CPSC 2150 Project 4 Report

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Requirements Analysis

Functional Requirements:

1. As a player I can drop my token on a particular column so that I can progress the game.
2. As a player I can select a number of Rows and Columns that allow up to a 100x100 board, so that I can customize my game.
3. As a player, I can allow for a minimum of 3 Rows or Columns so that the games can be played faster.
4. As a player, I need the game to allow for a fast GameBoard implementation, so the game performance is very quick.
5. As a player, I need the game to allow for a memory efficient GameBoard implementation, so the game does not use a large amount of memory.
6. As a player, I can choose my own character to represent my token, so that I can personalize the game and know when it is my turn.
7. As a player I can drop my token in a specific place so that I can block the other player from getting the required number of tokens in a row to win.
8. As a player, I can choose how many tokens it takes to win, so I can make the game shorter or longer.
9. As a player, I can allow for a minimum of 3 tokens to win, so that the game is playable.
10. As a player I can drop the required number of tokens in a diagonal line in order to win the game.
11. As a player I can drop the required number of tokens in a horizontal line in order to win the game.
12. As a player I can drop the required number of tokens in a vertical line so that I can win the game.
13. As a player I need to be able to select another column if a previously chosen column does not exist so that I can continue my turn.
14. As a player I need to be able to select another column if the column I chose first is full so that I can continue my turn.
15. As a player I can input a column number to place a token in so that I can use my turn.
16. As a player I can choose whether or not I would like to play again so that I can continue playing.

17. As a player I need to be able to know whose turn it is so that we don't lose track of whose turn it is.
18. As a player, I can allow for a minimum of 2 players so that I have someone to play against.
19. As a player I can allow for a maximum of 10 players so that we can play as a group.
20. As a player I can interact and be informed by a command line interface generated by the game.
21. As a player I need the game to alternate between player tokens so that each player gets a fair turn.
22. As a player I need the game to display the board after each turn so that I can determine where to place my token.
23. As a player I need the game board to update each time I place a token so I don't lose track of where my tokens are.
24. As a player I need the game to display the winner at the end so that we know who won.
25. As a player I need the columns to be numbered so I can easily tell which column is which.

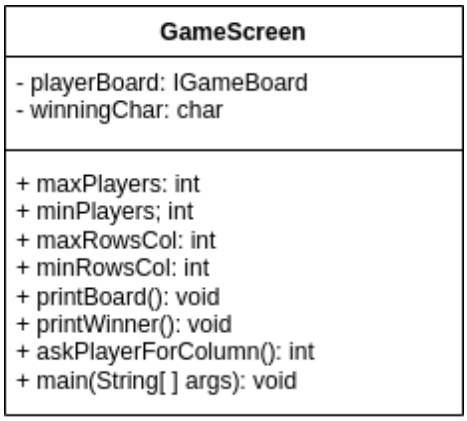
Non-Functional Requirements

1. The game must be written in Java.
2. The game will allow for a maximum of 10 players and alternate between the players.
3. The game must allow for a minimum of 2 players.
4. Players will be able to play on a customizable board of a maximum of 100x100.
5. The minimum number of rows or columns must be 3.
6. The game must determine if a specific space is available or already occupied.
7. Game must check if the player has won after each token is placed.
8. The game must check for a tie if neither player has won the game, then ask if they want to play again.
9. If a specific space is unavailable, the user must be asked if they would like to select another position.
10. The fast GameBoard implementation must use a 2-D character array.
11. The memory efficient GameBoard implementation must use a HashMap.
12. Players must be informed of which player won the game, then ask if they want to play again.
13. The game must run with a command line interface for user interaction.
14. Players need to be informed of when a selected row is full.

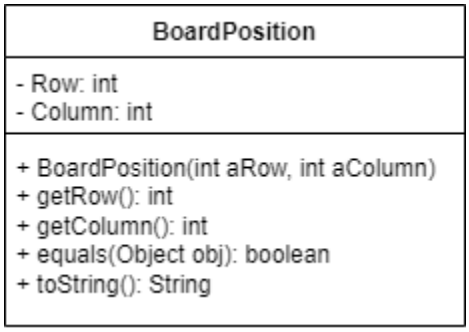
15. The game must inform the player if a selected column does not exist.
16. The game must allow each player to select their desired token at the beginning of the game.

