

1 CODEBREAKER

- **Extra Functionality Implemented**

1. Allowing messages with spaces and special characters
2. Full data validation
3. Extra coding measures for extra security
4. Saving and reading messages from file

- **Notes**

1. Message can only contains lower case alphabet letter, spaces, and special characters. In addition, the first character of the message must be a lower case alphabet letter
 - a. Upper case alphabet letter and numerical digit are considered invalid values
2. Number of messages to be stored in the “messages.txt” file must be in the range of 1 to 10

2 MEMORY CHALLENGE

- **Extra Functionality Implemented**

1. Playing against a computer opponent
2. The ability to save the state of a game
3. Keeping a running leaderboard for the game that is persistent

- **Notes**

1. All the required input are validated
2. Characters inside the board can only be unique pairs of a to r
 - a. i.e. a a, b b, ..., r r
3. Player name can only be a combination of upper/lower case alphabet letter. In addition, it must be a single word
4. When playing in single player mode, computer is represented as player2
5. After the user has finished the game (winner of the game /draw game has been shown), previous saved game state is not available anymore. The user needs to start a new game
6. Leaderboard feature in this application is persistent in the sense that when the application has been closed, the previous game score still exists in the “leaderboard.txt” file and can be added with new ones and will be sorted in descending order. In addition, all score except the computer’s score is added to the “leaderboard.txt” file