Scrabble

2.0

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Chapter 1

The-Good-The-Bad-and-The-Ugly

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```

1.0.1 <strong>Scrabble Game</strong>

Classes

```
Player - Used to create objects that represents the players in Scrabble
Frame - Used to create objects that represents the players' character frames in Scrabble
Pool - Used to create an object that represents the pool bag of tiles in Scrabble
Tile - Used to create objects that represents the character tiles in Scrabble
Square - Used to create objects that represents the squares on the board in Scrabble
Board - Used to create object that reprensents the board in Scrabble
Main - Is the class containing the main method ececuted by the jar and run expamle of the first few turns
```

Custom Exceptions

```
 InvalidFrameException - Custom Exception for Frame Class
 InvalidPlayerNameException - Custom Exception for name in Player Class
 InvalidPlayerScoreException - Custom Exception for Score in Player Class
 InvalidPoolException - Custom Exception for Pool Class
 InvalidTileException - Custom Exception for Tile Class
 InvalidSquareException - Custom Exception for Square Class
 InvalidBoardException - Custom Exception for Board Class
```

JUnit Tests

```
PlayerUnitTest - Tests Player Class
FrameTest - Tests Frame Class
PoolTest - Tests Pool Class
TileTest - Tests Tile Class
SquareTest - Tests Square Class
BoardTest - Tests Board Class
```

Project Notes:

This project is a gradle project and uses gradle and groovy as its build tool. To run the junit test create a gradle project by running "./gradlew build" in command line in the project folder to generate a gradle project. Then navigate in command line to the project folder and run "gradlew test". The output of the unit test is in a html file at "Project↩ Folder"/build/reports/tests/test/index.html (Where ProjectFolder is the folder where the project is stored).

The executable jar file run the Main Class that creates sample objects from Scrabble and prints out there initialized states.

The documentation is in the Doxygen folder as a pdf.

HTML JavaDoc is in build\docs\javadoc\index

Note: This project was made made on Windows 10 and was tested on Windows 10, other operating systems have not been test. Therefore there may be compatibility issues with other operating systems.

Chapter 2

Hierarchical Index

2.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

Chapter 3

Class Index

3.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

Chapter 4

Class Documentation

4.1 scrabble.Board Class Reference

Public Member Functions

- Board ()
- Square[ ][ ] getBoardSquares ()
- void resetBoard ()
- Square getSquare (int i, int j)
- String toString ()
- void placeTiles (Player player, char[ ] word, int[ ][ ] positions)

Static Public Attributes

- static final int BOARD_SIZE = 15

Protected Member Functions

- void checkValidMove (Player player, char[ ] word, int[ ][ ] positions)
- void placeTile (Tile tile, int position_i, int position_j)
- void checkValidPosition (int[ ][ ] positions)
- void checkPlayerHasTiles (Player player, char[ ] word)
- void checkWordLength (char[ ] word)
- void checkPositionContainsTile (int[ ][ ] position)
- void checkPositionLine (int[ ][ ] position)
- void checkWordConnects (int[ ][ ] position)

4.1.1 Detailed Description

The Board Class represents the Board for the Scrabble Game as an object

4.1.2 Constructor & Destructor Documentation

4.1.2.1 Board()

```
scrabble.Board.Board ( )
```

Board Constructor

4.1.3 Member Function Documentation

4.1.3.1 checkPlayerHasTiles()

```
void scrabble.Board.checkPlayerHasTiles (
             Player player,
             char[ ] word )  [protected]
```

Method to validate if the Player placing a list of Tiles has each Tile in his Frame

Parameters

player	Player to check if they have the necessary Tiles
word	List of Tiles to check

4.1.3.2 checkPositionContainsTile()

```
void scrabble.Board.checkPositionContainsTile (
             int position[ ][ ] )  [protected]
```

Method to check if a position on the Board already has a Tile in it

Parameters

position	Co-ordinates to check if a Tile in already in it

4.1.3.3 checkPositionLine()

```
void scrabble.Board.checkPositionLine (
             int position[ ][ ] )  [protected]
```

