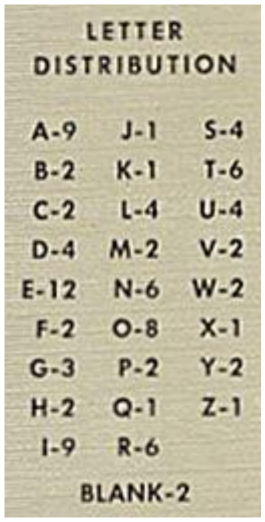
COMP 4610 GUI I

HW5
Implementing a Bit of Scrabble with Drag-and-Drop (with Extra Credits)

What This Assignment Is About



LETTER DISTRIBUTION

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The purposes of this assignment are to give you additional experience working with the jQuery UI and to pull together much of what we've been doing throughout the semester. You are to implement **a bit** of the game of Scrabble using drag-and-drop. **The idea is to display one line of the Scrabble board (one line sample) to the user along with seven letter tiles on a tile rack.** The user then drags tiles to the board to make a word, and you are to report his or her score, taking the letter values and bonus squares into consideration.

If you are not familiar with Scrabble, check out this video:
https://youtu.be/dSXSYwBBTFs

For more information about Scrabble, see
https://en.wikipedia.org/wiki/Scrabble and http://scrabble.hasbro.com/en-us/rules.

Below are two examples from students' submission in the past. **Please note that borrowing any code from these students are strictly prohibited and would be carefully checked for plagiarism.**

- An example of one-line Scrabble board implementation can be found here (please note that NOT all requirements are met here):
  http://yongcho.github.io/GUI-Programming-1/assignment9.html
- An example of the Full Scrabble board lines implementation (for extra credit) can be found here:
  https://downing.io/GUI/assignment9_v2.html

There are several pieces that you need to pull together to create this program, they are also provided as a zip (graphics_data.zip) in your homework:

- a data structure containing the actual letter tile distribution of the game and the value of each tile
  - there are 100 tiles in all, in the distribution shown at the right
  - Consider what data structure/format you want to use to store this distribution.
  - One possible JSON structure is attached and can be found here. (from students: Ramon Meza and Jason Downing)
  - Another associative array version of the data structure is also attached and can be found here (from Prof. Heines) and you can find a test program here.
- graphics of the tiles themselves

    - the linked file shows all the letter tiles in a single graphic, which someone will have to separate out into individual files
    - note that the linked file does *not* show all 100 letter tiles
    - graphics of all of the individual tiles can be found on this page
- Tile Rack
- graphics of the individual board spaces

There are many features that you can add to this program. One of the most obvious is a button that "deals" another seven random letter tiles so that the user doesn't get "stuck" if he or she can't make a word out of the letter tiles that were dealt. I'm sure that you can think of others that will improve the user experience. Be creative. This really should be fun as well as educational.

Please note that we expect to see very different levels of sophistication and completeness of this assignment. That's fine. No matter how far you get, you will definitely learn.

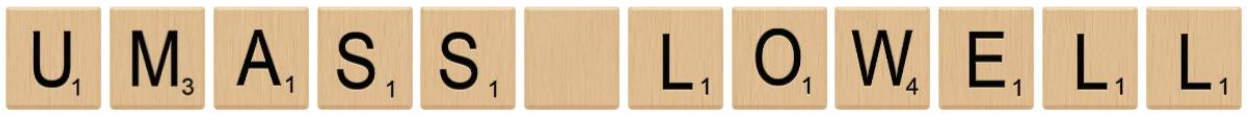
We also expect people to help each other by sharing data structures, graphics, and even algorithms. Please use Piazza as a medium to share. That's fine, too, but **remember that when you use others' work or share yours with another student, you must always document where and from whom your various components came from and with whom you shared yours.**

What You Are To Do

2. Refer to the jQuery UI documentation and examples on the jQuery UI website.

3. Begin your development by programming and testing dragging-and-dropping one graphic (the source) to another (the target) to ensure that you know how to do that.

