

EECS 22L
Winter 2016
Team 11: nøl / C Gets Degrees
Chess v1.0 User Manual

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Glossary

Pawn: (Eight pieces)

A Pawn only moves forward. Its first move allows it to move two spaces forward, otherwise it is limited to one space per turn. The Pawn can only capture other pieces in the first forward diagonal positions. Lastly if the Pawn reaches the very last row of the opposing side of the board, you can choose to replace it for your choice of either a Queen, Rook, Bishop, or Knight.

Note: The Pawn is involved in an Advanced Technique. See page 6 for details.

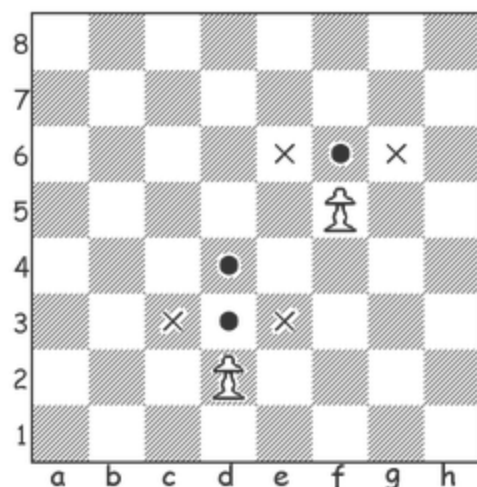


Figure 1

Knight: (Two pieces)

The Knight moves in either a horizontal or vertical “L” shape. You move one space forward or backward and then move two spaces to either side; or you move one space to either side and then two spaces forwards or backwards in order to capture an enemy piece. The Knight is also the only piece that is allowed to jump over other pieces when conducting its move. Note that the Knight will always move to a space with the opposite color of its current space.

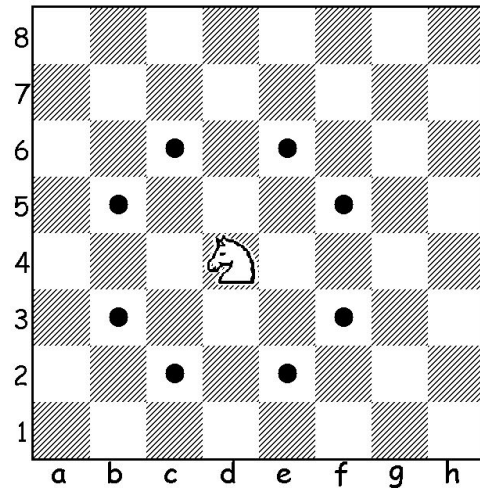


Figure 2

Bishop: (Two pieces)

The Bishop moves diagonally in any direction. It is not limited to a specific number of spaces. Bishops are allowed to move as far as possible until another ally or enemy piece is in the way, in which case the Bishop may capture the enemy piece.

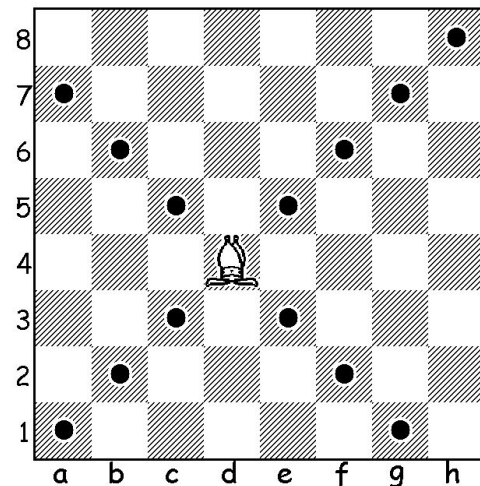


Figure 3

Rook: (Two pieces)

A rook moves forwards, backwards, left, or right as far as you want it to. It can move any number of spaces and only has to stop if another piece is in its way. When it captures the other pieces it takes that piece's place.

