



## Java Chess User Manual

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## Welcome!

Welcome and thank you for choosing Java Chess. Java Chess provides a platform for users to play a game of chess against another human player, play against an artificial player, or to watch a chess game simulation. Two-player mode consists of human players sharing hardware and taking turns making moves to complete a game. One-player mode allows the user to compete against a chess artificial intelligence that can be set to three varying difficulty levels. Simulation mode (zero players) allows the user to observe a chess artificial intelligence play against itself.

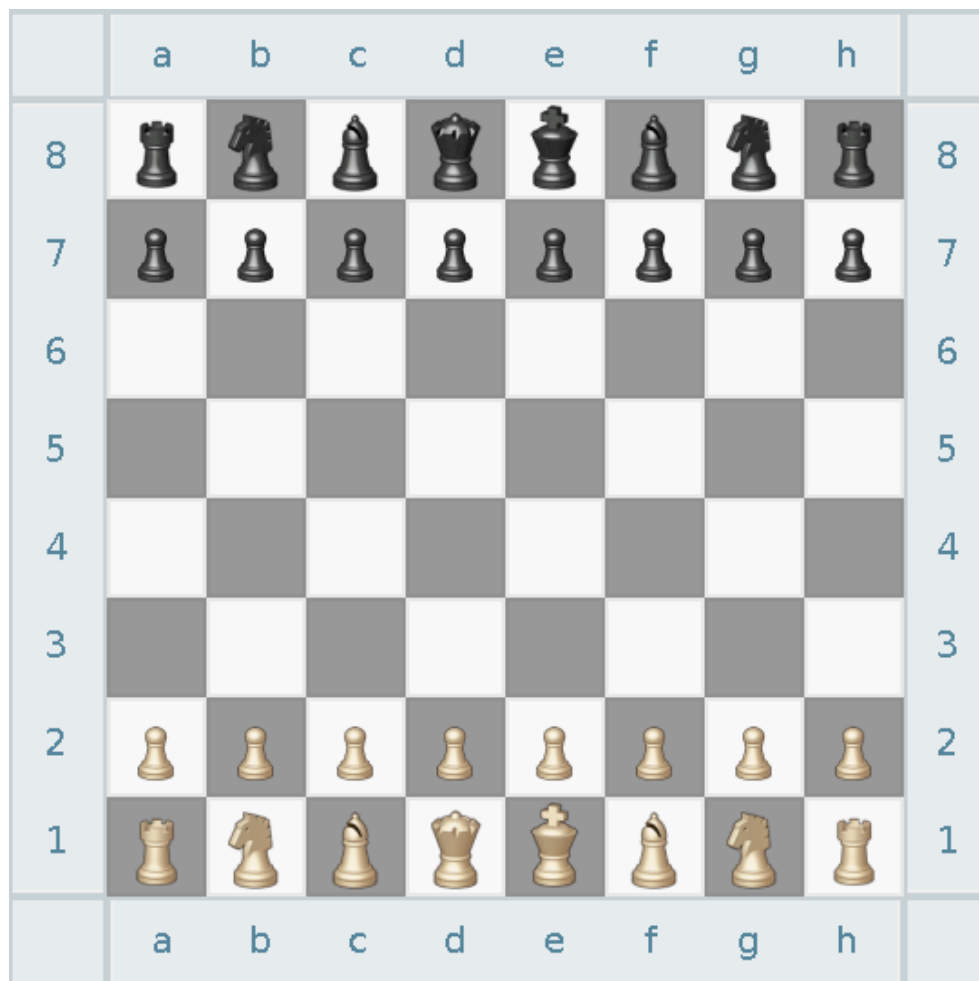
Java chess displays gameplay on both a traditional chess board and within an algebraic notation view port. PGN file format is supported to allow users to save and load games.

A full tutorial mode is available to teach novice chess players the basics of the game. This tutorial mode guides new players through a match using notifications, move hints, board highlighting and the ability to undo/redo moves. Detailed information about each chess piece is also accessible within the tutorial mode.

