Object Oriented Methodology
2nd Semester Project
Scrabble Game

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Introduction

Scrabble is a word game in which two to four players score points by placing tiles, each bearing a single letter, onto a game board divided into a 15×15 grid of squares. The tiles must form words that, in crossword fashion, read left to right in rows or downward in columns, and be included in a standard dictionary. This project implements the game in C++ language using the concepts of object oriented methodology.

Instructions

1. This game will be according to the number of turns i.e, if we choose to have two turns then the game will end after two turns.
2. It will have maximum 4 players and minimum 1 player. 1 player can also play to test his or her knowledge of dictionary words.
3. Each player will be given a set of 7 letters at the start of the game and after every turn vacancy in the set will be filled by new letters.
4. From that set each player will have to make a word of any number of letters (max 7) and the letters used for making that word will get deleted or removed from the set of that player.
5. Words will then be checked in the dictionary. If the word is valid the player will get points equal to the sum of values of letters else zero point.
6. Player with maximum points will be the winner.

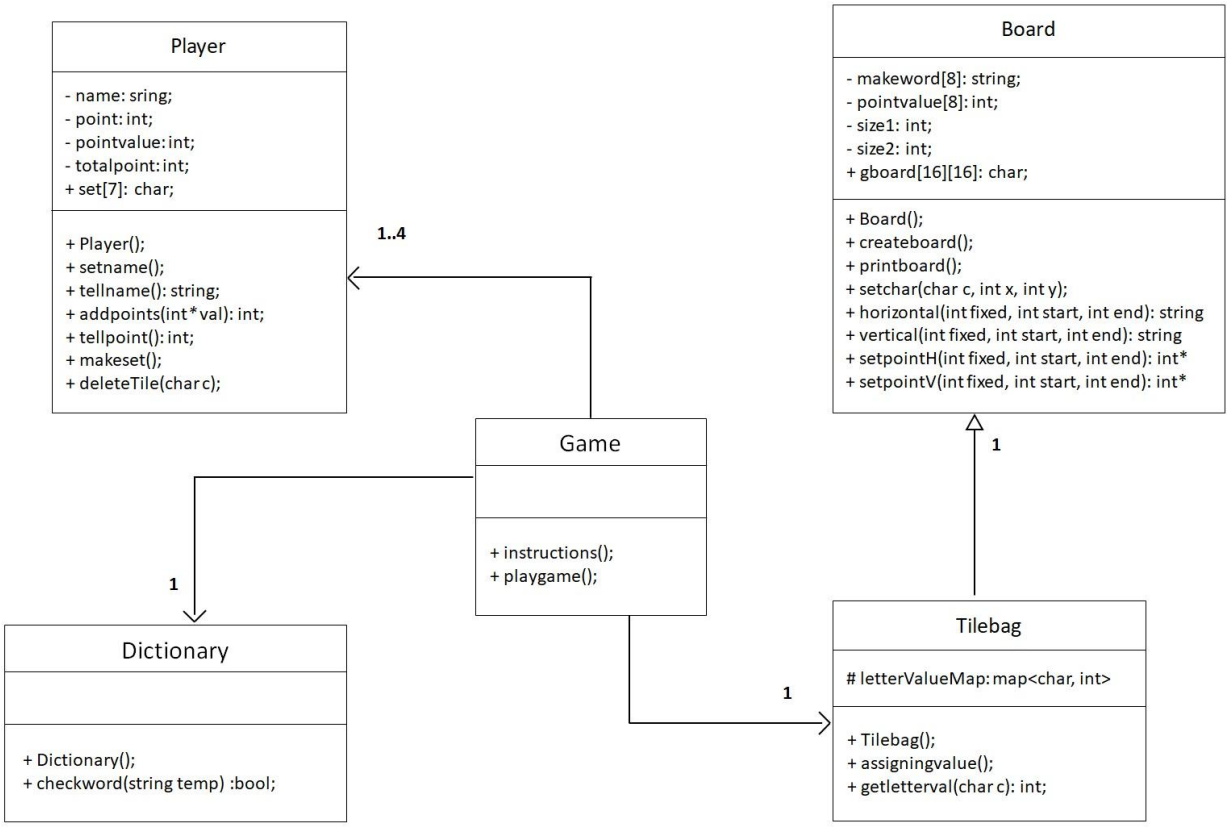
Objective of the project

- Design a software that simulates scrabble game.
- Design a well formatted graphic interface for the playing of the game.
- Maintain a one player or more setting for the game.
- Scoring of players.
- Determining the winner at the end of the games.