Method to check that a list of positions to place a word is in a line

Parameters

position	List of co-ordinates to check they are part of a line of Tiles

4.1.3.4 checkValidMove()

```
void scrabble.Board.checkValidMove (
            Player player,
            char[ ] word,
            int positions[ ][ ] )  [protected]
```

Method to check that a move from the player is valid

Parameters

player	Player making the move
word	List of tiles requested to make the move
positions	Positions entered to place each Tile

4.1.3.5 checkValidPosition()

```
void scrabble.Board.checkValidPosition (
            int positions[ ][ ] )  [protected]
```

Method to validate that a position passed in is on the board

Parameters

positions	Position to check if its on the board

4.1.3.6 checkWordConnects()

```
void scrabble.Board.checkWordConnects (
            int position[ ][ ] )  [protected]
```

Method to check if a list of positions connect with a tile already on the board

Parameters

position	List of positions to check if any of them would connect with a tile on the board

4.1.3.7 checkWordLength()

```
void scrabble.Board.checkWordLength (
             char[ ] word )  [protected]
```

Method to check that words to be placed on the board are valid lengths

Parameters

word	List of Tiles to check

4.1.3.8 getBoardSquares()

```
Square [ ][ ] scrabble.Board.getBoardSquares ( )
```

Method to return the current Board

Returns

the current Board

4.1.3.9 getSquare()

```
Square scrabble.Board.getSquare (
             int i,
             int j )
```

Method that returns a specific board square

Parameters

i	row coordinate
j	column coordinate

Returns

The Square at i and j

Exceptions

InvalidBoardException	Coordinates are not inside the Board

4.1.3.10 placeTile()

```
void scrabble.Board.placeTile (
            Tile tile,
            int position_i,
            int position_j )  [protected]
```

Method to place a Tile on the board

Parameters

tile	Tile to be placed on the Board
position←↩ _i	I position on the Board to place the Tile
position←↩ _j	J position on the Board to place the Tile

4.1.3.11 placeTiles()

```
void scrabble.Board.placeTiles (
            Player player,
            char[ ] word,
            int positions[ ][ ] )
```

Method for a Player to place a list of Tiles on the Board

Parameters

player	Person to place Tiles
word	Characters to place on the Board
positions	List of positions to place Tiles on the Board

4.1.3.12 resetBoard()

```
void scrabble.Board.resetBoard ( )
```

Method to reset the Board

4.1.3.13 toString()

```
String scrabble.Board.toString ( )
```

toString method that prints the Board

Returns

Returns the board as a string

4.1.4 Member Data Documentation

4.1.4.1 BOARD_SIZE

```
final int scrabble.Board.BOARD_SIZE = 15  [static]
```

Constant value for Board size

The documentation for this class was generated from the following file:

- src/main/java/scrabble/Board.java

4.2 scrabble.BoardTest Class Reference

The documentation for this class was generated from the following file:

- src/test/java/scrabble/BoardTest.java

4.3 scrabble.Frame Class Reference

Public Member Functions

- Frame (Pool pool)
- void fillFrame ()
- ArrayList< Tile > returnFrame ()
- boolean isEmpty ()
- void removeTile (int i)
- void removeTile (char c)
- void removeTile (Tile t)
- void removeTiles (char[ ] word)
- void removeTiles (ArrayList< Tile > tiles)
- void addTile (Tile tile)
- boolean checkTiles (ArrayList< Tile > tiles)
- boolean checkTiles (char[ ] word)
- Tile getTile (char c)
- Tile getTile (int i)
- ArrayList< Tile > getTiles (char[ ] word)
- void swapTiles (ArrayList< Tile > tiles)
- String toString ()

Static Public Member Functions

- static void **main** (String[ ] args)

4.3.1 Detailed Description

This class represents the Player's Frame in Scrabble

4.3.2 Constructor & Destructor Documentation

4.3.2.1 Frame()

```
scrabble.Frame.Frame (
             Pool pool )
```

Constructor for Frame

Parameters

pool	The reference to the Pool to access Tiles from

4.3.3 Member Function Documentation

4.3.3.1 addTile()

```
void scrabble.Frame.addTile (
             Tile tile )
```

Method to add a single Tile to the frame

Parameters

tile	To be added to the playerFrame

4.3.3.2 checkTiles() [1/2]

```
boolean scrabble.Frame.checkTiles (
             ArrayList< Tile > tiles )
```