The ability to choose between three modes of gameplay at varying levels of difficulty, the inclusion of both a graphical and a textual playing experience, and a robust, but optional, tutorial with additional help features allows players of any ability, from novice to master, to enjoy the game of chess.

## About Chess

Chess is a strategic game played between two opponents on a square board that is composed of 64 alternating smaller dark and light squares. Players are assigned a set of 16 pieces, one set black, and the other white. The 16 pieces are made up of six different types: eight pawns, two rooks, two knights, two bishops, one queen and one king. At the start of the game, the pieces are arranged as follows:



Note that the black queen begins on a dark square and the white queen begins on a light square, otherwise the board is arranged the same for both players.

Players alternate turns moving one piece at a time in accordance with the move regulations specific to the piece. White always moves first. If any piece is moved onto a square containing an opponent's piece, the opponent's piece is taken out of play for the remainder of the game and said to have been captured. Pieces may not be moved onto squares occupied by pieces of the same color.

The objective of the game is to force the opponent's king into [checkmate](#). A checkmate occurs when a king is put into a [check](#) position that it cannot escape from. A check occurs when, on the next move, the king may be captured by the opponent. The first player to achieve a checkmate against their opponent wins the game. A win may also occur if a player's opponent runs out of time on the [chess clock](#).

## Stalemate

Although the goal of the game is to put the opponent's king into checkmate, the game may also end if one player [resigns](#), or if the game results in a [draw](#). A draw occurs when neither player wins or loses because of one of the following conditions:

- Agreement between the players to end in a draw
- A condition known as [Stalemate](#) is reached in which one of the players has no legal move options
- [Threefold repetition](#) in which a player makes the same move three times in a row and cannot make further game progress
- Neither player makes progress in the form of moving their pawns and no pieces have been captured over the span of [fifty moves](#)
- If the game comes to a state where checkmate is not possible due to an [insufficient number of pieces](#) on the board

## Piece Movement

Individual pieces may be moved as follows:

Pawn: A pawn may advance one or two squares forward on its first move, but only one square forward for the remainder of the game. Pawns may capture opponent pieces one move forward in the diagonal only. Pawns may not move through other pieces.

Rook: Rooks may move to any square in the horizontal or vertical of the square it currently occupies. Rooks may not move through other pieces unless in the case of castling.

Knight: Knights are the only piece that may move through other pieces and may move to squares located two squares nearest to it but not directly horizontal, vertical, or diagonal.

Bishop: Bishops may move diagonally to any square from the square it occupies. Bishops may not move through other pieces.

Queen: Queens may move to any square horizontal, vertical or diagonal of the square they currently occupy. Queens may not move through other pieces.

King: Kings may move to adjoining squares only, except in the case of castling.

No piece may be moved in such a way that the move would result in the check of the player's own king.

## Special moves

Castling is a special move that occurs between a player's king and one of the same player's rooks. A castling move may only be performed if both the king and the participating rook have not yet been moved during the current game. To perform the castling move the king is moved two squares horizontal towards the participating rook, and the rook is moved two squares horizontal towards the king. The king and the rook may pass through each other to accomplish this move.

[En passant](#) capture may be made by a pawn when a player initially moves their pawn two squares, but had they only moved it by one square it would be under attack by the opposing player's pawn. In this case the opposing player may still capture the pawn as if it has only been moved by one square. This special capture can be made on the next turn only.

[Pawn promotion](#) occurs when a pawn is moved to a square of the last row on the opposite side of the board from which its color began. When this happens, the player must exchange the pawn for either a queen, a knight, a bishop or a rook of the same color, onto the square where the promotion occurs.

## Time

Game time is controlled by a clock with a time display for each player, each player's time runs only during that player's turn. Time is set to an agreed upon amount before the start of the game. If a player runs out of time during game play, that player then loses the match. For more information about time please see [here](#).

For more detailed information about chess rules, please see the [International Chess Federation rule book](#).

