

# Chess Simulator

## User Manual

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## Glossary:

### Chess Terms

1. *Checkmate* - No move for the player possible which would get the king out of check
2. *Check* - When a move creates an attack on the king but there are moves to evade.
3. *En Passant* - Pawn captures another pawn that is on its same row and adjacent file, the enemy pawn had to have made its initial 2 square advance.
4. *Castling* - A special move where if either side of the king has no pieces between the rooks, the king and rook can move at the same time. During this move, the king and rook cross over each other, with the king moving 2 squares toward the rook, and moving the rook directly next to the king. The move can not be done when: the king is in check, the king has already moved, when there are pieces in between, the rook has moved, and when the king can be moved into a spot it would be checked.
5. *Knight* - Can move 8 spaces, where it can move 2 steps forwards or backward and 1 step to the left or right. The knight may also go 2 steps to the left or right and 1 step forward or backward. Has the ability to move over pieces.
6. *Bishop* - Can move diagonally across the board.
7. *Rook* - Can move horizontally and vertically across the board
8. *Queen* - can move horizontally, vertically across the board
9. *King* - Can move in any direction, but only one step at a time. Must never move into check and there is a special “castling” move for the king
10. *Pawn* - Can move only forward towards the end of the board, but captures 1 square diagonally. From its initial position, a pawn may make two steps, otherwise only a single step at a time. If the pawn reaches the end of the board, it is automatically promoted to another piece (usually a queen)
11. *Increment* - In timed games, a player may be granted added time after moves.

# 1 Chess Simulator Overview

## 1.1 Usage scenario

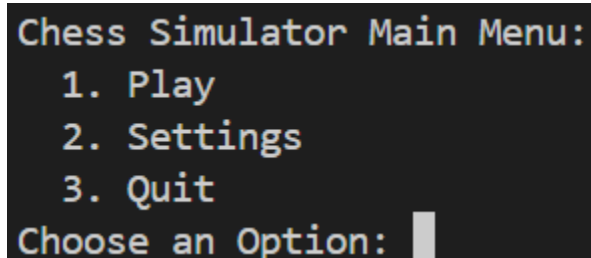
- Start Menu
- Settings Menu
- Choosing a Color
- Game Screen
- Gameover
  - Checkmate
  - Resign
  - Stalemate

### Start Menu

When user starts the program it launches into the start menu GUI

Button Usage: Selecting 1 moves the program to the color selection, selecting 2 pulls up the settings menu, and selecting 3 exits the program.

Screenshot:

A screenshot of a terminal window showing the 'Chess Simulator Main Menu'. The text is as follows:

```
Chess Simulator Main Menu:
1. Play
2. Settings
3. Quit
Choose an Option: |
```

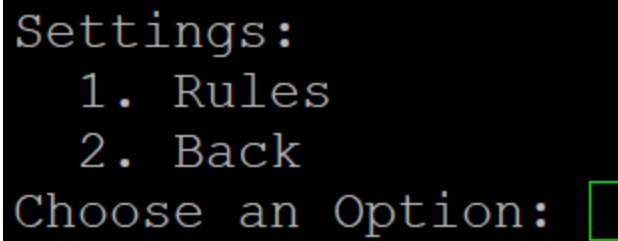
The cursor is positioned at the end of the 'Choose an Option:' line.

### Settings Menu

Usage: Selecting settings on any menu pulls up Settings Menu

Button Usage: Selecting the rules button brings up basic chess rules, selecting back moves the menu back to the previous menu.

Screenshot:

A screenshot of a terminal window showing a settings menu. The text is as follows:

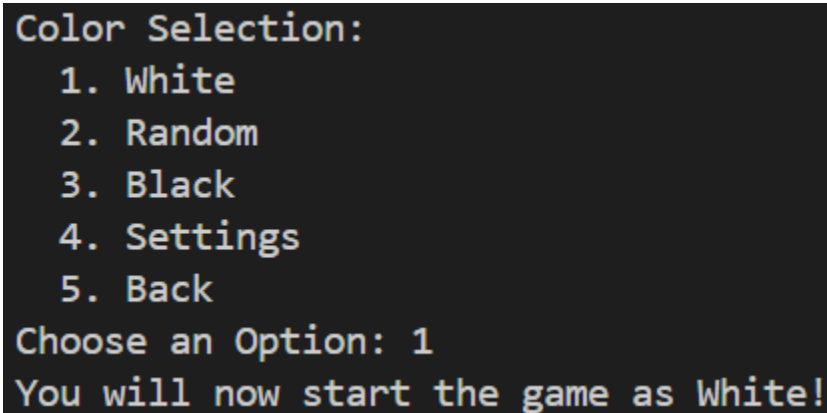
```
Settings:
  1. Rules
  2. Back
Choose an Option: 
```

### Choosing Color

Usage: Selecting the play button pulls up the color choice screen

Button Usage: Black, random, and white button determines the color of the chess pieces for the user. Selecting 4 pulls up the settings menu. Back button moves the screen back to the main menu.