Note: The Rook is involved in an Advanced Technique. See page 6 for details.

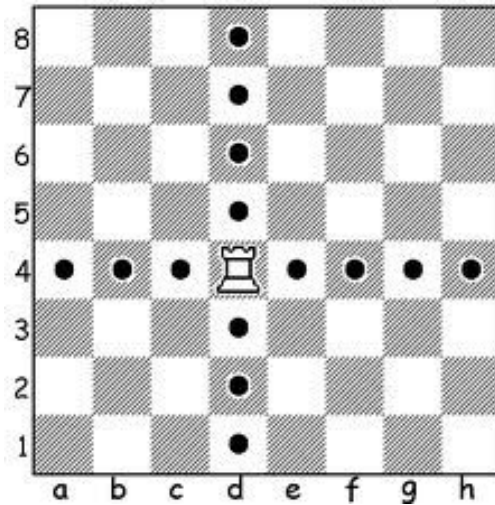


Figure 4

Queen: (One piece)

The Queen is a combination of a Rook and a Bishop. It can move diagonally, forwards, backwards, or to either side, while also moving as many spaces as desired. Similarly to all Chess pieces, the Queen takes position in the space of the captured enemy piece.

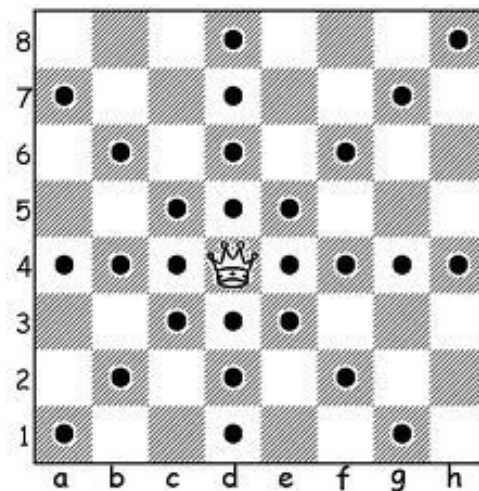


Figure 5

King: (One piece)

The King can move one space in any direction. It is also the most valuable piece in Chess. When the King is in "check", there is an opposing enemy piece threatening to capture it in its next move/turn. The player in check must move the King out of

danger. If there are no possible moves to keep the King from being in check, the opposing player wins with via “checkmate”.

Note: The Rook is involved in an Advanced Technique. See page 6 for details.

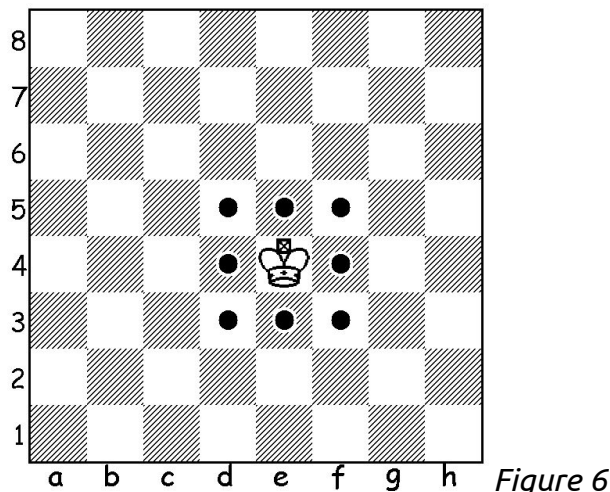


Figure 6

Advanced Techniques

En Passant:

En Passant is a special move that the Pawn can initiate. If the opposing player chooses to move his Pawn two spaces forward and his/her Pawn lands beside yours, (on your next turn) you can capture their pawn and place your pawn behind the pawn being captured. Note that this advanced technique can only be done on the turn right after the opposing pawn has been moved, and no later.