## Algebraic notation

Algebraic notation is the method by which chess games are recording move by move. Each square on the chessboard is assigned a coordinate based on its row and column position. Rows and columns, from white's point of view, are called ranks and files, respectively. Squares along the rank are labeled alphabetically, left to right, from a to h. Squares along the file are labeled numerically, top to bottom, from 1 to 8. The left side of the board from white's point of view is referred to as queenside, and the right as kingside.

The algebraic notation system of coordinates can be seen in the following image:

	a	b	c	d	e	f	g	h	
8	a8	b8	c8	d8	e8	f8	g8	h8	8
7	a7	b7	c7	d7	e7	f7	g7	h7	7
6	a6	b6	c6	d6	e6	f6	g6	h6	6
5	a5	b5	c5	d5	e5	f5	g5	h5	5
4	a4	b4	c4	d4	e4	f4	g4	h4	4
3	a3	b3	c3	d3	e3	f3	g3	h3	3
2	a2	b2	c2	d2	e2	f2	g2	h2	2
1	a1	b1	c1	d1	e1	f1	g1	h1	1
	a	b	c	d	e	f	g	h	



Piece types also have algebraic identifiers except for the pawn. The others are as follows:

Rook – R

Knight – N

Bishop – B

Queen – Q

King – K

Moves are recorded according to the piece's upper-case letter (except in the case of a pawn move which does not include an upper-case letter) followed by the coordinate of the square that the piece moved to. If a capture took place during the move an x is included between the uppercase identifier and the coordinate of the destination square. For example, Qxd8 would indicate that queen captures the piece on d8. Pawn captures are recorded by including the rank location of the pawn at the start of the move coordinate. For example, dxc5 would indicate that the pawn on square d4 moved to square c5 and made a capture. If a pawn makes an En passant capture, the move is recorded with "e.p." at the end.

### Recording special case moves

If two or more pieces can move to the same square the piece that is moved must be identified by including either the file departure or the rank departure or both in the record. Example: Rde8

Pawn promotions are recorded by including an equal sign followed by the uppercase indication of what type of piece the pawn was promoted to at the end of the move record. Example: b8=Q

Castling is recorded with "O-O" for kingside castling and "O-O-O" for queenside castling.

Check is recorded by including "+" at the end of the record. Example: Rb1+

Checkmate is recorded by including "#" at the end of the record. Example: Rb1#

A Draw is recorded by and equal sign in parentheses. (=)

The end of the game is indicated with the conclusion of the game represented as follows:

White won: 1-0

Black won: 0-1

Draw: ½-½

White forfeit: 0-½

Black forfeit: ½-0

Both forfeit: 0-0

Loss by default: +/-, -/+ or -/-

For more information about chess algebraic notation please see the [FIDE laws of chess handbook](#).

## Portable Game Notation

[Portable Game Notation](#) (PGN) is a format for recording chess using plain text and is fully supported by this application. PGN is the standard method by which chess software allows for saving and loading matches. PGN is based on algebraic notation and uses the file name extension .pgn.

PGN can have one of two formats, import format or export format. Import format allows for data that may have been prepared by a human. Export format has strict stylistic formatting conventions and is composed of machine prepared data.

PGN files begin with seven tag pairs that contain data about the event, location, date, round number, name of white player, name of black player, and the result of the match. An additional seven optional tag pairs may be included and contain data about the annotator, the string value indicating the total number of half moves (PlyCount), time control data, termination details, mode (in person or electronic) and the initial set up of the board (FEN).