Method which checks if a series of Tiles are currently in the Frame

Parameters

tiles	List of tiles to be checked

Returns

boolean: Result for if the Frame contains all the Tiles

4.3.3.3 checkTiles() [2/2]

```
boolean scrabble.Frame.checkTiles (
             char[] word )
```

Method to check if a list of characters are in the Frame

Parameters

word	List of characters to check

Returns

Boolean answer

4.3.3.4 fillFrame()

```
void scrabble.Frame.fillFrame ( )
```

Method to fill the Frame up to the maximum number of Tiles

4.3.3.5 getTile() [1/2]

```
Tile scrabble.Frame.getTile (
             char c )
```

Method that retrieves a Tile with a given character from the Frame

Parameters

c	Character of Tile wanted

Returns

Tile with given character

4.3.3.6 getTile() [2/2]

```
Tile scrabble.Frame.getTile (
             int i )
```

Accessor method for Tile from Frame

Parameters

i	index of the Tile in the Frame

Returns

The Tile at index i in the Frame

4.3.3.7 getTiles()

```
ArrayList<Tile> scrabble.Frame.getTiles (
             char[ ] word )
```

Method to retrieve a list of Tile with given characters from Frame

Parameters

word	list of wanted character Tiles

Returns

List of Tiles

4.3.3.8 isEmpty()

```
boolean scrabble.Frame.isEmpty ( )
```

Method to check if the playerFrame has Tiles in it

Returns

boolean: Answer for if the playerFrame is empty

4.3.3.9 removeTile() [1/3]

```
void scrabble.Frame.removeTile (
             char c )
```

Method to remove a single Tile from the Frame

Parameters

c	Character of the Tile to be removed

Exceptions

InvalidTileException	If Character is not in the Frame

4.3.3.10 removeTile() [2/3]

```
void scrabble.Frame.removeTile (
             int i )
```

Method to remove a single Tile from the Frame

Parameters

i	Tile index to be removed

Exceptions

InvalidTileException	If index is not in the Frame

4.3.3.11 removeTile() [3/3]

```
void scrabble.Frame.removeTile (
             Tile t )
```

Method to remove a single Tile from the Frame

Parameters

t	Tile to be removed

4.3.3.12 removeTiles() [1/2]

```
void scrabble.Frame.removeTiles (
             ArrayList< Tile > tiles )
```

Method to remove a list of Tiles from the Frame

Parameters

tiles	List of Tiles to be removed

Exceptions

InvalidFrameException	If the Tiles to be removed are in the Frame

4.3.3.13 removeTiles() [2/2]

```
void scrabble.Frame.removeTiles (
             char[ ] word )
```

Method to remove a multiple Tile from the Frame

Parameters

word	Array of Tile Characters to be removed

Exceptions

InvalidTileException	If Tile is not in the Frame

4.3.3.14 returnFrame()

```
ArrayList<Tile> scrabble.Frame.returnFrame ( )
```

Accessor method for playerFrame

Returns

playerFrame: The ArrayList of Tiles in playerFrame

4.3.3.15 swapTiles()

```
void scrabble.Frame.swapTiles (
             ArrayList< Tile > tiles )
```

Method used to swap a number of Tiles from the Frame for new ones in the Pool

Parameters

tiles	List of Tiles to be removed

4.3.3.16 toString()

```
String scrabble.Frame.toString ( )
```

Method overriding the toString method

Returns

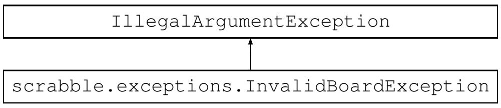
String: Formatted string of the Tiles in Frame

The documentation for this class was generated from the following file:

- src/main/java/scrabble/Frame.java

4.4 scrabble.exceptions.InvalidBoardException Class Reference

Inheritance diagram for scrabble.exceptions.InvalidBoardException:



Public Member Functions

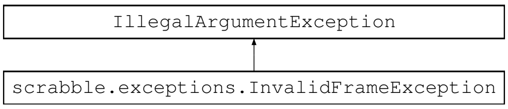
- **InvalidBoardException** (String s)

