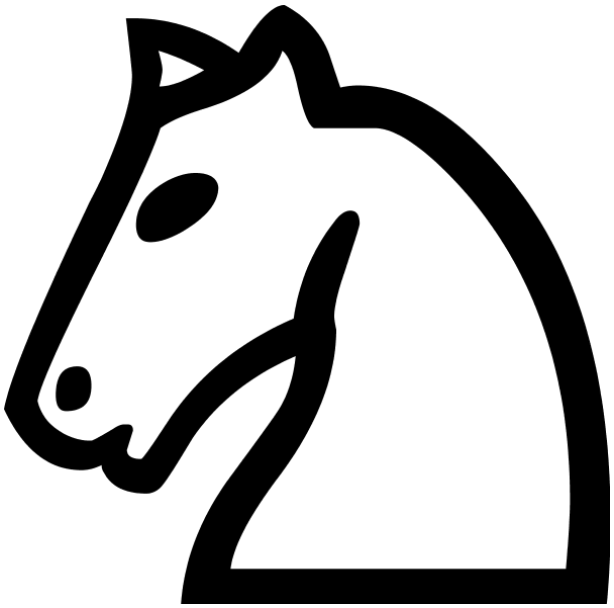
White Knights

User Application Specifications



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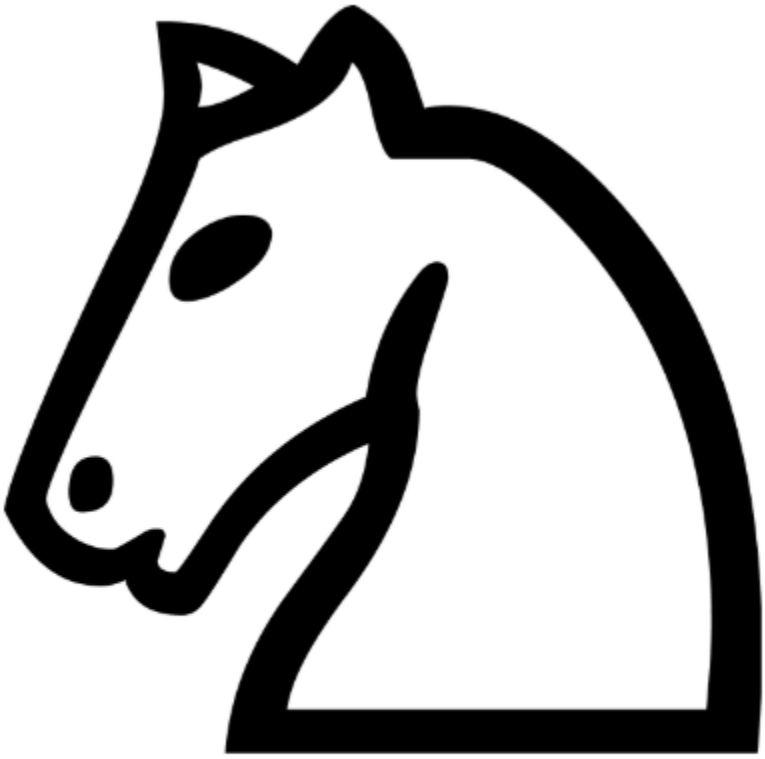
Welcome!

Thank you for downloading our software package! White Knights would like to express our gratitude for your time and attention. Our goal is to provide our customers with the utmost products for enjoyable and hands-on experience. We like to extend our gratitude to the team behind this product for their diligence and hard work. Please enjoy this product.



Thank You!

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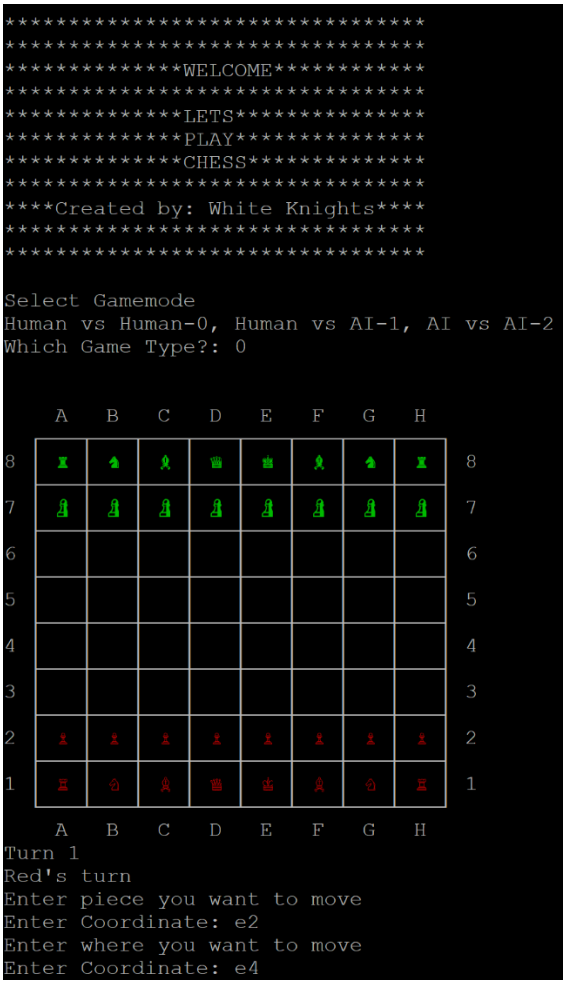
Chess

1.1 Usage Scenario:

The following are screenshots of the different moves against **Human vs Human**.