Screenshot:

A screenshot of a terminal window showing a color selection menu. The text is as follows:

```
Color Selection:
  1. White
  2. Random
  3. Black
  4. Settings
  5. Back
Choose an Option: 1
You will now start the game as White!
```

### Game Screen

Usage: Chessboard is displayed and the player/computer will make moves. There will be available buttons such as Undo, Settings and Resign.

Button Usage: Undo will reverse moves and Resign will forfeit the match and grant the opponent the win. Selecting 5 pulls up the Settings menu. There will also be a status button indicating a player's king being in check.

Screenshot:

8		BR	BN	BB	BQ	BK	BB	BN	BR	
7		BP	BP	BP	BP	BP	BP	BP	BP	
6		---	---	---	---	---	---	---	---	
5		---	---	---	---	---	---	---	---	
4		---	---	---	---	---	---	---	---	
3		---	---	---	---	---	---	---	---	
2		WP	WP	WP	WP	WP	WP	WP	WP	
1		WR	WN	WB	WQ	WK	WB	WN	WR	
<hr/>										
		A	B	C	D	E	F	G	H	
Game Options:										
1. Move Piece										
2. Undo										
3. Resign										
4. Log										
5. Settings										
Choose an Option: 3										
You have resigned!										

### Checkmate

Usage: This occurs when the player or both checkmates the other player ending the game.

Button Usage: Enter key brings the user back to the home menu.

Screenshot:

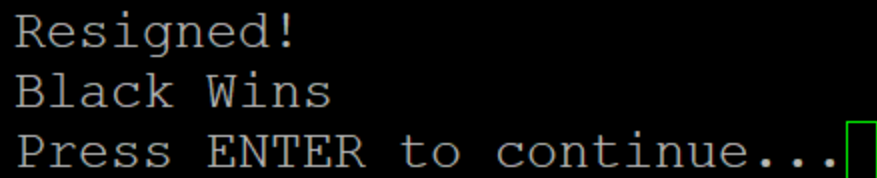
```
Checkmate!
Black Wins
Press ENTER to continue...
```

### Resign (Forfeit?)

Usage: This occurs when the player voluntarily ends the game.

Button Usage: Enter key brings the user back to the home menu.

Screenshot:



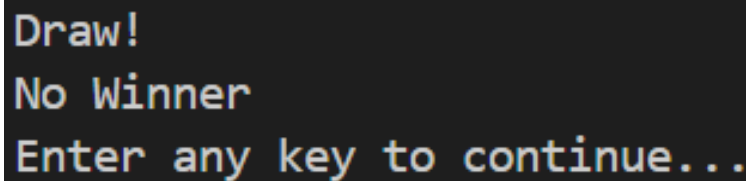
```
Resigned!  
Black Wins  
Press ENTER to continue...
```

### Stalemate

Usage: Occurs when the game has gone into a stalemate. This can happen through a repetition of moves or not enough pieces to complete a checkmate.

Button Usage: Enter Key brings the user back to the home menu.

Screenshot:



```
Draw!  
No Winner  
Enter any key to continue...
```

## 1.2 Goals (How To Play)

- Welcome menu
- Choosing a side
- Starting the game
- Win against either the player/bot
- Tell user how to play (goal of game)

## 1.3 Features

- Player Vs. Bot
- Player Vs. Player
- Bot Vs. Bot
- Undo Move
- Settings Menu
- Rules
- Move Log
- Algebraic Notation

## **2 Installation**

### **2.1 System requirements**

- Windows/Mac with built in terminal
- Able to use/SSH into a linux server
- Download Xming(windows) to be able to display the chess GUI in separate window

### **2.2 Setup and configuration**

- mkdir chess
- cd chess
- Download files chess directory in linux server
- tar -xvzf Chess\_V1.0.tar.gz
- make all
- cd bin/
- ./Chess

### **2.3 Uninstalling**

- Navigate to the parent directory of "chess/"
- Type "rm -rf chess/" to remove the entire "chess/" directory

## **3 Chess Simulator Functions and Features**

### **3.1 Player Vs. Bot**

User input: Select mode using keyboard

Program output: Will start game and show user the game screen

Screenshot:



8		BR	BN	BB	BQ	BK	BB	BN	BR	
7		BP	BP	BP	BP	BP	BP	BP	BP	
6		---	---	---	---	---	---	---	---	
5		---	---	---	---	---	---	---	---	
4		---	---	---	---	---	---	---	---	
3		---	---	---	---	---	---	---	---	
2		WP	WP	WP	WP	WP	WP	WP	WP	
1		WR	WN	WB	WQ	WK	WB	WN	WR	
<hr/>										
		A	B	C	D	E	F	G	H	
Game Options:										
1. Move Piece										
2. Undo										
3. Resign										
4. Log										
5. Settings										
Choose an Option: 3										
You have resigned!										

### 3.2 Undo Move - Players will be able to reverse/undo moves.

User Input: Mouse Select Undo Button with keyboard

Program Output: Will reverse one move every time the button is selected.