The documentation for this class was generated from the following file:

- src/main/java/scrabble/exceptions/InvalidBoardException.java

4.5 scrabble.exceptions.InvalidFrameException Class Reference

Inheritance diagram for scrabble.exceptions.InvalidFrameException:



Public Member Functions

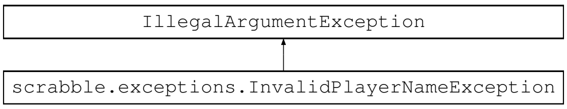
- **InvalidFrameException** (String s)

The documentation for this class was generated from the following file:

- src/main/java/scrabble/exceptions/InvalidFrameException.java

4.6 scrabble.exceptions.InvalidPlayerNameException Class Reference

Inheritance diagram for scrabble.exceptions.InvalidPlayerNameException:



Public Member Functions

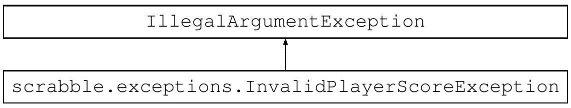
- **InvalidPlayerNameException** (String s)

The documentation for this class was generated from the following file:

- src/main/java/scrabble/exceptions/InvalidPlayerNameException.java

4.7 scrabble.exceptions.InvalidPlayerScoreException Class Reference

Inheritance diagram for scrabble.exceptions.InvalidPlayerScoreException:



Public Member Functions

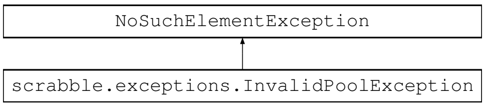
- **InvalidPlayerScoreException** (String s)

The documentation for this class was generated from the following file:

- src/main/java/scrabble/exceptions/InvalidPlayerScoreException.java

4.8 scrabble.exceptions.InvalidPoolException Class Reference

Inheritance diagram for scrabble.exceptions.InvalidPoolException:



Public Member Functions

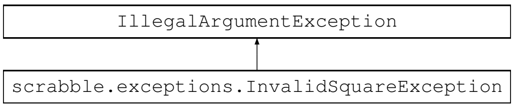
- **InvalidPoolException** (String s)

The documentation for this class was generated from the following file:

- src/main/java/scrabble/exceptions/InvalidPoolException.java

4.9 scrabble.exceptions.InvalidSquareException Class Reference

Inheritance diagram for scrabble.exceptions.InvalidSquareException:



Public Member Functions

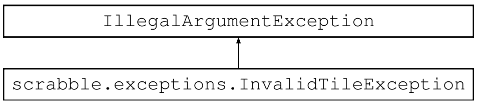
- **InvalidSquareException** (String s)

The documentation for this class was generated from the following file:

- src/main/java/scrabble/exceptions/InvalidSquareException.java

4.10 scrabble.exceptions.InvalidTileException Class Reference

Inheritance diagram for scrabble.exceptions.InvalidTileException:



Public Member Functions

- **InvalidTileException** (String s)

The documentation for this class was generated from the following file:

- src/main/java/scrabble/exceptions/InvalidTileException.java

4.11 scrabble.Main Class Reference

Static Public Member Functions

- static void **main** (String[ ] args)

The documentation for this class was generated from the following file:

- src/main/java/scrabble/Main.java

4.12 scrabble.Player Class Reference

Public Member Functions

- Player (String namePlayer, Pool pool)
- void playerReset (String newName)
- String getName ()
- void setName (String name)
- int getScore ()
- void increaseScore (int scoreIncrease)
- void decreaseScore (int scoreDecrease)
- Frame getPlayerFrame ()
- boolean **charUserInputCheck** (char letter)
- String toString ()

4.12.1 Detailed Description

Class that represents a player. Contains the information of each players

4.12.2 Constructor & Destructor Documentation

4.12.2.1 Player()

```
scrabble.Player.Player (
            String namePlayer,
            Pool pool )
```

Player Constructor

Parameters

namePlayer	String for the name of the Player
pool	Reference to the Pool of the game