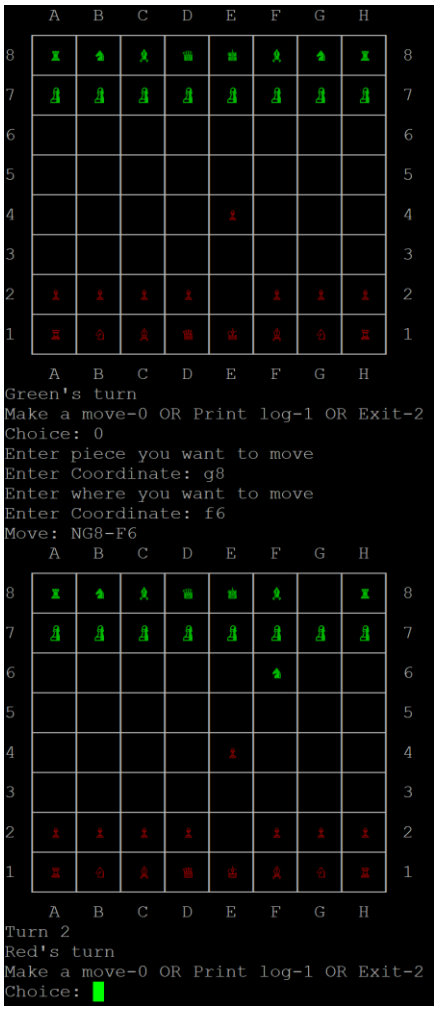


Figure 1: Red(White) Piece Movement

Figure 2: Green(Black)Piece Movement

By selecting Human vs Human with Game mode ‘0’,we will start a game involving two human players. Both the images above showcase the first move made by Player1(White/Red color on board). White pieces will always be towards the bottom and the top will always be black pieces (Green color on board).

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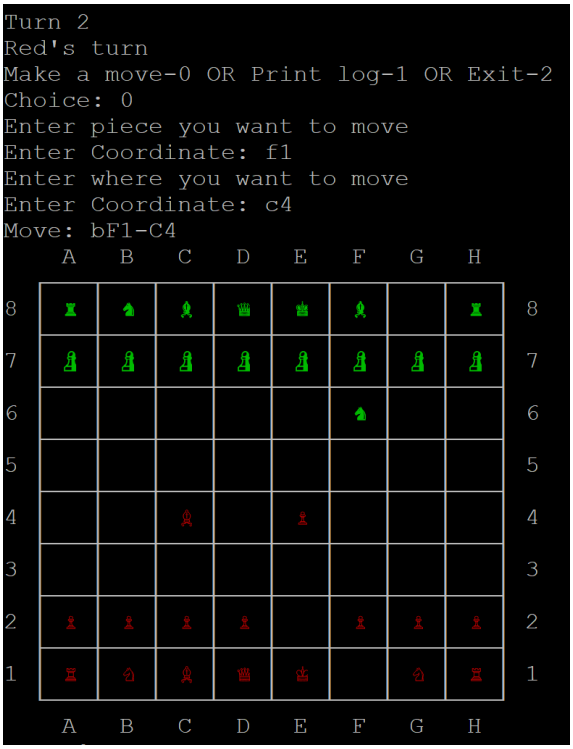

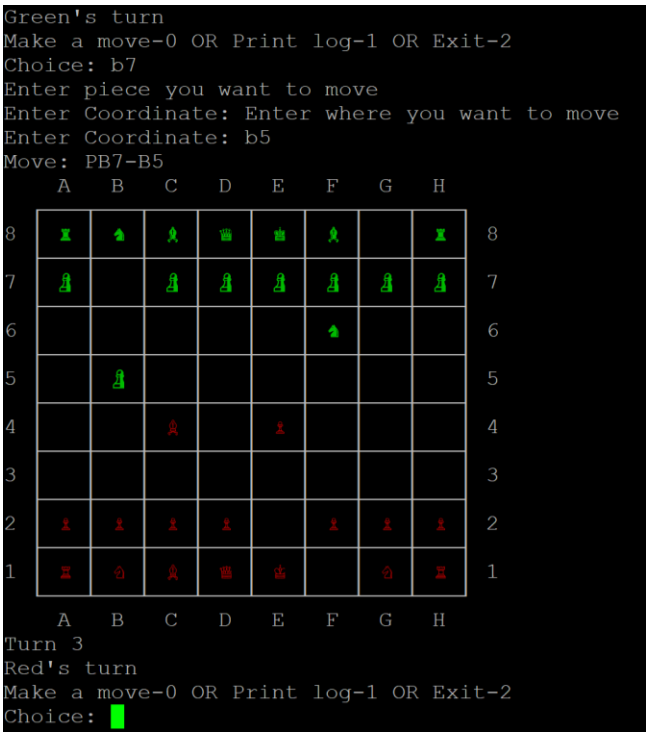

Figure 3: Both players makes a move.