Classes

- Game
- Board
- Dictionary
- Player
- Tilebag

Class Diagram



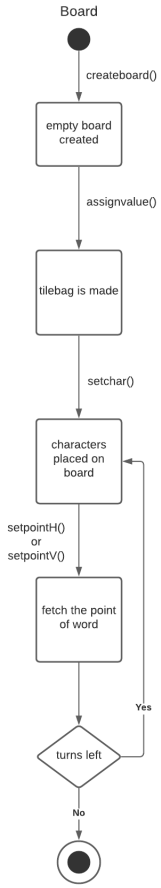
Individual Class Analysis

Game

- The game class is the main function which is executed at the beginning. It consists of three options
    - Begin game
    - How to play
    - Exit
- Once the game begins the user can select the number of players and the player names through the player class.
- The number of turns the players play has to be set by the user/player.

Board

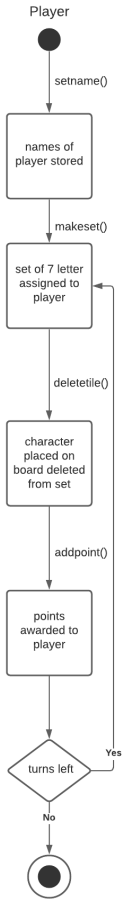
- Once the game begins, a board object is created and an empty board printed onto the screen.
- The board is the derived class of superclass tilebag.
- Then the player sets the characters on board and the word made is sent to dictionary class to check if the word exists.



a) State diagram of board

Player

- A player object is created for each player which contains the name and points of the player.
- A set of 7-random letters is assigned to each player which is updated for vacancies after each turn.



b) State diagram of Player

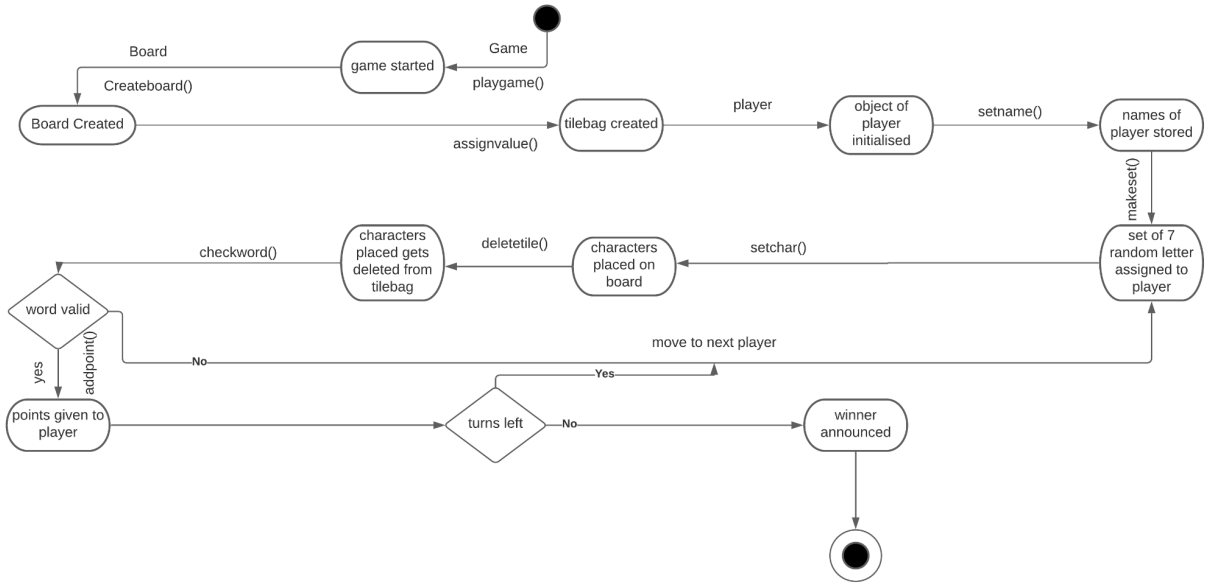
Dictionary

- A dictionary class contains a function which checks if the input word by the player is valid.
- The function cross references the word through a dictionary text file (Words.txt).

Tilebag

- The tilebag class initializes points value for the letters of the alphabet.
- The function getletterval() takes a character as input and returns the points for the character.