An example of a game recorded in a PGN file can be seen as follows:

```
[Event "Sarajevo"]
[Site "Sarajevo"]
[Date "1983.02.09"]
[Round "3"]
[White "Nikolic, Predrag"]
[Black "Gligoric, Svetozar"]
[Result "1-0"]
[WhiteElo "2490"]
[BlackElo "2510"]
[ECO "E60"]

1.d4 Nf6 2.c4 g6 3.Nf3 Bg7 4.g3 c5 5.d5 d6 6.Bg2 b5 7.cxb5 Qa5+ 8.Nfd2 Qxb5
9.Nc3 Qa6 10.0-0 0-0 11.Re1 Nbd7 12.h3 Qa5 13.Nc4 Qb4 14.Qa4 Nb6 15.Nxb6 Qxb6
16.Rb1 Rb8 17.Bd2 Qa6 18.Qc2 Nd7 19.b3 Nb6 20.e4 Bd7 21.Bf1 Qc8 22.Kh2 Na8
23.Bf4 Nc7 24.e5 Bf5 25.Bd3 Bxd3 26.Qxd3 Rd8 27.Qf3 Nb5 28.Nxb5 Rxb5 29.exd6 exd6
30.Re7 Qf5 31.Rbe1 Be5 32.Qe2 Rb4 33.Bxe5 dxe5 34.Rxe5 Qf6 35.Rc1 Rc8 36.Re8+ Rxe8
37.Qxe8+ Kg7 38.Qe3 h5 39.h4 Qb2 40.Rxc5 Re4 41.Qf3 Re5 42.Rc4 Qd2 43.Rf4 Qxd5
44.Qxd5 Rxd5 45.Ra4 a5 46.Kg2 Kf6 47.Kf3 Ke5 48.Ke3 Rb5 49.Re4+ Kd6 50.Kd3 f6
51.Re8 g5 52.hxg5 fxg5 53.Rh8 g4 54.Rf8 Re5 55.Kd4 Rb5 56.Ke4 Ke6 57.Kf4 Rd5
58.a4 Rc5 59.Re8+ Kf6 60.Rb8 Rf5+ 61.Ke4 Re5+ 62.Kd3 h4 63.gxh4 Rh5 64.Rb6+ Kf7
65.Ke4 1-0
```

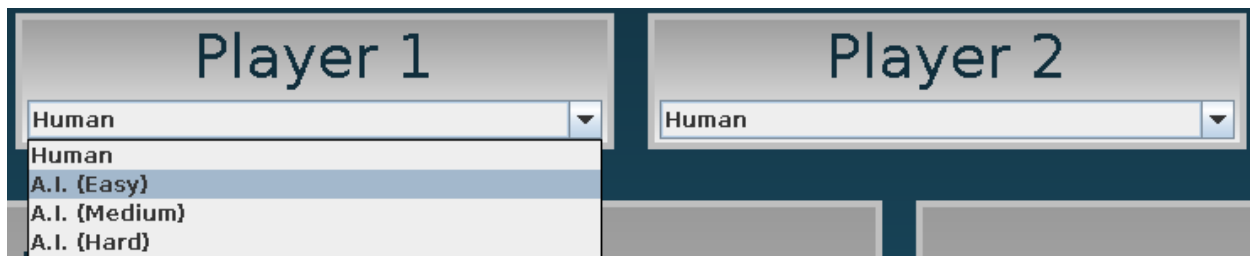
## Application Help

### Game Set Up

To begin a customized game of chess, select the "New Game" option from the main menu screen as shown below:

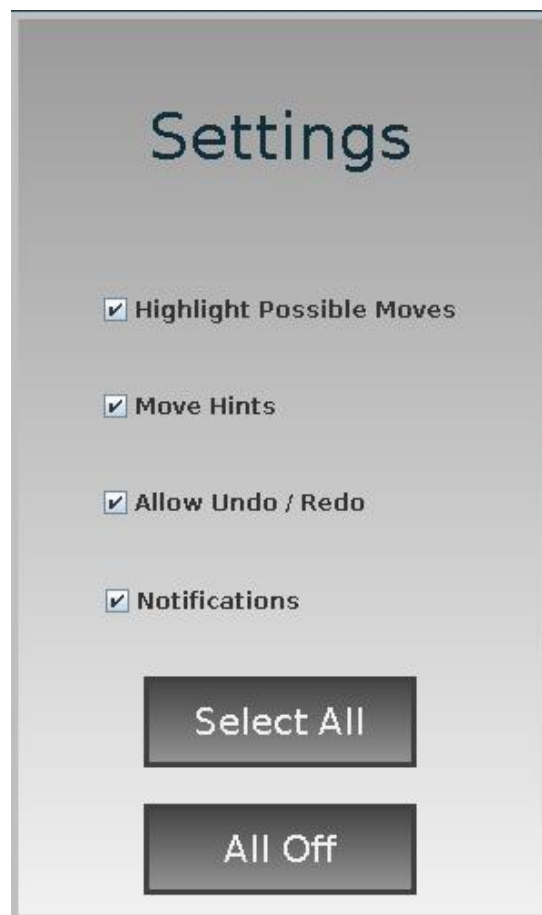


Next, within the set-up screen, assign player types to player 1 and player 2 using the drop-down menu to make your selection. You may choose human, or one of three A.I. players of specified levels of difficulty.



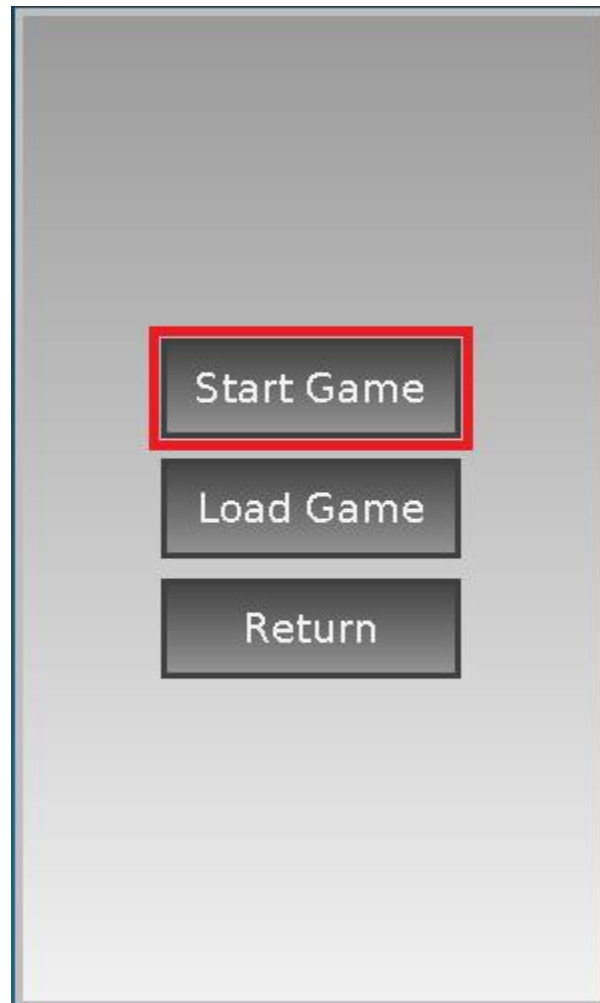
If two A.I. players are selected, the game play mode will consist of a presentation of a simulation of a chess game between the two A.I. players that you selected.

Choose which features you would like turned on or turned off during your game from the settings panel. Note: These features are only available to human players.



A checked box indicates that the corresponding feature will be turned ON. A blank checkbox indicates that the corresponding feature will be turned OFF.

Once you have chosen your preferred settings, click the "Start Game" button to begin.



### Tutorial Mode

For novice users who wish to learn more about chess, a full tutorial mode is available. Simply select the "Tutorial" button from the main menu screen to begin the tutorial.



Tutorial mode will guide you through a game of chess using text notifications, move hints, a board highlighting feature and the ability to undo/redo moves.

### [Load Game](#)

To load a previously saved game of chess, you may select the load button from the main menu or from the menu bar.

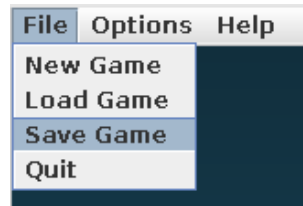


You will then be presented with a file chooser that will allow you to select the game file that you wish to open. Please note that the loaded game must be in PGN file format.

### Save Game

To save a game, you must be in gameplay mode. Select the "Save Game" option from the menu bar.

