

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.*

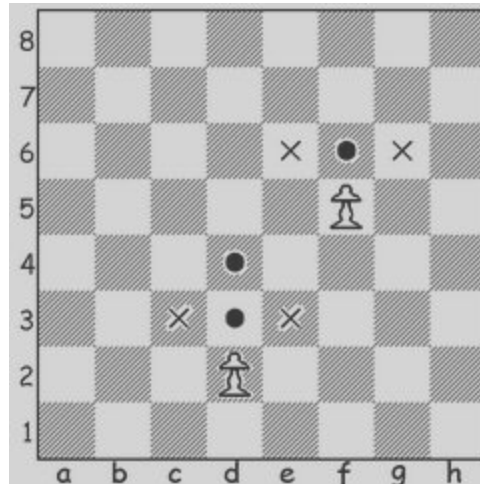


Figure 1

### **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.

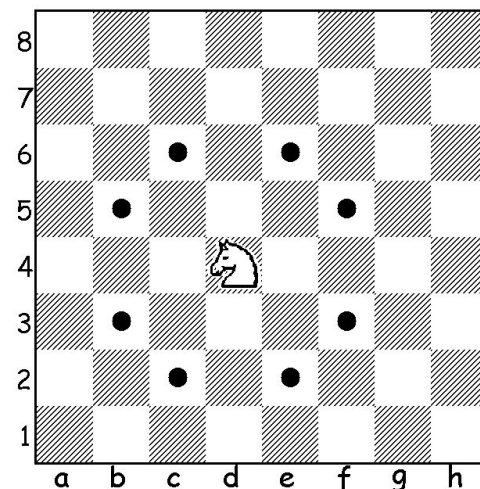


Figure 2

**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.

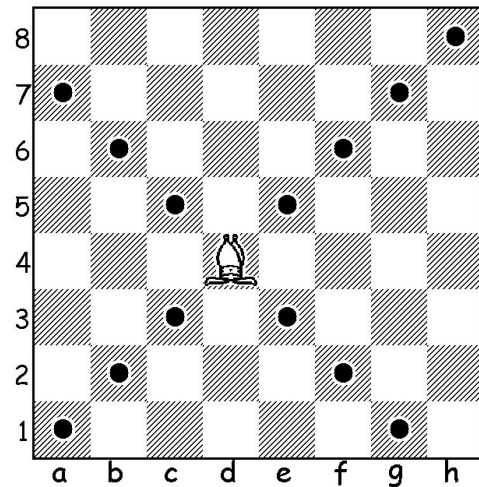


Figure 3

**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.*

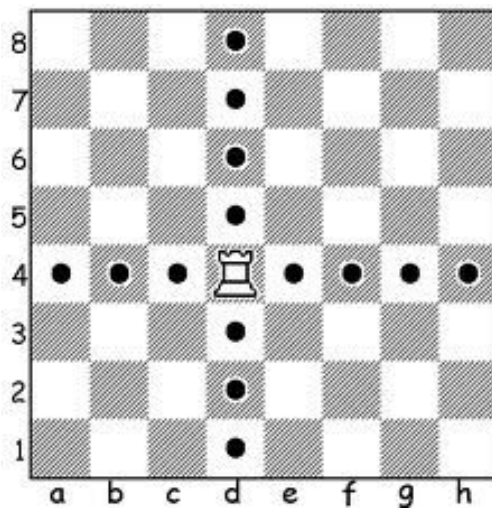


Figure 4

**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.

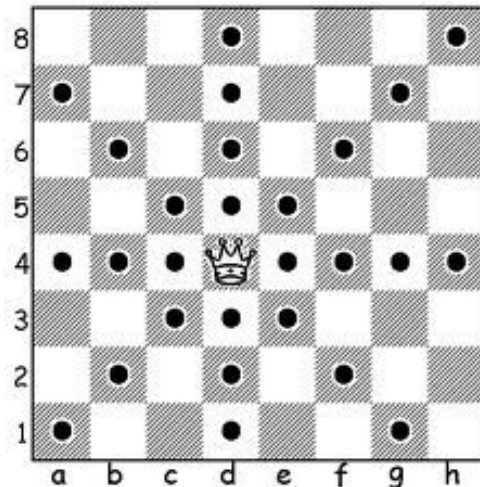


Figure 5

**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 via “checkmate”.

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