In order to move a piece you first enter the coordinate of the piece you want to move followed by the coordinate of the place you want to move it. This move must be a valid move in accordance with the rules of chess or else the program will result in an error and will ask the player to enter the coordinates again. After every turn, the game will ask if you want to continue. Inputting the number '0' will result in the continuation of the game. The user can view the log with inputting the number '1' or exit the game with inputting number '2'.

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The following are screenshots of the different moves against **Human vs AI :**

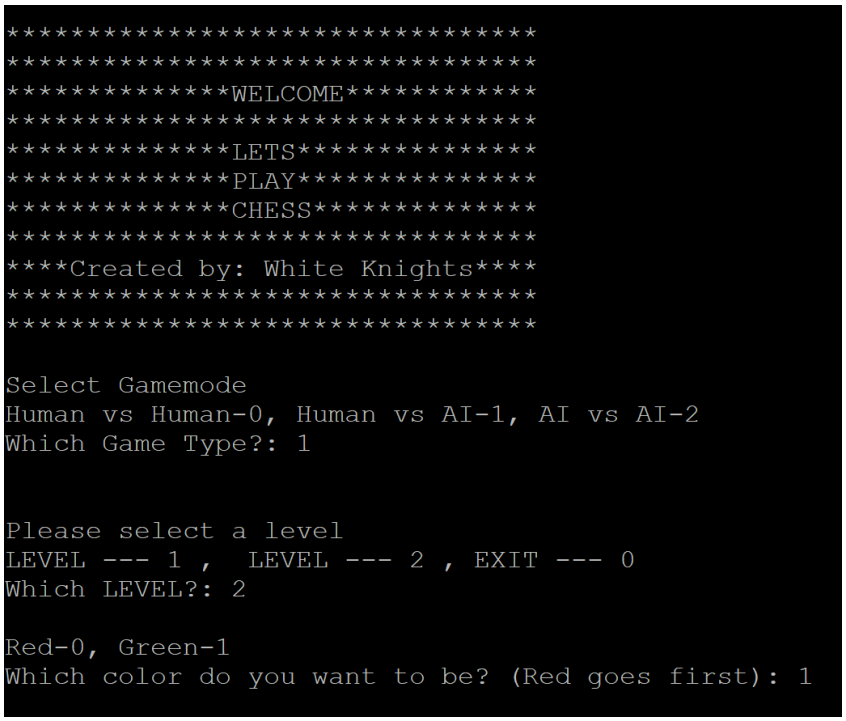

Figure 4: Selecting Level

By selecting Human vs AI Game mode '1', we will start a game involving a human player vs the AI as player 2. It is the user's choice to choose between 2 different difficulty levels of AI. The user is open to choose the color of their choice to determine, which player shall make the first move. According to the official rules of Chess, the white color plays first, followed by black. Remember our board is color oriented with Red being the White color chess piece and Green as Black color chess piece.

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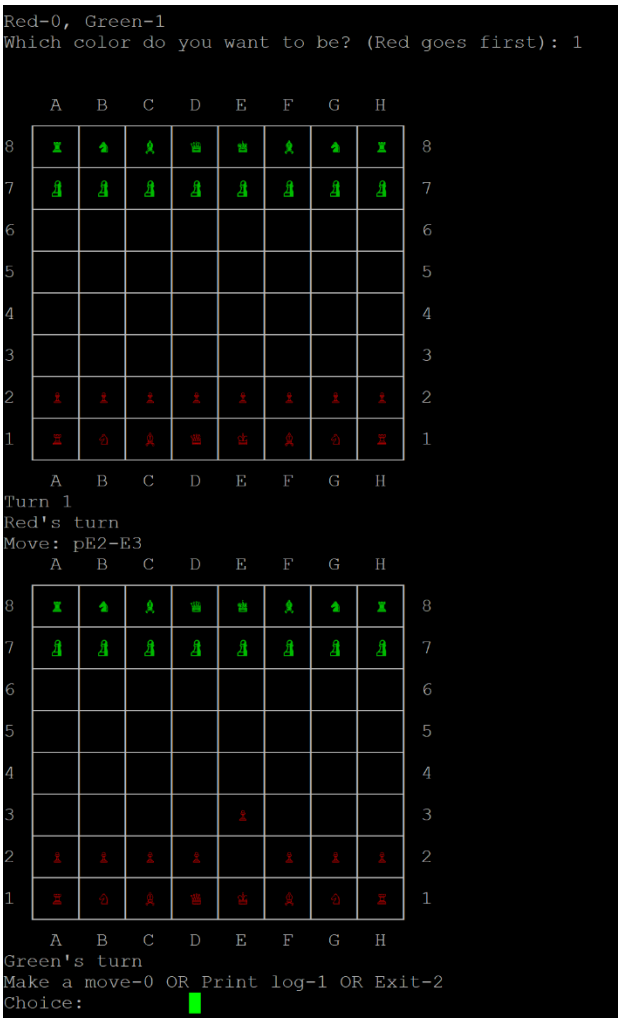

