

# User Manual

## V1.1



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# Glossary

## Keywords of chess(Normal Move)

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



Rook: move horizontally and vertically across the board.



Bishop: move diagonally across the board.



Knight: jump to eight different squares which are two steps forward plus one step sideways from its current position.



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



Pawn: move only forward towards the end of the board, but captures sideways. 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).



Check: When the king is under attack, it is called check. If a player is in check, they must get out of check.

Checkmate: If there is no move for the player possible that would get his king out of check, the player loses.

## Special Move

Castling: a special move in the game of chess involving the king and either of the original rooks of the same color. It is the only move in chess (except promotion) in which a player moves two pieces at the same time. Castling consists of moving the king two squares towards a rook on the player's first rank (row), then moving the rook onto the square over which the king crossed. Castling can only be done if the king has never moved, the rook involved has never moved, the squares between the king and the rook involved are not occupied, the king is not in check, and the king does not cross over or end on a square in which it would be in check.

En passant: a special pawn capture that can occur immediately after a player moves a pawn two squares forward from its starting position, and an enemy pawn could have captured it had the same pawn moved only one square forward. The opponent captures the just-moved pawn as if taking it "as it passes" through the first Square. The resulting position is the same as if the pawn had moved only one square forward and the enemy pawn had captured normally. The En passant capture must be done on the very next turn or the right to do so is lost. Such a move is the only occasion in chess in which a piece captures but does not move to the square of the captured piece. If an en passant capture is the only legal move available, it must be made.

# 1. Computer Chess

## 1.1 Usage Scenario

The following figure shows what might the board of our chess game look like if you chose the white side

-b stands for 'black'

-w stands for 'white'

-R stands for 'rook'

-N stands for 'knight'

-B stands for 'bishop'

-Q stands for 'queen'

-K stands for 'king'

7	bR	bN	bB	bQ	bK	bB	bN	bR	
6	bP	bP	bP	bP	bP	bP	bP	bP	
5									
4									
3									
2									
1	wP	wP	wP	wP	wP	wP	wP	wP	
0	wR	wN	wB	wQ	wK	wB	wN	wR	
	0	1	2	3	4	5	6	7	

## 1.2 Goals

The aim of this program is to allow users to play chess with a computer. This game follows all the normal chess rules. The goal of this game is to capture the opponent's king.

### **1.3 Features**

- Interactive user interface
- Display a chessboard
- Choice of white and black
- Choose to play with a computer or play with another human
- Undo previous move
- Hints on possible moves

## **2. Installation**

### **2.1 System Requirement**

- Linux based on OS
- Minimum of 2GB RAM
- Monitor, Keyboard, and Mouse
- Equipped GCC and GNU make

### **2.2 Setup and Configuration**

1. First, open a terminal window or Putty window.
2. Logging into a Linux account given by the developers.
3. Use the "cd" command to go to the folder where the game at.
4. Unpack the source code from the archive by “ tar -xvzf chess.tar.gz” (For now, our file name is chess)
5. Compile the source code of the program by “ make clean” and then “make”.
6. Run the compiled program by the command ” ./chess”.

### **2.3 Uninstalling**

1. First, open a terminal window or Putty window.
2. Logging into a Linux account given by the developers.
3. Use the "cd" command to go to the folder where the game at.
4. Use the command” rm chess” to delete the installation of the chess game.

## 3. Chess Program Functions and Features

### 3.1 Main Menu

At first, the terminal will give the user an option to play with other users or a bot player.

### 3.2 Choose a Color

The user may choose the color that they want to play with: white or black. Then, the terminal will display a game board that shows the positions of pieces in the game depending on the color the user chose before.

### 3.3 Moving Pieces

In each movement, the player should input 4 numbers. The first two numbers are the position of the piece the player chooses to move. The second two are the final position of the piece.

While the player is thinking, a timer is working. It gives the player 60 seconds to make each move. If the player spends more than 60 seconds, he or she will directly lose the game.

```
Please make a move:
First, enter the x coordinate of the piece you wanted to move: 1
Enter the y coordinate of the piece you wanted to move: 0
Then, enter the x coordinate of the destination: 2
Enter the y coordinate of the destination: 0
```

### 3.4 Legal Move

When playing, the program will ensure that all the moves by the player or bot is a legal move under the chess rules. If it is an illegal move, the user will be asked to make a different move within the given time.

### 3.5 Log of all the moves

The program will record all the moves down by the player and print them out at the end of the game so that the user can see in which round they have made a bad move or mistake.

### 3.6 Bot Player

The bot player is programmed to be a smart chess player that can give the user an interesting playing experience.

## 4. Back Matters

### 4.1 Copyright

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### 4.2 Error Messages

- “The color you entered does not exist. Please try again.”  
This message is displayed if the player enters a color that is neither black nor white.
- “The opponent you entered does not exist. Please try again.”  
This message is displayed if the player enters a string that is neither player nor computer.
- “You have not made any move yet. Please make a move.”  
This message is displayed if the player attempts to undo a previous move when the player has not made the first move.
- “You are attempting an illegal move. Please try again.”  
This message is displayed if the player
  1. enters a displacement that is against the rule of the displacement of the selected piece.
  2. enters an initial/ final position that is not on the board.
  3. enters a final position that has one of the player’s pieces.
- “You do not have a piece on the position you entered. Please try again.”  
This message is displayed if the player enters an initial position that does not have any piece of the player’s.



- “Time out. You lose the game.”

This message is displayed if the player does not enter any displacement within 60 seconds of the player’s turn.

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