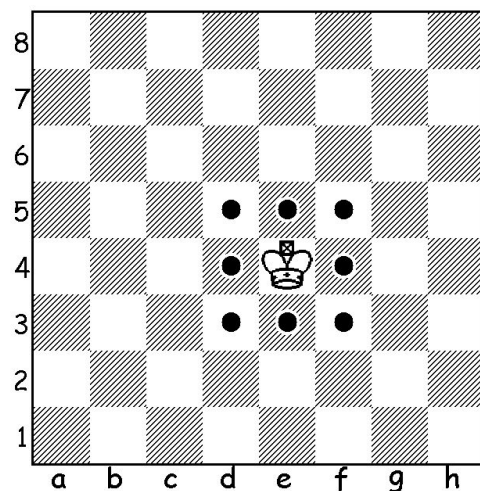
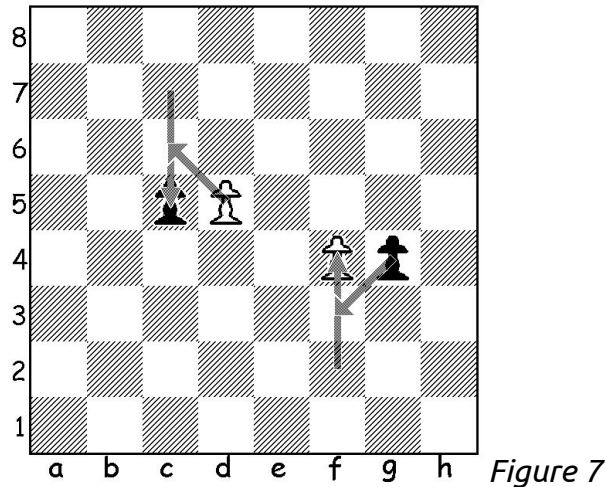


Figure 6

## Advanced Techniques

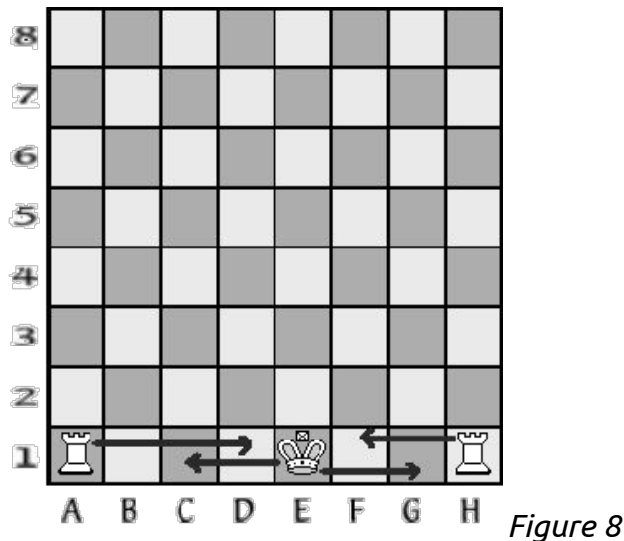
### **En Passant:**

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.



### **Castling:**

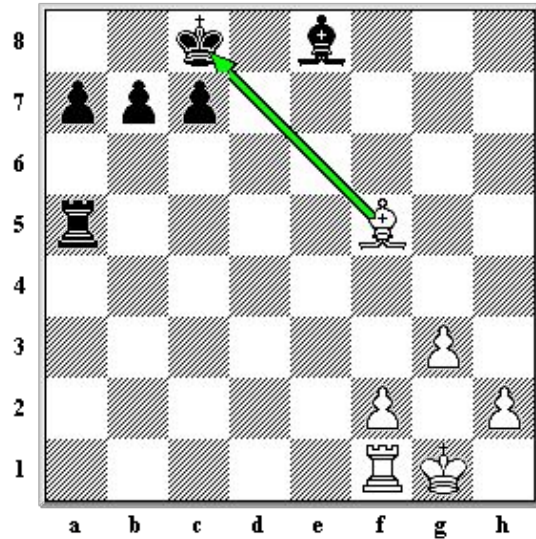
Castling is a special move that the King can perform with the Rook. The first condition is that the King and Rook must have not moved during the entire game. Secondly, there should be no pieces between the Rook you want to move and the King. The move allows the rook to slide from its original position to the space right beside the King and then the King jumps to the other side of the Rook.