Figure 5: AI (Red) movement

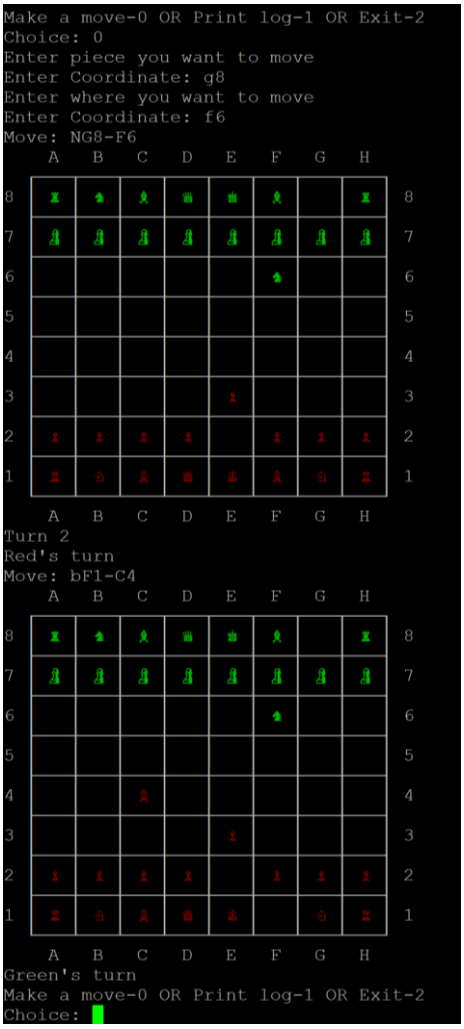

Figure 6: Player (Green) movement

As the user chooses to be the color Green (Black), AI being the Red (White) color implements the first move as the game starts. This is followed by the game prompting the user to continue the game, view the log file or exit the game.

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The following are screenshots of the different moves against **AI vs AI :**

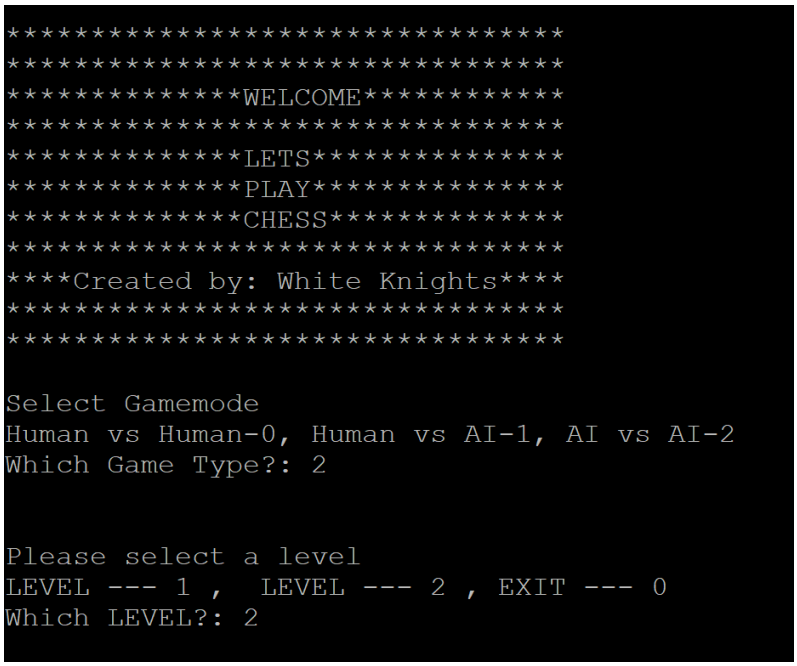

Figure 7: AI Menu

By selecting AI vs AI Game mode '2', we will start a game involving our AI as player 1 vs the AI as player 2. It is the user's choice to choose between 2 different difficulty levels of AI. As the game commences in accordance with the official chess rules, Red makes the first move, followed by Green.