Exceptions

InvalidPlayerNameException	If inputted name is invalid

4.12.3 Member Function Documentation

4.12.3.1 decreaseScore()

```
void scrabble.Player.decreaseScore (
             int scoreDecrease )
```

Mutator method for score to decrease the players score

Parameters

scoreDecrease	The value for the score to be increased by

Exceptions

InvalidPlayerScoreException	If a negative value is passed into Decrease_Score

4.12.3.2 getName()

```
String scrabble.Player.getName ( )
```

Accessor Method for Name

Returns

The name of the player

4.12.3.3 getPlayerFrame()

```
Frame scrabble.Player.getPlayerFrame ( )
```

Accessing Method player's frame

Returns

The value of playerFrame

4.12.3.4 getScore()

```
int scrabble.Player.getScore ( )
```

Accessor Method for Player Score

Returns

The Player's Score

4.12.3.5 increaseScore()

```
void scrabble.Player.increaseScore (
             int scoreIncrease )
```

Mutator method for score to increase the players score

Parameters

scoreIncrease	The value for the score to be increased by

Exceptions

InvalidPlayerScoreException	If player's score is increased by a negative value

4.12.3.6 playerReset()

```
void scrabble.Player.playerReset (
             String newName )
```

Resetting the score and name of the player

Parameters

newName	The new player name after the player is reset

Exceptions

InvalidPlayerNameException	If inputted name is invalid

4.12.3.7 setName()

```
void scrabble.Player.setName (
             String name )
```

Mutator Method for name

Parameters

name	The new Name of the Player

Exceptions

InvalidPlayerNameException	If inputted name is invalid

4.12.3.8 toString()

```
String scrabble.Player.toString ( )
```

A toString method to print the Player class variables

Returns

The Player class variables

The documentation for this class was generated from the following file:

- src/main/java/scrabble/Player.java

4.13 scrabble.Pool Class Reference

Public Member Functions

- void poolFill () throws InvalidTileException
- String toString ()
- Tile removeTile () throws InvalidPoolException
- void receiveTile (Tile tileAdded)
- int tilesInPool ()
- boolean isEmpty ()
- Pool ()

Static Public Member Functions

- static void **main** (String[ ] args)

4.13.1 Detailed Description

Class that represent a Character Tile for the Game of Scrabble

4.13.2 Constructor & Destructor Documentation

4.13.2.1 Pool()

```
scrabble.Pool.Pool ( )
```

Pool constructor

4.13.3 Member Function Documentation

4.13.3.1 isEmpty()

```
boolean scrabble.Pool.isEmpty ( )
```

Method to Check if the pool is empty

Returns

True if pool is empty

4.13.3.2 poolFill()

```
void scrabble.Pool.poolFill ( ) throws InvalidTileException
```

Function to fill the array with the set amount of each Tile in the standard English rules

4.13.3.3 receiveTile()

```
void scrabble.Pool.receiveTile (
             Tile tileAdded )
```

Method to take in a tile and add it to a pool

Parameters

tileAdded	The tile to be added to the pool

4.13.3.4 removeTile()

```
Tile scrabble.Pool.removeTile ( ) throws InvalidPoolException
```

Method to remove a random tile from the pool and return the tile that was removed

Returns

The tile which was randomly removed from the pool

Exceptions

InvalidPoolException	If the pool is empty

4.13.3.5 tilesInPool()

```
int scrabble.Pool.tilesInPool ( )
```

Method to find the number of tiles in pool

Returns

The number of tiles in pool

4.13.3.6 toString()

```
String scrabble.Pool.toString ( )
```

Pool toString Method

Returns

Pool information in the form of a String

The documentation for this class was generated from the following file:

- src/main/java/scrabble/Pool.java

4.14 scrabble.PoolTest Class Reference

The documentation for this class was generated from the following file:

- src/test/java/scrabble/PoolTest.java

4.15 scrabble.Square Class Reference

Classes

- enum **SquareType**

Public Member Functions

- Square (SquareType type)
- SquareType getType ()
- Tile getTile ()
- Boolean isEmpty ()
- SquareType setNormal ()
- void setTile (Tile tile)
- String toString ()