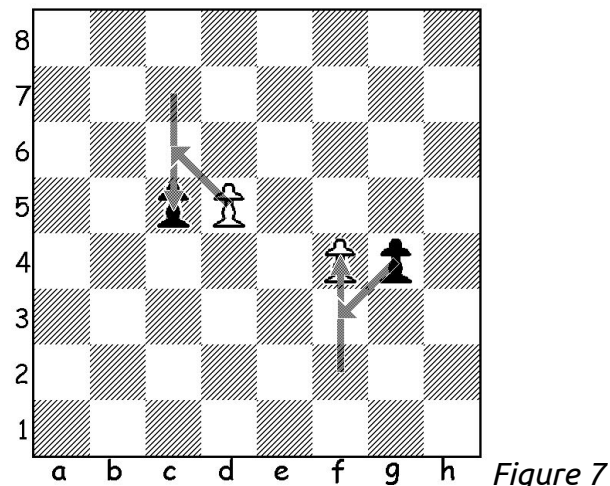


Figure 7

Castling:

Castling is a special move that the King can perform with the Rook. The first condition is that the King and Rook must have not moved during the entire game.

Secondly, there should be no pieces between the Rook you want to move and the King. The move allows the rook to slide from its original position to the space right beside the King and then the King jumps to the other side of the Rook.

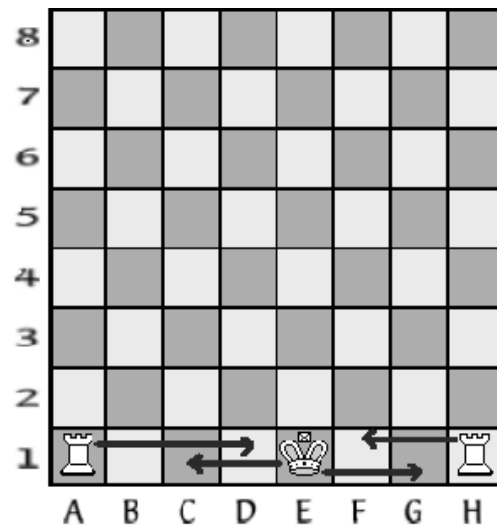


Figure 8

Chess Keywords

Check:

A Check is when the King is being threatened of being captured by an enemy piece, but still has the ability to move in order to prevent being captured the next turn (even if it means sacrificing other pieces by moving them in the path). If this happens the player **must** do anything to prevent the king from being captured. A King can never move into check--suicide is not allowed.

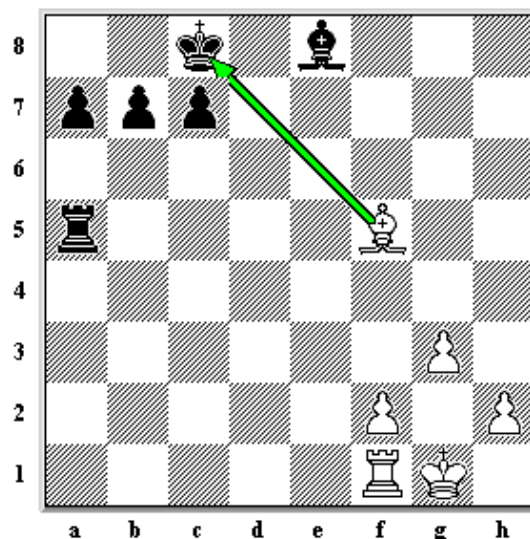
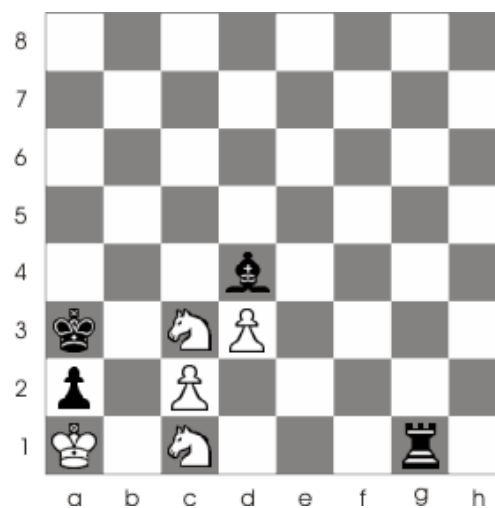
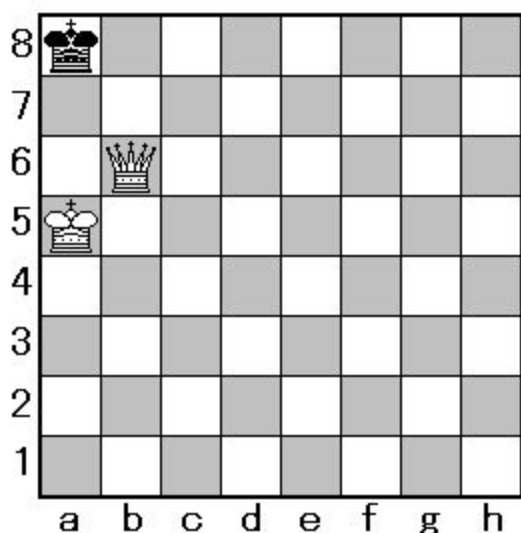