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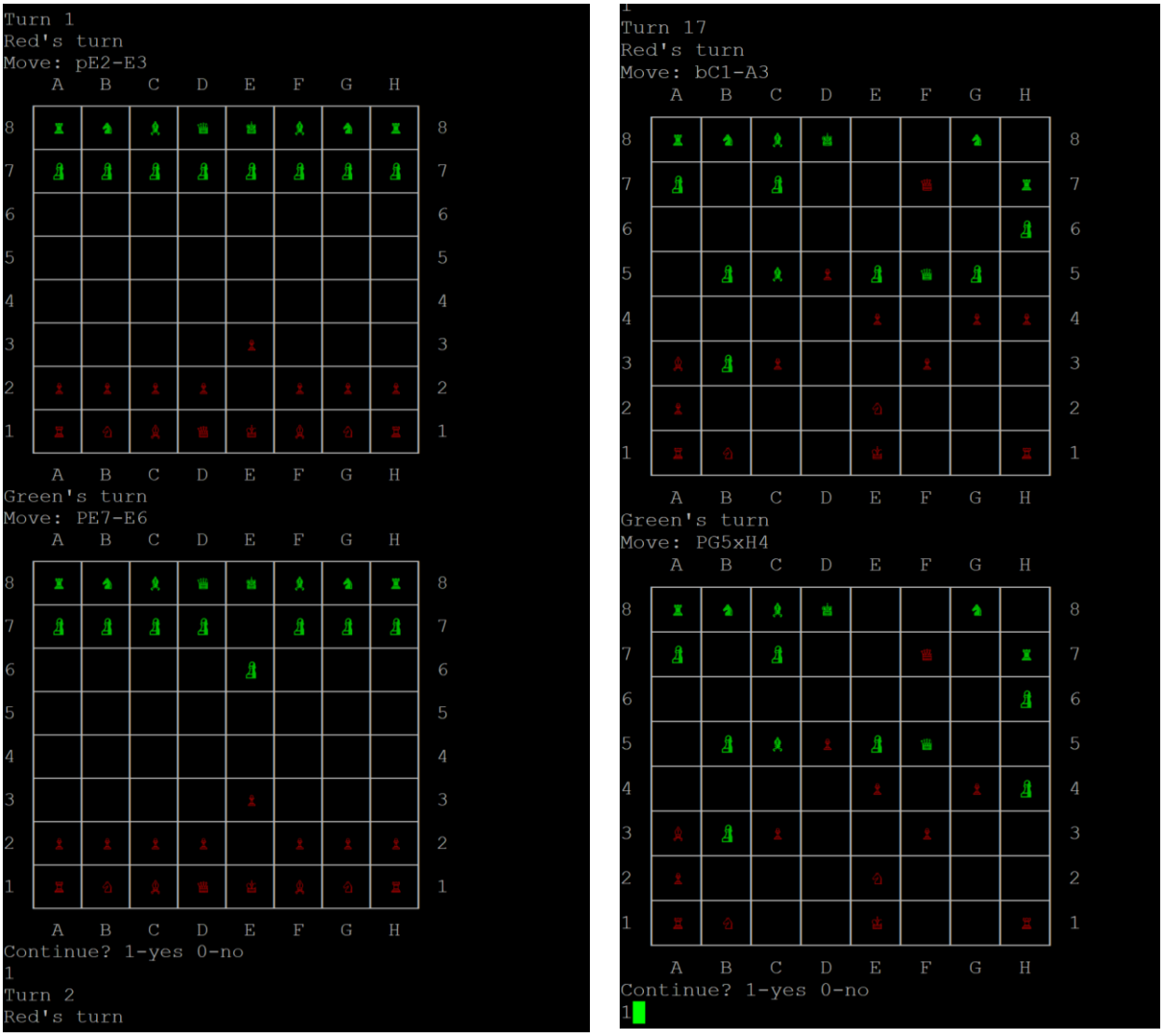

Figure 8: AI Game moves

By selecting AI vs AI Game mode ‘2’, we will start a game involving our AI as player 1 vs the AI as player 2. Both AI’s try and beat each other to win the game. Each move is displayed and also stored in Log.txt.

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Usage of the **Log File**

The log file records every game with the moves of both Green (Black) and Red (White) pieces. After every game, you will be able to access the "Log.txt."

The log records the moves that have been played. To understand the log:

1. **Regular move**: The piece name followed by the original coordinate and the new coordinate with a '-' in between.
   Ex: NB8-C6 rG2-G4

2. **Pawn promotion**: The regular move notation followed by the piece that the pawn promotes to with a '/' in between.
   Ex: pE7-E8/q PA2-A1

3. **Castling**: 0-0 will be shown for kingside castle and 0-0-0 will be shown for queenside castle.

4. **Check**: A move that checks the enemy king will be followed by a '+'.
   Ex: bF1-B5+ qH4-H5+

5. **Checkmate**: A move that results in checkmate will be followed by a '#'.

1.2 Goals:

The goal or the main objective of the game of chess is to checkmate your opponent's king. To complete this goal, you must trap your opponent's king where they cannot make any more legal moves without being captured on the next term.