System Design

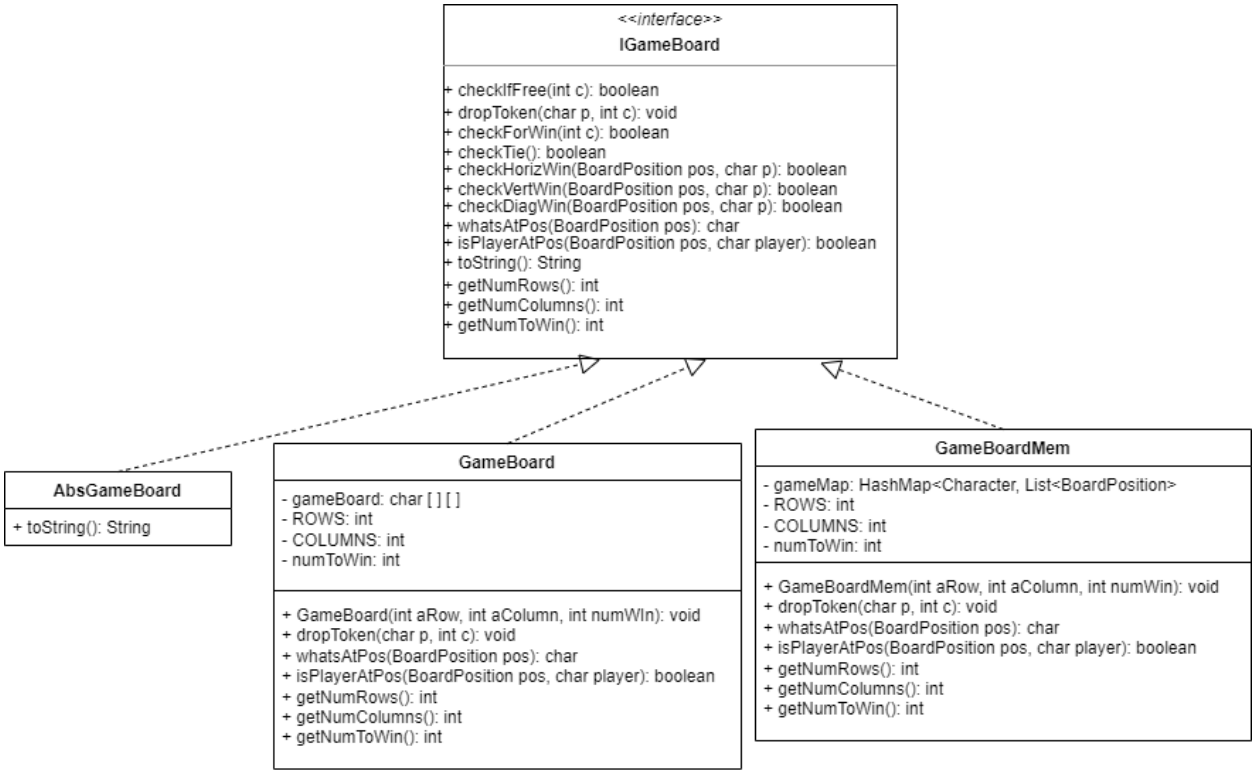
GameScreen:



BoardPosition:



IGameBoard, GameBoard, GameBoardMem, and AbsGameBoard:



Deployment

In order to compile and run the program follow these steps:

- First enter command, make, into the command line.
- To then run the program enter the command, make run.
- To compile the JUnit tests for the program, enter the command: make test, into the command line.
- To run the tests for GameBoard fast implementation, enter the command: make testGB.
- To run the tests for GameBoardMem implementation, enter the command: make testGBMem
- To remove temporary .class files after running the program, enter the command: make clean