Figure 9

Stalemate:

A stalemate is a tie. The king is **not** in check, but does not have any valid moves, as in, all available moves will place the King into check. Also if there are other pieces in

play, they must not be able to move anywhere either. If all of these conditions are met and it is that king's turn, the result is a stalemate.



Figures 10 and 11

Checkmate:

A checkmate means that a player has won the game. The following conditions are needed for a checkmate: a King must be in check, there are no pieces that can remove the King from check, and the King is unable to move himself from check. You also cannot castle into check or over check. If all of the above conditions are true, the player that is checkmated loses the match. The opposing player wins.

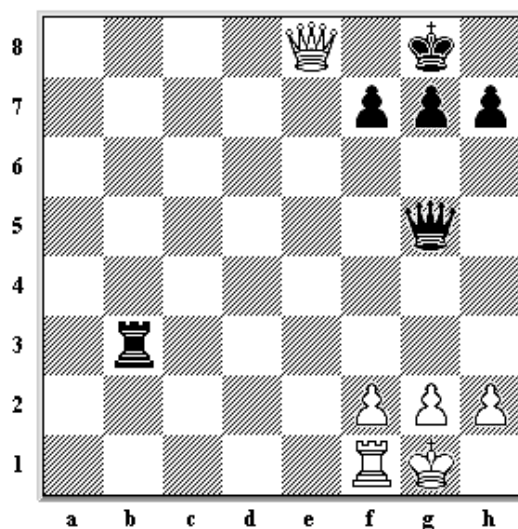


Figure 12

Chess

Usage

Chess (nøl / C Gets Degrees, 2016) is a computer game that simulates the chess board game with **Player versus Player**, **Player versus Computer**, and **Computer versus Computer** game modes.

Goals

Our goal for Chess is to create a comprehensive program covering all the basic rules of the Chess board game and to create a computer opponent that systematically plays chess by analyzing the best possible moves. The program follows the basic rules of chess and includes special moves like en passant and castling. It also has some special features that are explained below.

```
  a b c d e f g h
8 | r | n | b | q | k | b | n | r | 8
+---+---+---+---+---+---+---+---+
7 | p | p | p | p | p | p | p | p | 7
+---+---+---+---+---+---+---+---+
6 |   |   |   |   |   |   |   |   | 6
+---+---+---+---+---+---+---+---+
5 |   |   |   |   |   |   |   |   | 5
+---+---+---+---+---+---+---+---+
4 |   |   |   |   |   |   |   |   | 4
+---+---+---+---+---+---+---+---+
3 |   |   |   |   |   |   |   |   | 3
+---+---+---+---+---+---+---+---+
2 | P | P | P | P | P | P | P | P | 2
+---+---+---+---+---+---+---+---+
1 | R | N | B | Q | K | B | N | R | 1
+---+---+---+---+---+---+---+---+
  a b c d e f g h

White's turn
White pieces are displayed in CAPITALS. Black pieces are displayed in lowercase
Move a piece by typing its location and its destination like: a2 a3 or a2a3
You can also see a piece's available moves by typing its location like: a1
Load a game by typing load (see user manual for more instructions)
To bring up these instructions again, type help
Exit the game by typing exit or quit
>
```

