THE UNIVERSITY OF THE WEST INDIES
Department of Computing
COMP2130 – Systems Programming (Semester II, 2018)
Lecturer: Dr. Kevin Miller
Final Project [25 Marks]

Problem Definition

In your final project, you will be tasked to create a terminal based client/server scrabble like game in groups of a maximum of three (3) members. The name of this game is MyScrabble. This game is played between two human players (clients) on a 8 x 8 grid as shown in Figure 1. The aim of the game is to spell words with 4 or more letters. Each letter has a value as shown below, so therefore, a player's score for a word is calculated by using these values. A *words.txt* file will be provided to check against for valid words. The game should begin by the server randomly placing 10 letters on the board. You are given some helper code to help with displaying and basic manipulation of the board.

```
SCRABBLE_LETTER_VALUES = {
   'A': 1, 'B': 3, 'C': 3, 'D': 2, 'E': 1, 'F': 4, 'G': 2, 'H': 4, 'I': 1, 'J': 8, 'K': 5, 'L': 1, 'M': 3, 'N': 1, 'O': 1, 'P': 3,
'Q': 10, 'R': 1, 'S': 1, 'T': 1, 'U': 1, 'V': 4, 'W': 4, 'X': 8, 'Y': 4, 'Z': 10
}
```

Rules:

1. To get a score for a word, the last letter played should start a word in any direction. This rule is included to simplify the game. For example, if the following letters are on the board “tao” and “b” is placed after “o” then the word become “boat”.

2. The clients will take turns in placing a letter on the board. The clients must either place a letter on the board or ask the server to quit the game.

3. The game ends when there are no more empty squares on the board, or one of the player types 'quit'

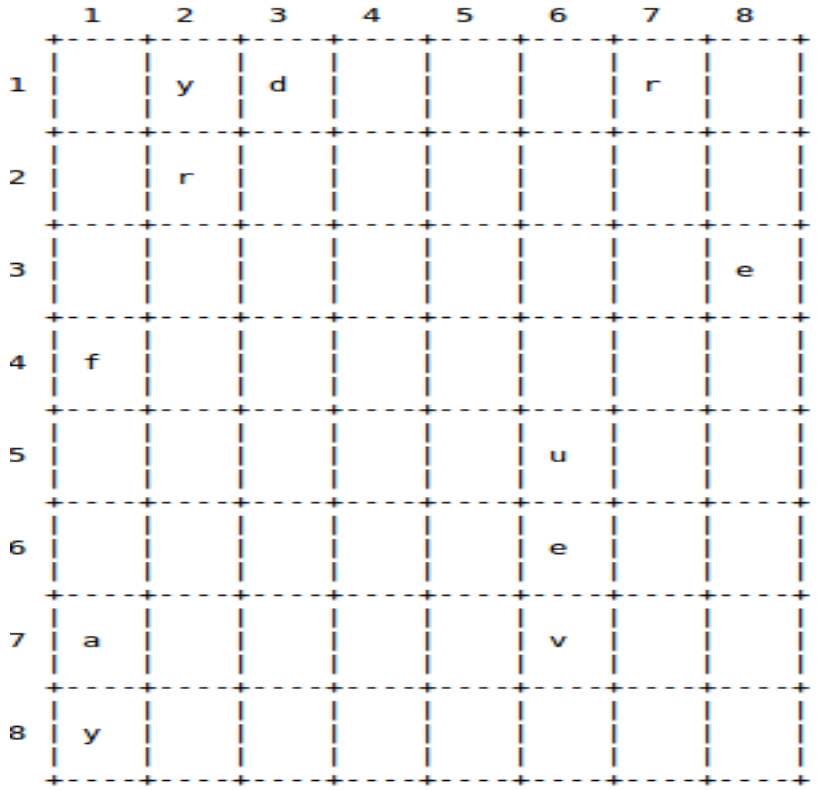
The Role of the Server

The server will obviously be doing most of the work. It will be responsible for drawing and manipulating the 8 x 8 grid and managing the playing of game giving each client a turn. All display will be done on the server.

The Clients

The client will interact with the server by sending the position to place the letter on the board using xy coordinates and the letter to be placed. This will serve as input to the `makePlay(int x, int y, char * c)` function, eg. `makePlay(3,4, “a”)`.

Figure 1



Your implementation must at least create the following functions:

Function 1:

You need to create a function `getPlayerMove()`. This function must first ask for the letter to play or for the user to type 'quit' if they want to end the game. This function should then get the x and y coordinates on the grid to place the letter in the form xy. Therefore, if the position that the player wants to move is x = 4 and y =7, the player should enter xy.

Function 2:

Create a function `calculateScore(char * word)`. This function should take a word and calculate the score for that word based on the dictionary like structure that holds the letter values. Function should return the score for the word.

Function 3:

Create a function `isOnBoard(int x, int y)`. This function should take and `x` and `y` coordinate and return an integer to represent True if the coordinates are on the board or an integer to represent False if they are not.

Function 4:

Create a function `startBoard()`. This function uses the board to randomly position 10 letters on the board.

TIPS

Make sure you use functions appropriately.
Your code should be properly commented.
Break down the problems into small workable units and create associated functions.

BONUS MARKS

1. Allow the client to request a change to the default behavior of the server in that the display board functionality is available to the clients. This means, instead of the server doing the display of the board, the required data is sent to the client after each play so that the client can now see the board without looking at the server.

NB: *Bonus marks can only be given if you have completed the requirements for the game.*

DEADLINE: APRIL 15, 2018 @ 11:59PM (*A submission link will be created)*

**** THE END ****