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Report

Class Requirements

LetterTile:

- Variables:
  - Letter
  - Point value of each letter
- Functions:
  - Get letter
  - Get point value of each letter

LetterRack:

- Variables:
  - Array of letter tiles
  - Size of array
  - Number of tiles in the rack
- Functions:
  - Remove a specific letter tile from the rack
  - Fill rack
  - Print rack
  - Exchange tiles
  - Get the number of tiles in the rack
  - Access operator for the tiles in the rack
  - Check if a specific letter is in the rack
  - Replace tile

LetterBag:

- Variables:
  - Vector of letter tiles
- Functions:
  - Add tiles
  - Check if the bag is empty
  - Draw a random tile

Square:

- Variables:
  - ○ Default empty square

GameBoard:

- Variables:
    - 2D vector of squares
- Functions:
    - Check if the word can be placed at the provided location
    - Prints the current board
    - Places a word on the board if placement was valid
    - Initialize the board
    - Get the tile at a specified position
    - Get all possible words formed from word placement
    - Check all words formed by placement are valid

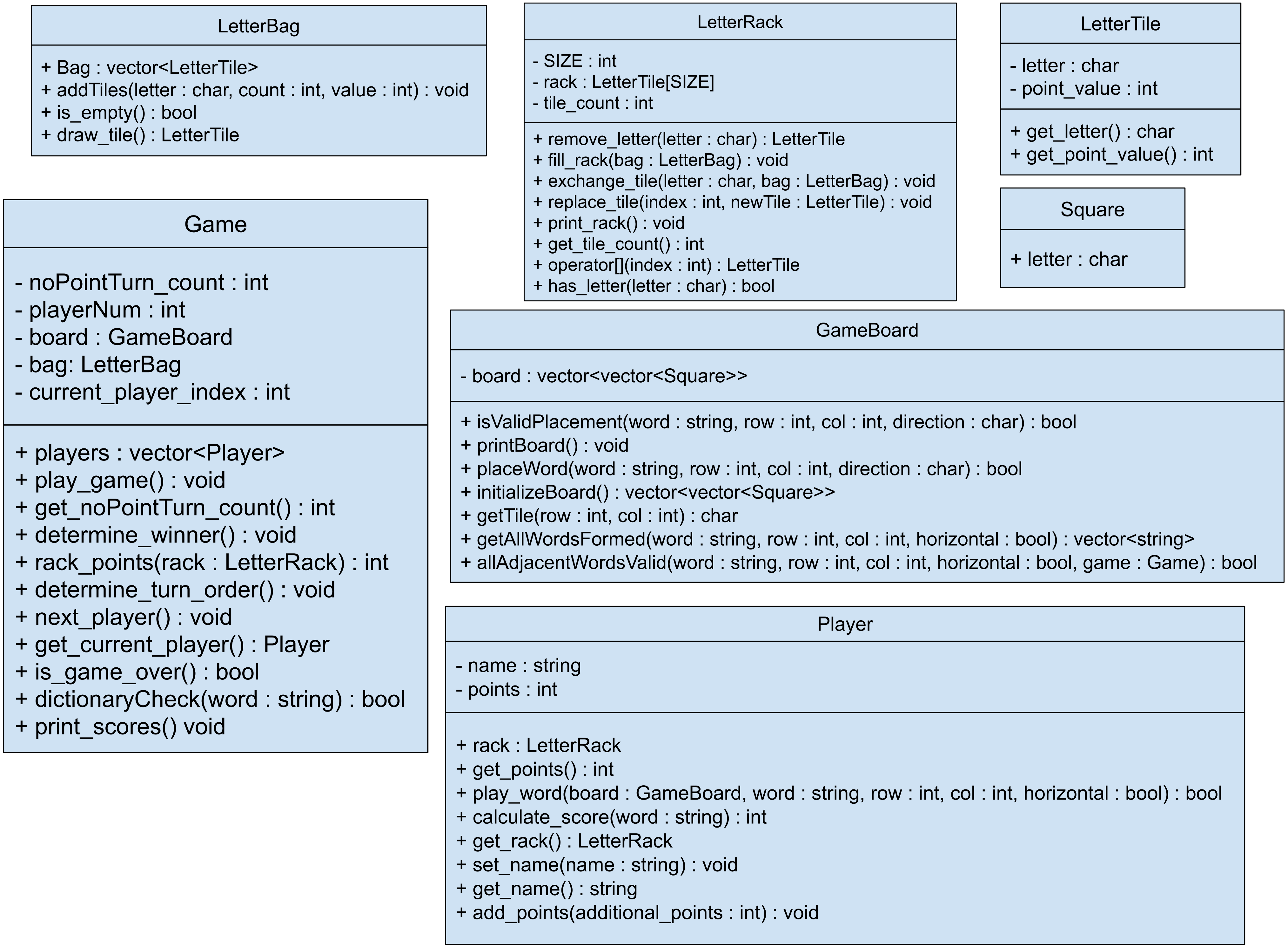
Player:

- Variables:
    - Name of player
    - Player’s points
    - Player’s rack
- Functions:
    - Get points
    - Play a word
    - Calculate their score for a word
    - Get their rack
    - Set the player’s name
    - Get the player’s name
    - Add points to the player’s score

Game:

- Variables:
    - A vector of players
    - Count of consecutive turns with no points earned
    - Number of players
    - A game board
    - A tile bag
    - The index of the current player
- Functions:
    - Play game
    - Get count of consecutive turns with no points earned
    - Determine and announce the winner
    - Calculate the number of points remaining on the player’s rack
    - Determine the turn order
    - Advance to the next player’s turn
    - Get a reference to the current player

- Check if one of the game end conditions are met
    - Player’s rack and letter bag are both empty
- Check if the word is in the dictionary
- Print the scores



```
LetterBag
+ Bag : vector<LetterTile>
+ addTiles(letter : char, count : int, value : int) : void
+ is_empty() : bool
+ draw_tile() : LetterTile
```

```
LetterRack
- SIZE : int
- rack : LetterTile[SIZE]
- tile_count : int
+ remove_letter(letter : char) : LetterTile
+ fill_rack(bag : LetterBag) : void
+ exchange_tile(letter : char, bag : LetterBag) : void
+ replace_tile(index : int, newTile : LetterTile) : void
+ print_rack() : void
+ get_tile_count() : int
+ operator[](index : int) : LetterTile
+ has_letter(letter : char) : bool
```

```
LetterTile
- letter : char
- point_value : int
+ get_letter() : char
+ get_point_value() : int
```

```
Square
+ letter : char
```

```
Game
- noPointTurn_count : int
- playerNum : int
- board : GameBoard
- bag: LetterBag
- current_player_index : int
+ players : vector<Player>
+ play_game() : void
+ get_noPointTurn_count() : int
+ determine_winner() : void
+ rack_points(rack : LetterRack) : int
+ determine_turn_order() : void
+ next_player() : void
+ get_current_player() : Player
+ is_game_over() : bool
+ dictionaryCheck(word : string) : bool
+ print_scores() void
```

```
GameBoard
- board : vector<vector<Square>>
+ isValidPlacement(word : string, row : int, col : int, direction : char) : bool
+ printBoard() : void
+ placeWord(word : string, row : int, col : int, direction : char) : bool
+ initializeBoard() : vector<vector<Square>>
+ getTile(row : int, col : int) : char
+ getAllWordsFormed(word : string, row : int, col : int, horizontal : bool) : vector<string>
+ allAdjacentWordsValid(word : string, row : int, col : int, horizontal : bool, game : Game) : bool
```

```
Player
- name : string
- points : int
+ rack : LetterRack
+ get_points() : int
+ play_word(board : GameBoard, word : string, row : int, col : int, horizontal : bool) : bool
+ calculate_score(word : string) : int
+ get_rack() : LetterRack
+ set_name(name : string) : void
+ get_name() : string
+ add_points(additional_points : int) : void
```