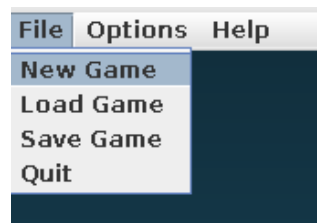




You will then be prompted to select where you would like to save the game on your PC. The game will be saved using PGN file format.

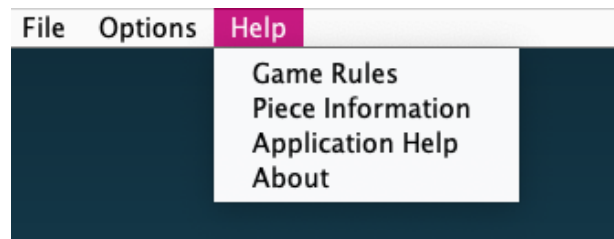
### New Game

During gameplay mode if you wish to start a new game, simply select the "New Game" option from the menu bar to return to the main menu and proceed accordingly.



### Help

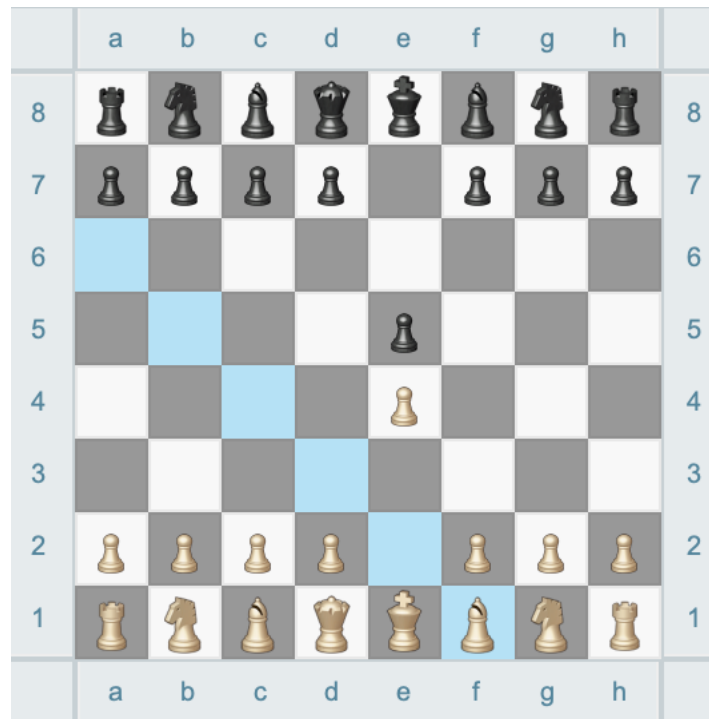
For detailed information about the rules of chess, please select the "Chess Rules" option from the "Help" section of the menu bar. For detailed information about each chess piece, please select the "Piece Information" option from the "Help" section of the menu bar. For application help, please select the "Application Help" option from the "Help" section of the menu bar. And for more information about Java Chess, please select the "About" option from the "Help" section of the menu bar.



## Game Features

### Board Highlight

The board highlight feature presents a visual guide as to where a selected chess piece may move during human gameplay. Please see the following example using a rook.