4.15.1 Detailed Description

The Square Class represents the square on the Scrabble Board as objects

4.15.2 Constructor & Destructor Documentation

4.15.2.1 Square()

```
scrabble.Square.Square (
              SquareType type )
```

Square Constructor

Parameters

type	The SquareType of the Square

4.15.3 Member Function Documentation

4.15.3.1 getTile()

```
Tile scrabble.Square.getTile ( )
```

Accessor Method for the Tile on the Square

Returns

The Tile on the Square

4.15.3.2 getType()

```
SquareType scrabble.Square.getType ( )
```

Accessor Method for the SquareType of the Square

Returns

The SquareType of the Square

4.15.3.3 isEmpty()

```
Boolean scrabble.Square.isEmpty ( )
```

Method to find if the Square has a Tile

Returns

True if the Square has no Tile on it

4.15.3.4 setNormal()

```
SquareType scrabble.Square.setNormal ( )
```

Method to set the SquareType of a Square to NORMAL

Returns

The SquareType of the Square before setting to normal

4.15.3.5 setTile()

```
void scrabble.Square.setTile (
            Tile tile )
```

Mutator Method for Tile on Square

Parameters

tile	Tile to be placed on the Square

Exceptions

InvalidSquareException	The Square has a Tile on it already or the Tile is a null Tile

4.15.3.6 toString()

```
String scrabble.Square.toString ( )
```

toString Method for Square

Returns

the String form of Square

The documentation for this class was generated from the following file:

- src/main/java/scrabble/Square.java

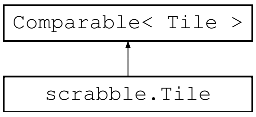
4.16 scrabble.SquareTest Class Reference

The documentation for this class was generated from the following file:

- src/test/java/scrabble/SquareTest.java

4.17 scrabble.Tile Class Reference

Inheritance diagram for scrabble.Tile:



Public Member Functions

- int compareTo (Tile t)
- boolean equals (Object obj)
- short getValue ()
- char getCharacter ()
- void setCharacter (char character) throws InvalidTileException
- void setNull ()
- Tile (char c) throws InvalidTileException
- String toString ()

Static Public Member Functions

- static void main (String[ ] args)

4.17.1 Detailed Description

Class that represent a Character Tile for the Game of Scrabble

4.17.2 Constructor & Destructor Documentation

4.17.2.1 Tile()

```
scrabble.Tile.Tile (
            char c ) throws InvalidTileException
```

Constructor for Tile

Parameters

c	Character for the Tile

Exceptions

InvalidTileException	If an invalid character is inputted

4.17.3 Member Function Documentation

4.17.3.1 compareTo()

```
int scrabble.Tile.compareTo (
            Tile t )
```

Method to compare Tile objects by Character then Value

Parameters

t	Tile for this tile to be compared to

Returns

Returns 0 if equal. Returns 1 if this Character is greater or Characters are equals and this Value is greater else returns -1

4.17.3.2 equals()

```
boolean scrabble.Tile.equals (
             Object obj )
```

Method to see if this Tile equals another object

Parameters

obj	Object to be compared to

Returns

Returns True if the objects are equal

4.17.3.3 getCharacter()

```
char scrabble.Tile.getCharacter ( )
```

Accessor method for character of the Tile

Returns

Char of the Tile

4.17.3.4 getValue()

```
short scrabble.Tile.getValue ( )
```

Accessor method for value of the tile

Returns

Short value of the tile

4.17.3.5 main()

```
static void scrabble.Tile.main (
             String[] args )  [static]
```

Main Function

Parameters

args	Arguments

4.17.3.6 setCharacter()

```
void scrabble.Tile.setCharacter (
             char character ) throws InvalidTileException
```

Method to change the character of a blank Tile

Parameters

character	New char for the Tile

Exceptions

InvalidTileException	If an invalid char inputted or the Tile is not blank

4.17.3.7 setNull()

```
void scrabble.Tile.setNull ( )
```

Method to set Blank Tiles Character back to null

Exceptions

InvalidTileException	If the tile is not a blank tile

4.17.3.8 toString()

```
String scrabble.Tile.toString ( )
```

toString Method for Tile

Returns

The string of Tile

The documentation for this class was generated from the following file:

- src/main/java/scrabble/Tile.java

Index