1.3 Features:

1. Chess House Rules
2. Interactive Graphical User Interface (ASCII)
3. Playing Against Player or AI
4. AI vs AI
5. Choose Side: Red or Green
6. Human Readable Log File

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Installation

2.1 System Requirements:

- Hardware PC: Hardware x86_64 server
- Operating System Required: Linux OS
- Third Party Software Required
    - GCC
- Dependent Libraries : Math Library (Math.h)
- Software Program : Xming

2.2 Setup and Configurations:

1. Open PuTTy (log into a server).
2. Type command *'cd'* (Change the current directory) to find the correct folder which the game was downloaded into.
3. Extract the src code by typing '*tar -xvzf Chess_V1.0_src.tar.gz*' .
4. then type *'cd Chess_V1.0_src'* to change directories into the source file.
5. Type *'make'* to build the software.
6. Run '*./Chess'* to open the game.

2.3 Uninstalling:

1. In PuTTy, look for the corresponding source file labeled "src" . Find the directory where the files are in. Type command 'ls' to view the files in the directory.
2. Type command 'rm' then the file name after it.

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Chess Program Functions and Features

3.1 House Game Rules

This program of Chess follows the official rules of chess. There are no outliers or special exceptions to the game. The game includes all special functions such as checkmate, check, en passant, pawn promotion and castling too. After every move by Green the game asks the user: “Make a move – 0 OR Print Log-1 OR Exit -2” for user flexibility.

3.2 Interactive Graphical User Interface:

The interface for this chess board is in ASCII.

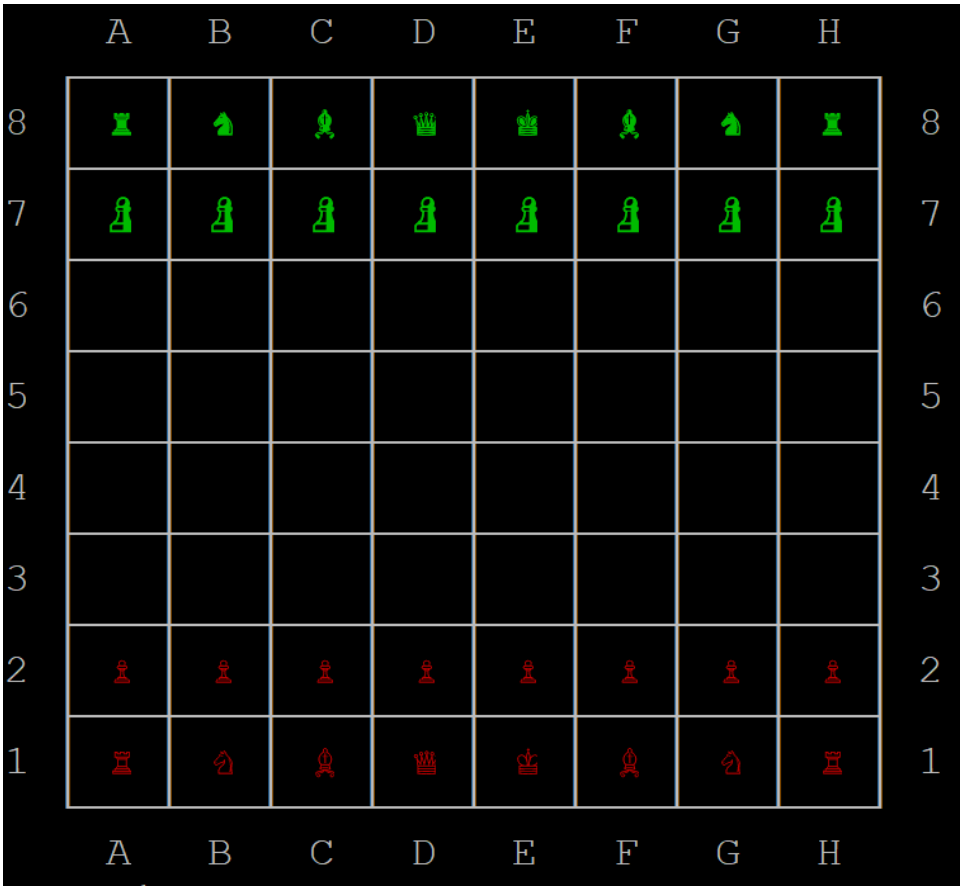

Figure 9:Image of the chessboard

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3.3 Choose Opponent: P vs P or P vs AI or AI vs AI

On startup, the player has a choice to play against another player or play against a computer or AI vs AI. The game proceeds with user's choice. If the player chooses the "Human vs AI " option, they will be prompted with choosing between 2 different levels of difficulty. The next step involves the user to choose between the colors red or green. User will Type '0' to be the color Red (White pieces) and '1' for Green (Black pieces).