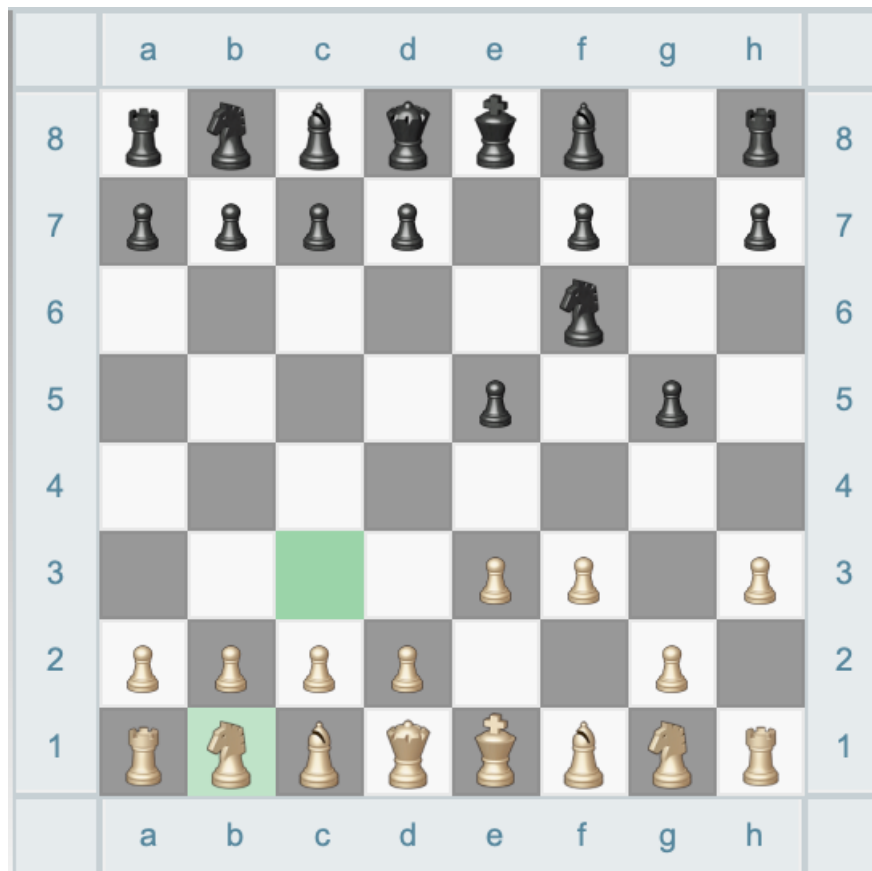


### Notifications

Notifications provide information regarding the state of the game during gameplay mode and can be viewed in the notifications pane below the graphical chess board. Notifications are indented to provide human players with information to help them learn about chess and to aid them in the successful completion of a game.

## Move Hints

Move hints can be generated by pressing the "Hint" button located below the algebraic display. The board will illuminate green on the piece that is suggested to move, and the square that it is suggested this piece be moved to will also illuminate.



## Piece Information

To view information about a specific chess piece, first select the piece you wish to learn about during human game play mode and then click the "About Piece" button located below the algebraic display. A window will open with information about how this piece may legally move during a chess match. The window can be left open for reference or closed at any time.



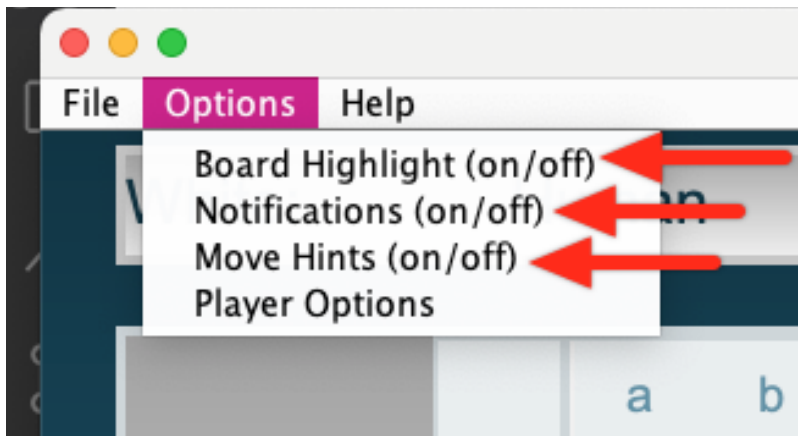
## Undo/Redo Move

To undo or redo a move, select the undo or the redo button located below the algebraic display.



## Turning features on/off

Features can be turned on or off before gameplay begins from the settings panel during game setup. If you wish to turn a specific feature on or off during gameplay mode, this may be done by selecting the feature you wish to turn on or off from the menu bar.



## Software License

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