Screenshot:

```
8 | BR  BN  BB  BQ  BK  BB  BN  BR |
7 | BP  BP  BP  BP  BP  BP  BP  BP |
6 | ---  ---  ---  ---  ---  ---  --- |
5 | ---  ---  ---  ---  ---  ---  --- |
4 | ---  ---  ---  ---  ---  ---  --- |
3 | ---  ---  ---  ---  ---  ---  --- |
2 | WP  WP  WP  WP  WP  WP  WP  WP |
1 | WR  WN  WB  WQ  WK  WB  WN  WR |
-----
      A   B   C   D   E   F   G   H
Game Options:
  1. Move Piece
  2. Undo
  3. Resign
  4. Log
  5. Settings
Choose an Option: 3
You have resigned!
```

### 3.3 Change ChessBoard Color

User input: Keyboard enter for one of three choices: white, colored, or random. Random would randomly select a color while selecting white or colored would make the player the selected color.

Screenshot:

```
Color Selection:
  1. White
  2. Random
  3. Black
  4. Settings
  5. Back
Choose an Option: 1
You will now start the game as White!
```

### 3.4 Settings Button

User Input: Select the settings option

Program Output: Settings Menu

Screenshot:

```
8 | BR  BN  BB  BQ  BK  BB  BN  BR |
7 | BP  BP  BP  BP  BP  BP  BP  BP |
6 |  _  _  _  _  _  _  _  _ |
5 |  _  _  _  _  _  _  _  _ |
4 |  _  _  _  _  _  _  _  _ |
3 |  _  _  _  _  _  _  _  _ |
2 | WP  WP  WP  WP  WP  WP  WP  WP |
1 | WR  WN  WB  WQ  WK  WB  WN  WR |
  |  _  _  _  _  _  _  _  _ |
  | A   B   C   D   E   F   G   H |
Game Options:
  1. Move Piece
  2. Undo
  3. Resign
  4. Log
  5. Settings
Choose an Option: 3
You have resigned!
```

### 3.5 Rules Button

User Input: User selects the rules in settings

Program Output: User selects the rules option which lists the notations used in the program and a link to the official chess rules.

Screenshot:

```
Settings:
  1. Rules
  2. Highlight Moves
  3. Back
Choose an Option: 3
```

### 3.6 Move Log

User Input: N/A

Program Output: A page that logs all of the moves played on the side of the board.

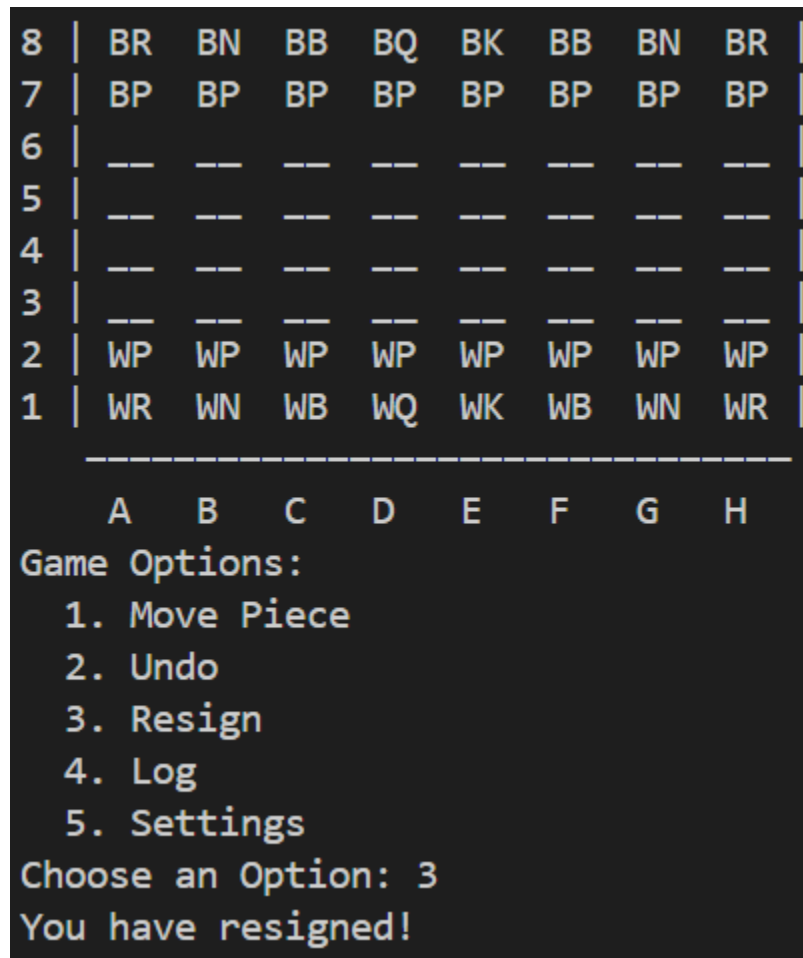
Screenshot:

### 3.7 Algebraic Notation

User Input: N/A

Program Output: Label the board with numbers and letters, no user interaction

Screenshot:



## Error messages

No valid pawn move found.

Path blocked at (0, 1)

Attempt to capture own piece or move out of bounds.

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