Activity Diagram



How to play

- Run the game with the executable Scrabble_Game.
- Choose whether you want to see the instructions or play the game in the main menu.

```
1. Read Instructions for Game
2. Play Game
3. Exit
Enter your choice : 1

--- INSTRUCTIONS FOR GAME ---

1. This game will be according to number of turns i.e., if we choose to have two
   turns then game will end after two turns.
2. It will have maximum 4 players and minimum 1 player. 1 player can also play
   to test his or her knowledge of dictionary words.
3. Each player will be given a set of 7 letters at start of game and after every
   turn vacancy in set will be filled by new letters.
4. From that set each player will have to make a word of any number of letters
   (max 7) and the letters used for making that word will get deleted or removed
   from set of that player.
5. Word will be then checked in dictionary. If word will be valid player will get
   points equal to the sum of values of letters else zero point.
6. Player with maximum points will be winner.

----------------------------------------

1. Read Instructions for Game
2. Play Game
3. Exit
Enter your choice : 2
This is Constructor of Tilebag Class
This is Constructor of Board Class
This is Constructor of Dictionary Class
creating Board
How many turns' game you want??
2
Enter number of Players (Max 4)
2
Enter Player names
Player 1 : Sakshi
Player 2 : Harsh
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Creating Players...
```
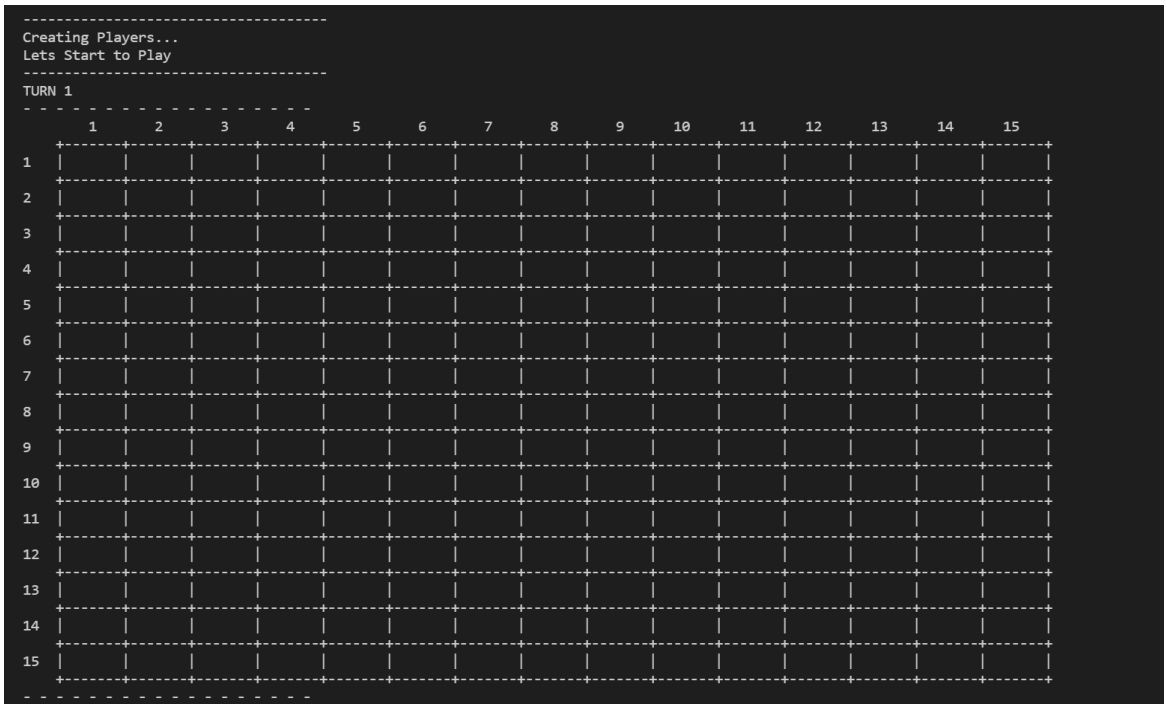
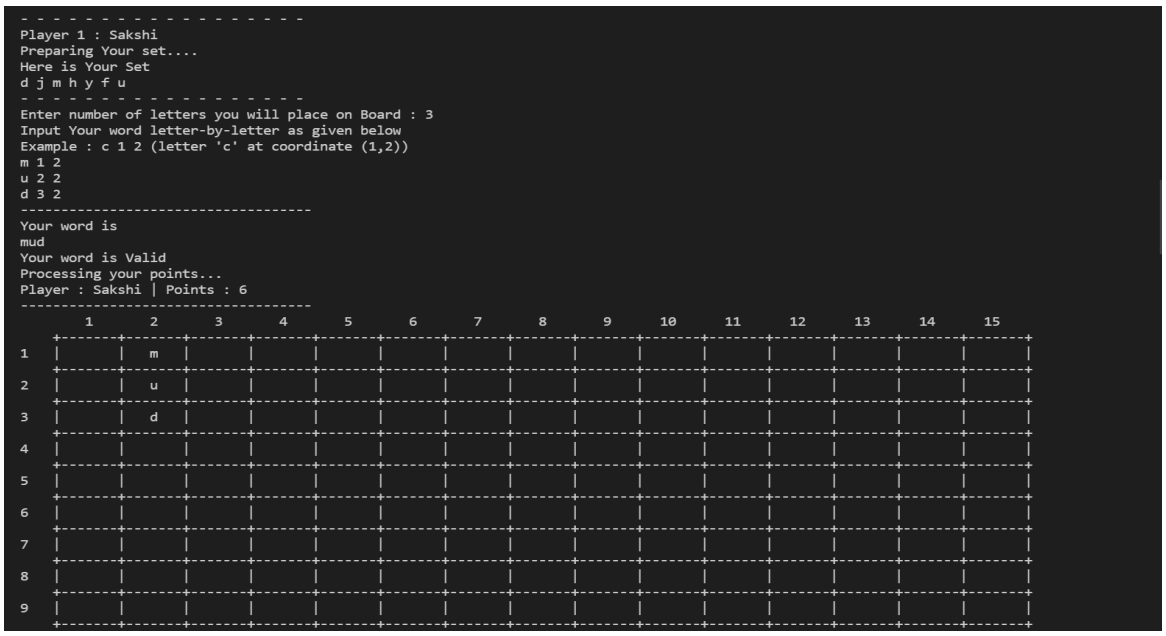