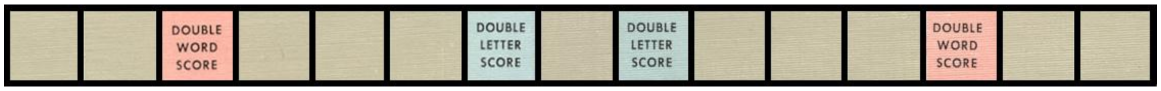
4. Next, add multiple graphic sources and multiple graphic targets and write code that allows you to identify which source was dropped on which target. The use of this and $(this) can be tricky here, so you'll need to explore the examples on the jQuery UI website and do some experimentation with your own graphics.



5. Implement the "rack" (which can just be an area of the screen) to hold the user's letter tiles. Each tile must be a single draggable image.

6. Implement a single row of the Scrabble board as a series of images, each of which is a drop target. You may use this **one-line sample** or extract any one-line from the scrabble

board. **However, your single line must include at least __two different types of bonus squares__**.



For example, The following row does not satisfy our requirement as it has only one type of bonus square – "double word score"

DOUBLE WORD SCORE
DOUBLE WORD SCORE

7. Implement the algorithm to identify which letter tile was dragged to which block.

8. Implement the algorithm to tally the score of the user's word after he or she somehow indicates that all the tiles in the word have been completely played.

9. Add other features to enhance your program.

10. Test your page thoroughly. Try to anticipate all the errors that a user might make, whether intentional or unintentional. Make sure that you handle each possibility.

11. Have a friend run your application and try to "break" it. Plug any "holes" that your friend finds in your application and/or its validation scheme.

12. **Create a __write-up document__** describing what features are currently working, partially working, and fully working.
13. Finally, here are some helpful links for various topics related to this homework. We will discuss and post more on Piazza:
    1. How to get current position of an image in jQuery?
    2. Jquery - add image at specific co-ordinates
    3. Dictionary Lookups in JavaScript (extra credit part)

14. If you implement any "extra credit" features, please explain them on your "readme" file.
    - (5 point) Implement full Scrabble board lines.
        - This homework only requires a one line version of scrabble, if you challenge yourself to create the full scrabble board, you will earn extra credit.
    - (2 points) Validating to see if a word that the user enters is valid.
        - Word validation is not required, but extra credit will be given for those who implements this feature. A dictionary can be found on your system from /usr/share/dict/words

Submitting Your Assignment for Grading

Please submit on Blackboard:

1. Readme file:
   a. GitHub URL where your application resides
   b. Link to your Github repository
   c. The write up: Describe the implemented features and their status.

2. All related code as a zip

How You Will Be Graded

This assignment will be graded on a 48-point system with points awarded as follows. Please note that the lists of features provided below are not meant to be exhaustive. They are merely representative of the types of things we are looking for in each grading category.

Criteria (numbers in parentheses are the points that can be earned for that bullet item)	***Possible Points***
Program Integrity / Design • (4) letter tiles in the player's "hand" are selected randomly from a data structure with the proper distribution of the letters (code!) • (4) letter tiles can be dragged-and-dropped onto target Scrabble squares • (4) program identifies which letter tile is dropped onto which Scrabble square • (4) board includes at least two bonus squares • (4) score is tallied correctly, including consideration of bonus square multipliers • (3) any number of words can be played until the player wishes to quit or depletes all tiles • (3) the board is cleared after each round so that a new word can be played • (3) after playing a word, only the number of letter tiles needed to bring the player's "hand" back to 7 tiles are selected • (3) score is kept for multiple words until the user restart a new game (implement next vs. restart) • (2) Tiles can only be dragged from the "rack" to Scrabble board. If the user drop them anywhere else, they will be bounced back to the "rack". • (2) Once the tile is placed on the Scrabble board, it can be moved back to the "rack". • (2) Except for the first letter, all sub-subsequent letters must be placed directly next to or below another letter with no space. Else, they will bounce back to the "rack". • (2) user can always restart the game.	40
Source Code Documentation and Formatting • **Complete write-up** about implemented features • user name and pertinent contact information appear in all source files • ***all*** files contain adequate explanatory documentation that is meaningful and does not merely echo code • ***all*** files are properly indented and formatted with adequate white space for readability • ***any sources used are cited in comments embedded within code***	8
Extra Credit • (5 point) Full Scrabble board lines are implemented • (2 points) Validating to see if a word that the user enters is valid (from /usr/share/dict/words)	7