Program Features

As mentioned previously, the program includes a computer opponent for the player to play against. The player can choose which side they want to play on. Our program also features the following:

- 3 levels of difficulty for Player versus Computer mode (Easy, Medium, Hard)
- Showing all possible moves for any specific piece
- Outputs a formatted log of all of the moves made in the previous game
- Loading a game from a text file containing sequential moves
- Taking back a move (undo)
- Preset game timer durations

More detailed explanation of all game functions can be found under the **Functions and Features** section of this user manual.

Installation

System Requirements:

For Windows:

- Make sure the computer can run a terminal through a ssh client (such as PuTTY or MobaXterm).
- Computer should be able to access the EECS servers, specifically the Zuma (zuma.eecs.uci.edu) or CrystalCove (crystalcove.eecs.uci.edu) Linux servers and run a terminal.

For Macs:

- Open the program called Terminal on your Mac. It should already be an installed application on your Mac.
- Make sure to go to the New Remote Connection in the Shell option and access the EECS servers by typing zuma.eecs.uci.edu or crystalcove.eecs.uci.edu in the secure shell box.

Setup and Configuration

- Connect to the EECS server
- Copy the game files from the server to your current directory by typing in the command line: `cp ~L16T11/Chess_Alpha.tar.gz .`
- Unzip and extract the game files by typing in the command line: `gtar -xzf Chess_Alpha.tar.gz`
- Navigate inside the game folder by typing: `cd Chess_V1.0`
- Open INSTALL.txt for instructions to run the program

Uninstalling

- First navigate outside of the game folder by typing `cd ..`
- To remove all games files, type `rm -r Chess_V1.0`

Functions and Features

User Input Handling / Selection of Pieces

The player has several text input options at the start of their respective turns. The program will handle these options and will output the “invalid selection” error if none of the following are entered.

- Exit the game by typing `exit` or `quit`
- Undo the last move by typing `undo`
- Make the move directly by typing two board locations: the current position of the piece and intended position.
- Selecting a piece by typing the current position. This will display the piece’s available moves.

Check Notification

If a player’s king is in check, the game will notify the player and prevent them from suiciding (performing a move that still results in a check). If no such move is possible, the program will declare a checkmate and end the game. A player can start a new game if they wish.

Undo Move

A player can undo their previous move. This will also take back the last move that the opponent made. This function only allows the player to take back one move per turn.

Stalemate Detection

If the game detects a stalemate has occurred (see Glossary for definition), the program will indicate so and end the game.

Move Log

All moves in a game will be logged in a text file automatically. The file will contain information in the standard algebraic notation of Chess. Below is an example of a move log that may be outputted at the end of each game.

	White	Black
1.	a2-a4	a7-a5
2.	Ra1-a3	Nb8-c6
3.	Ra3-h3	d7-d6
4.	c2-c4	Bc8xh3
5.	c4-c5	Bh3xg2
6.	c5xd6	e7-e5
7.	d6xc7	Ra8-a6
8.	c7-c8Q	e5-e4
9.	Qc8xd8#	
1-0		

Notation

The notation for the moves, spaces, and pieces are as follows:

Pieces - R: Rook | N: Knight | B: Bishop | Q: Queen | K: King | Pawn: No letter

Spaces - The squares of a chessboard are divided into ranks (numbers) and files (lowercase letters). The ranks correspond to the horizontal rows on the board whereas files are the vertical columns.