## Chess Keywords

### **Check:**

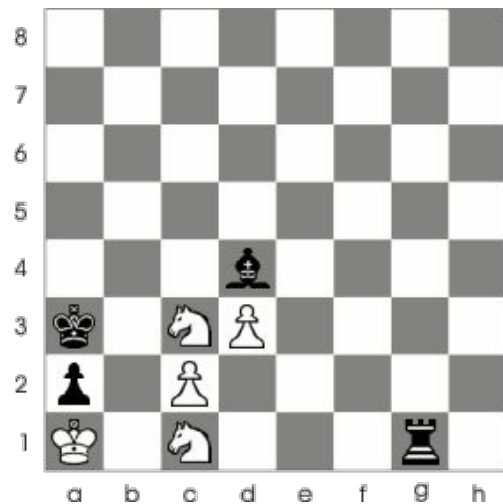
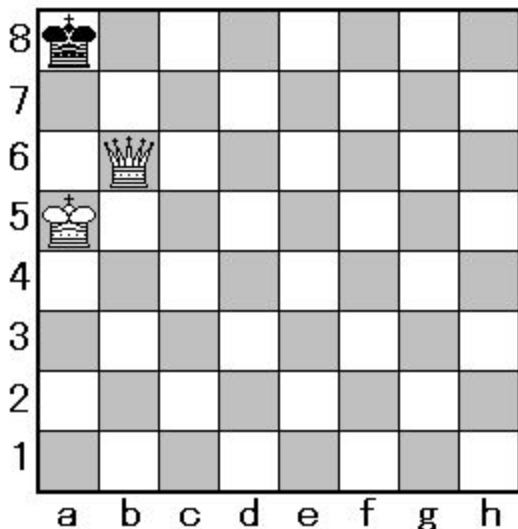
A Check is when the King is being threatened of being captured by an enemy piece, but still has the ability to move in order to prevent being captured the next turn (even if it means sacrificing other pieces by moving them in the path). If this happens the player **must** do anything to prevent the king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



*Figure 9*

### **Stalemate:**

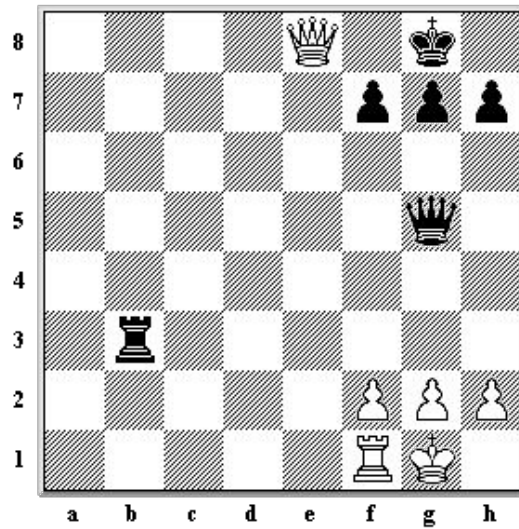
A stalemate is a tie. The king is **not** in check, but does not have any valid moves, as in, all available moves will place the King into check. Also if there are other pieces in play, they must not be able to move anywhere either. If all of these conditions are met and it is that king's turn, the result is a stalemate.



