble Board.

Letter Bag

- Description: object for the bag of letters that are available in the game. The main one used during game play will lose letters as users pick from the bag.
- Attributes
    - Letter data - a dictionary form of the JSON file with the letters, the number of tiles, and the scores
    - Letter distribution - a dictionary that contains all the letters as keys, with the number of tiles as the value

    - Letter scores - a dictionary that contains all the letters as keys, with the number of tiles as the value
- Methods
    - Get letters - converts the JSON file of the letters, tile count, and score into a dictionary
    - Get tile distribution - converts the letter data into a dictionary with the format, letter: tile count
    - Get letter scores - converts the letter data into a dictionary with the format, letter: score

Letter Rack

- Description: object for the rack of letters that each player has and can choose from
- Attributes
    - Letters - a list of the letters that the user has in their rack
    - Letter count - count of the letters that the user has on their rack
- Methods
    - Pick Letters - draws letters from a letter bag until the player has 7 letters and stops when there are no letters left in the bag
    - Shuffle - randomizes the order the letters appear on the players rack

Scrabble Dictionary

- Description: the object for all words that are valid words in Scrabble
- Attributes:
    - Scrabble dictionary - a list that contains all words that are valid words in Scrabble
- Method:
    - Generate data - takes a file that is a list of words and returns the data in Python list format
    - Check valid word - check's a user input to see if it's a valid word

Player

- Description: a player in the game
- Attributes:
    - Is current player - a boolean to indicate if it is that player's turn yet
    - Rack - that player's rack
    - Score - that player's score
- Methods:
    - Make word - takes user input for a word based on the user's letters
    - Add score - adds the score of the word that the user entered (if it is valid)

Game Engine

- Description: runs the game and allows players to take their turns
- Attribute:
    - Current player - either p1 or p2 depending on whose turn it is
- Methods
    - Switch active player - changes current player to the other player