Moves - Moves work as such: If a player moves his Bishop from the space on the fourth row, second column to the space on the third row, third column, the move log would denote the move as Bb4-c3. Furthermore, if the Bishop had to capture a piece in the process of moving to the space, the dash would be replaced with an 'x' such that the move would now be noted by Bb4xc3.

Check - If a move causes the opponent to be in check, a '+' will be displayed after the move. If checkmate, a '#' will be displayed and the score will be shown as 1-0 if White wins, and 0-1 if Black wins. For a stalemate, no symbol will be shown but the score will be shown as 1/2-1/2.

Loading a Game

You may load a game and continue playing by typing "load" while in game. The program will then prompt you for a file name. This file must be a text file with sequential moves.

Game Timer

The game may be timed. In the beginning of the game there will be three preset options for how long you want the game timer to be (in minutes): 5, 10, 20, or no timer at all. Each number represents the amount of cumulative time each player can have for all of his or her moves. That is to say that if you were to select "5" all of your moves, both players cannot spend more than 5 minutes each on all their moves, meaning that the game can take up a total of 10 minutes. The player that runs out of time first automatically loses.

```
a2a4  
a7a5  
a1a3  
b8c6  
a3h3  
d7d6  
c2c4  
c8h3  
c4c5  
h3g2  
c5d6  
e7d5  
d6c7  
a8a6  
c7c8  
e5e4
```

Error Messages

"Invalid move. Please try again." - this error occurs when a player attempts to move a piece that is not allowed (ex: trying to move a pawn three spaces), or to a space that doesn't exist (ex: trying to move any piece to A12).

"Unknown command. Please try again." - an error that occurs when an unrecognized command is issued. Make sure to check the spelling and the format of the command. Valid commands are:

- quit
- exit
- undo
- load
- [piece location]
- [piece location][destination location]

"Invalid selection. Please try again." - this error occurs when the user enters a value that is out of bounds of the presented options:

"Invalid entry or format. Please try again" - this error is similar to unknown command, but appears most often if a typo has been made. Some examples may include:

- a4b55
- e66

"No piece in selected location. Please try again." - this error occurs when an empty location is selected.

"No available moves for [piece name/location]" - error message received when trying to move a piece that cannot move at all (ex: trying to move a rook before any pieces have been moved out of its way).

"You are not allowed to move your opponent's pieces. Please try again" - this error occurs when a player attempts to move the opponent's pieces.

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This project was developed as an assignment in the Winter of 2016. It is the intellectual property of nøl and C Gets Degrees, a group of students at the University of California, Irvine and should not be used, copied, or distributed for commercial or other non-personal use. The source code is licensed under the [GNU General Public License](#).

Project Contributors:

- Aaron "A.I." Liao, 90811748
- Alden "The Pawn" Chico, 83197101
- Brad "Bishop" Leiserowitz, 21437905
- Bryan "The Board" Ou, 1174696
- Carlos "Castling" Cortes Gutierrez, 80207156
- Jeffrey "My Name's Jeff" Han, 51999492
- Syed "Stalemate" Azeemuddin, 18393977
- Tam "The Timer" Nguyen, 12276989

Bibliography

"Check and Checkmate." *Chess Corner*. N.p., n.d. Web. 13 Jan. 2016. (*Figures 9,12*)

"Chess: Castling." *Dad's Gaming Addiction*. N.p., 10 May 2012. Web. 13 Jan. 2016. (*Figure 8*)

https://commons.wikimedia.org/wiki/File:Stalemate_chess.png (*Figure 10*)

"Let's Play Chess." USCF, n.d. Web. 13 Jan. 2016.

"Pieces and Movement." *Pieces and Movement*. N.p., n.d. Web. 13 Jan. 2016. (*Figures 1-7*)

"The Chess Rules for Stalemate." *The Chess Rules for Stalemate*. N.p., n.d. Web. 13 Jan. 2016. (*Figure 11*)

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