*Figures 10 and 11*

**Checkmate:**

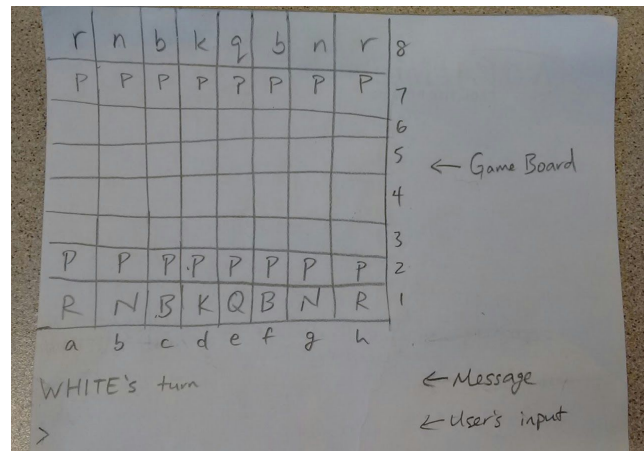
A checkmate means that a player has won the game. The following conditions are needed for a checkmate: a King must be in check, there are no pieces that can remove the King from check, and the King is unable to move himself from check. You also cannot castle into check or over check. If all of the above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



*Figure 12*



# Chess



## Usage

*Chess* (nøl and C Gets Degrees, 2016) is a computer game that simulates the chess board game with both **Player versus Player** and **Player versus Computer** game modes. In the case of Player versus Computer, there are three levels of difficulty: Easy, Medium, and Hard.

## 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.

## Program Features

As mentioned previously, the program includes a computer opponent for the player to play against. Our program also allows players to do the following:

- Choose to use a chess timer
- Take back their previous move
- Log all of the moves made in a text file
- Show all possible moves for a specific piece

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 -r .`
- Type `make install` to compile the executable program
- To play the game, type `chess` into your terminal and the program will initiate.
- Type `exit` or `quit` at any time to close the program.

### Uninstalling

- To uninstall the game, navigate to the directory containing the game.
- Now type `make clean` to remove the files.
- You will no longer have the files for the game, but you can reinstall by typing `make install` again.

## **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 separated by a space: the current position of the piece and intended position.
- Selecting a piece by typing the current position of the piece.

The last option will then display the piece’s available moves, if any, and then prompt the player to move it to one of those locations.

### **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. A new game can be started again if the user desires.

### **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.

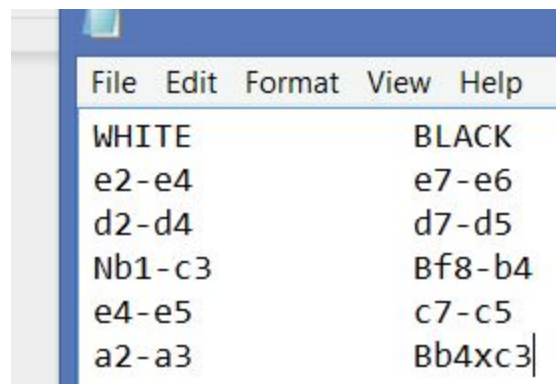
### Notation

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.

A screenshot of a chess application window. The window has a blue title bar and a menu bar with 'File', 'Edit', 'Format', 'View', and 'Help'. Below the menu bar is a table with two columns: 'WHITE' and 'BLACK'. The table contains a list of moves for each player. The last move in the 'BLACK' column is 'Bb4xc3', which is highlighted with a cursor.

WHITE	BLACK
e2-e4	e7-e6
d2-d4	d7-d5
Nb1-c3	Bf8-b4
e4-e5	c7-c5
a2-a3	Bb4xc3

### 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.

## 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 spelling and the format of the command. Valid commands are:

- (Universal) quit
- (Universal) exit
- (In Game) undo

"Invalid selection. Please try again." - this error occurs when one of the following occurs:

- (Game Setup) The number entered to select difficulty is out of bounds
- (Game Setup) The number entered to select player color is out of bounds
- (Game Setup) The number entered to select game mode is out of bounds
- (In Game) A single board position that refers to an empty space or enemy piece

"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).

## Copyright and License

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](#).

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- Tam "The Timer" Nguyen, 12276989

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"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](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*)

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