- Mention the number of turns you want to play the game.

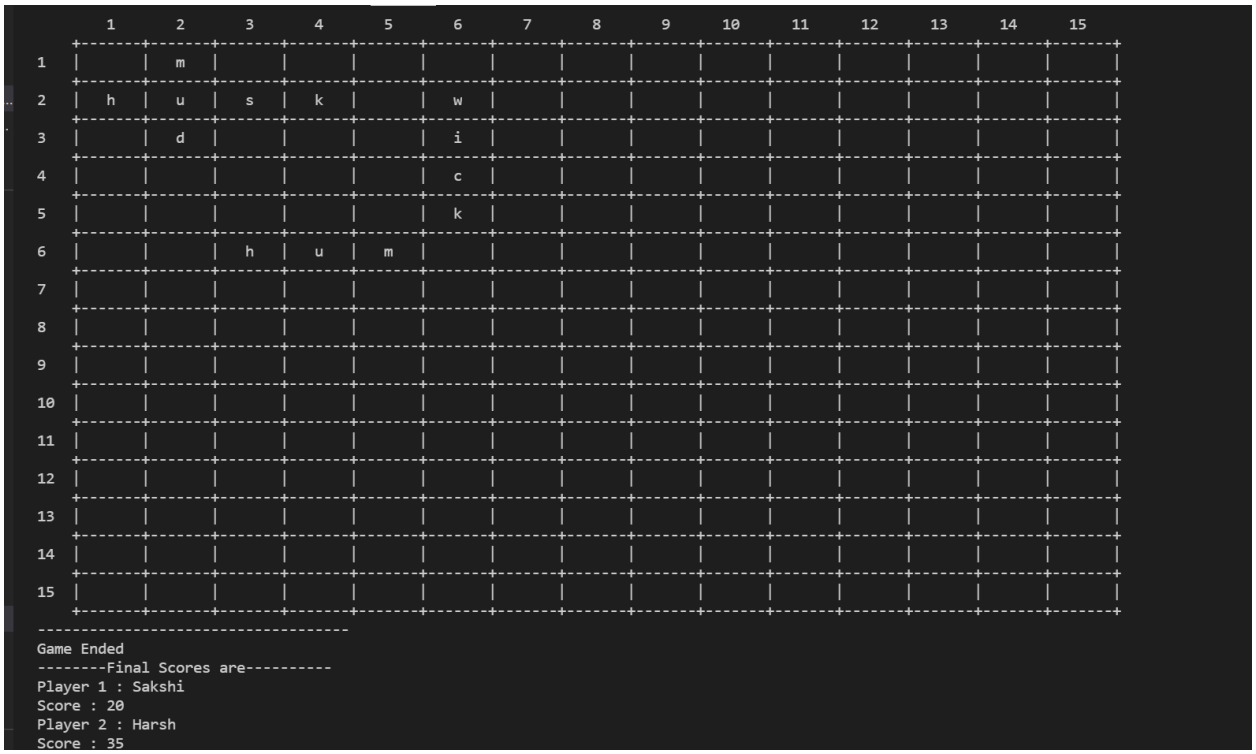
- Select the number of players(1-4) and their names.



- Make a word from the given set and input the word along with their position.
  For Eg: “c 1 2” where c is the first letter, 1 is the position on x axis and 2 is the position on y axis.
- If the word is valid then player will get points equal to sum of individual points of letter and else it's next player's turn and current player will not receive any points.



- And that word will be then displayed on board.



- This will continue for each players till the number of turns get completed. Then final the score is calculated and displayed.
- Player with maximum points would be winner.