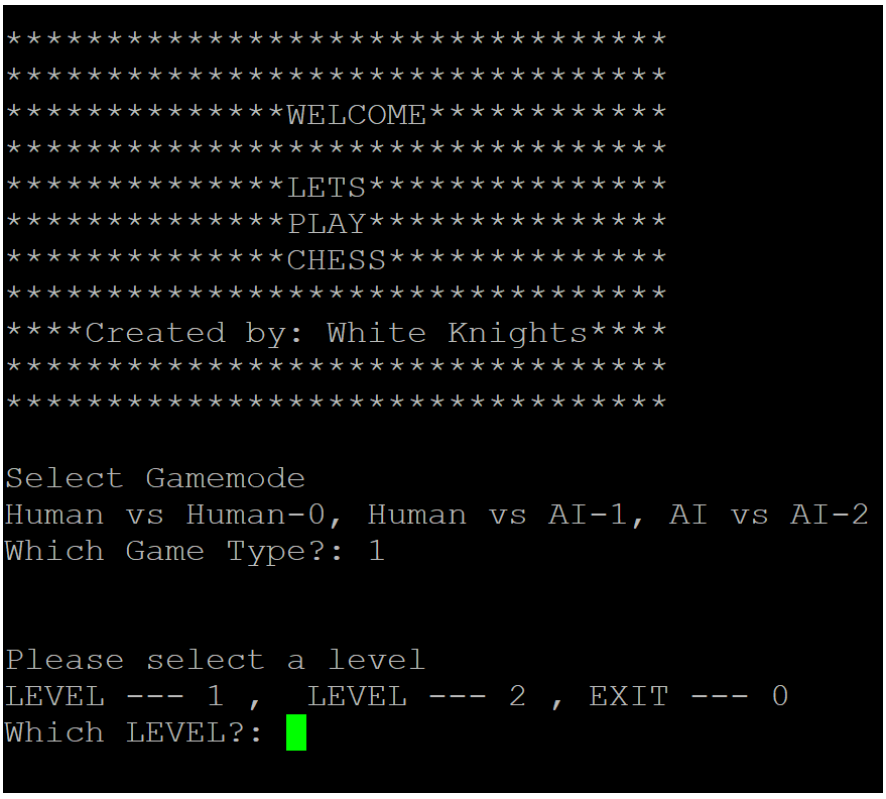

Figure 10: **Menu Options**

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3.4 Choose Side: Red or Green:

The user types ‘0’ to be the color Red (White Pieces) , or chooses to enter ‘1’ for Green (Black pieces)

