# Introduction:

This analysis document aims to provide an overview of a Chess Board Application that has been built to facilitate playing the game of chess. The application has been designed to allow two human players to play the game of chess online. The application has been built using the Python programming language, and the chess board is displayed using a graphical user interface.

# Functionality:

The Chess Board Application has all the functionalities that are required for two human players to play the game of chess. The application allows players to make their moves by clicking on the piece they want to move and then clicking on the square they want to move the piece to. The application keeps track of the current state of the game, and it highlights the squares where a player can move their pieces.

The Chess Board Application also will tell the player if they try to make an illegal move by displaying the appropriate message to the console. The application renders in a GUI where the player can see the actual chess board in its natural format.

# Implementation:

The Chess Board Application has been implemented using the Python programming language. The graphical user interface has been built using the Pygame library. The application does not use any library to implement the chess engine, instead, it is built from scratch. The application provides all the functionalities that are required to implement a chess engine, such as defining the board state, valid moves, and evaluating a position.

The software also provides functions to check if a move is legal or not, and it provides functions to generate all the legal moves for a given position. These functionalities have been used to implement the move validation and generation functionalities in the Chess Board Application.

# Improvements:

There are several improvements that can be made to the Chess Board Application to make it more user-friendly and to add more functionalities to the application. For instance, currently, the application only allows two human players to play the game of chess. The application can be improved to allow players to play against an AI player.

To make the application more user-friendly, the user interface can be improved by adding features such as a timer, a chat feature, and a feature to save and load games. These features will make the application more user-friendly and will make it more enjoyable to play the game of chess. Fortunately, the implementation of the user-friendly non-functional requirement is not applicable for this project.

The solution requires some additional refactoring because of spelling issues, and as well as uncompleted methods represented by the following code:

# TODO

def rook\_can\_see\_king(self):

return False

# TODO

def castling\_squares\_under\_attack(self):

return False

# TODO

def castling(self):

if self.current\_color == "white" and self.white\_king\_moved and not self.rook\_can\_see\_king() and not self.castling\_squares\_under\_attack():

return "cannot castle white king"

if self.current\_color == "black" and self.black\_king\_moved and not self.rook\_can\_see\_king() and not self.castling\_squares\_under\_attack():

return "cannot castle black king"

# TODO

def en\_passant(self):

pass

Additionally, there are several functionalities that have to be implemented, as mentioned in the code snippet above. These include the implementation of the rook\_can\_see\_king function, the castling\_squares\_under\_attack function, and the en\_passant function.

# Conclusion:

In conclusion, the Chess Board Application is a functional and user-friendly application that allows two human players to play the game of chess online. The application has been implemented using the Python programming language and the Pygame library. The application is similar to a library, called python-chess library to implement the chess engine, which provides all the functionalities required to implement a chess engine. However, there are several improvements that can be made to the application to make it more reliable, and useful, and to add more functionalities to the application. Additionally, some functionalities have to be implemented, as mentioned in the code snippet above, to make the application fully functional.