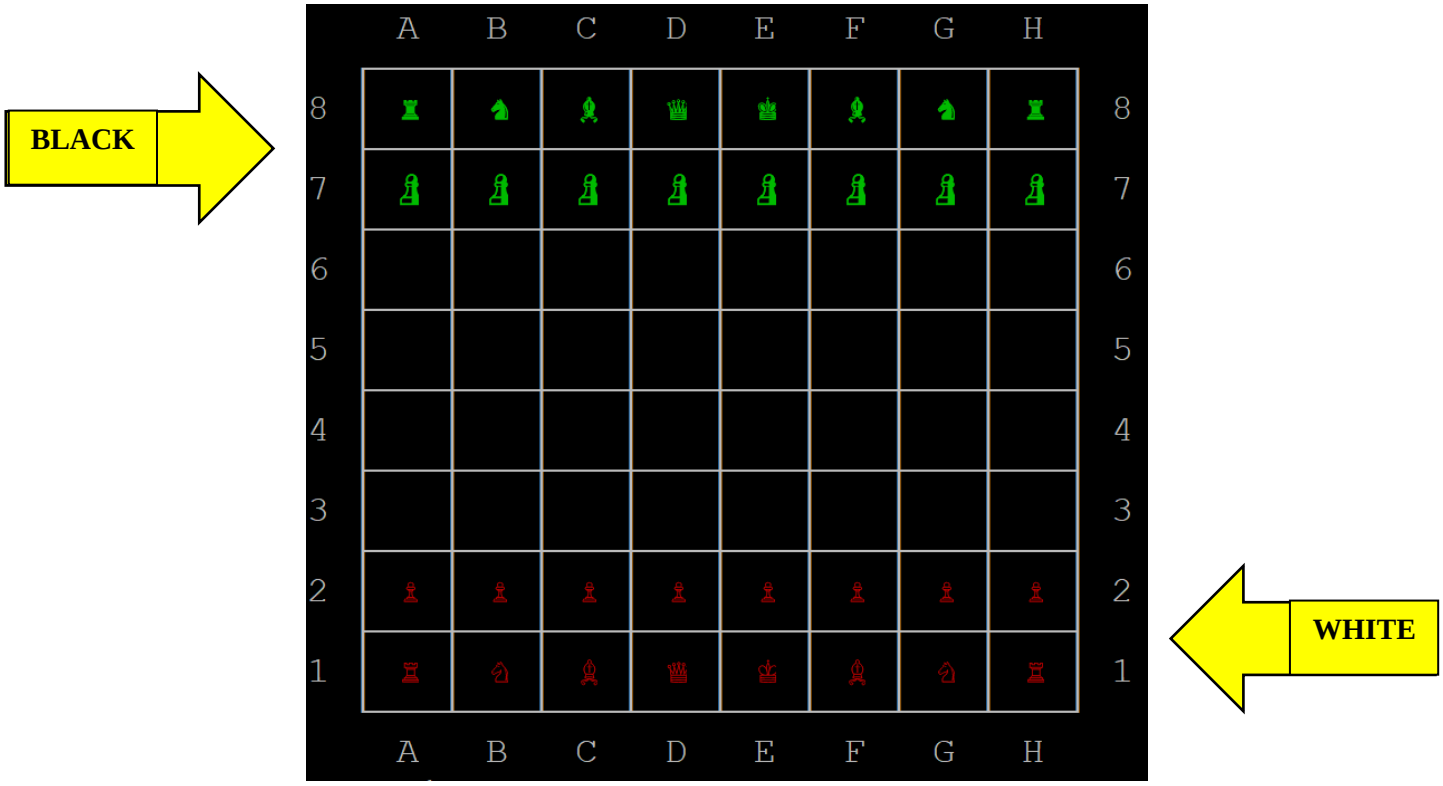

Figure 11: **Color orientation of board with chess rules**

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3.5 Human Readable Log File:

After every game, a text file is generated. All the legal moves are recorded and stored. The file keeps track of the number of turns, the piece that was moved, and the coordinates of each moved piece. It also keeps track of capture, castling, check, pawn promotion and checkmate.

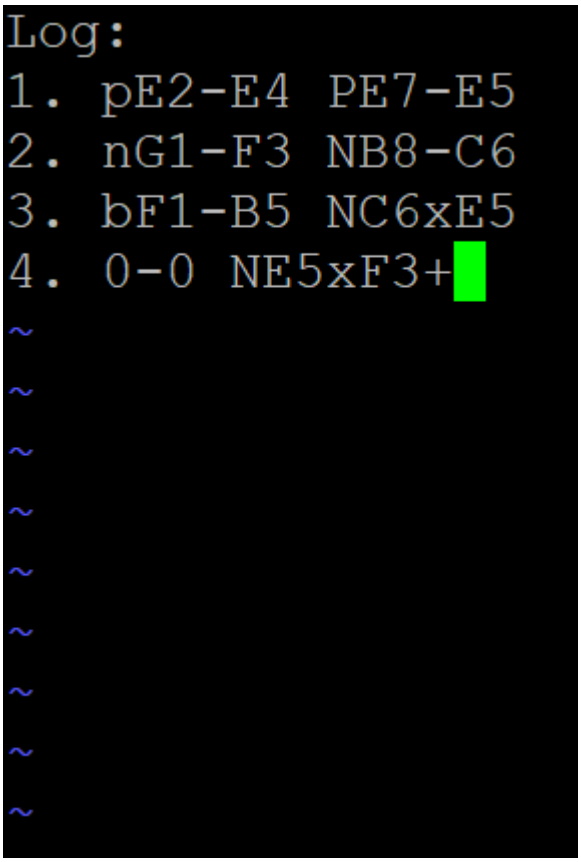

Figure 12 :Contents inside Log.txt

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Symbols	Meaning
x	Capture
#	Checkmate
0-0	King Side Castling
000	Queen Side Castling
=	Promotion
+	Check
1-0	Red Won
0-1	Green Won

Log Key Reference

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Glossary:

Bishop: Can move diagonally across the board.

Capture: (or Take) not Kill – to remove a piece from the board via a legal move.

Castle: To move your unmoved King 2 squares toward an unmoved Rook and to move the Rook on the other side of the King is the castling move.

Castling: A special move involving both the king and one rook. Its purpose is generally to protect the king and develop the rook. To castle you move the king two spaces toward the rook and the rook moves to the last space the king passed through. The king and rook cannot have moved previously. The

Check: An attack on the King. You do not have to announce “check”.

Checkmate: An attack on the King where there is no way for your opponent to finish his turn and no longer have the King attacked. To be checkmated.

Color: The white or black pieces.

En Passant: Capturing a pawn that moved 2 spaces with a pawn that could have captured it if it had only moved 1 space, on the next turn only.

King: Can move in any direction, but only one step at a time. Also, the king must never move into check.

Knight: Can jump to eight different squares which are two steps forward plus one step sideways from its current position. This is the only piece that can jump over other pieces.

Pawn: Can move only forward towards the end of the board, but captures diagonally forwards one square to the left or right. From its initial position a pawn may make two steps, otherwise a single step at a time. If the pawn reaches the end of the board, it is automatically promoted to another piece of the player’s choice.

Queen: Can move horizontally, vertically, and diagonally across the board.

Rook: Can move horizontally and vertically across the board.

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Error Messages:

“Invalid Move: There is no piece there!

- There is no piece at the selected coordinate.

“Invalid Move: That piece is not yours!”

- The piece that you selected belongs to the other player.

“Invalid Move: That piece can’t move there!”

- The move that you have inputted is not a legal move.

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Castling, **10, 12, 15, 16, 17**

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Regular Move, **10**

References:

http://www.wachusettchess.org/ChessGlossary.pdf

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