King Me!

User Manual
Version 1.0

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Glossary

Terminology

Capture - When a piece is taken by another from the opposite player, it is removed from the board.

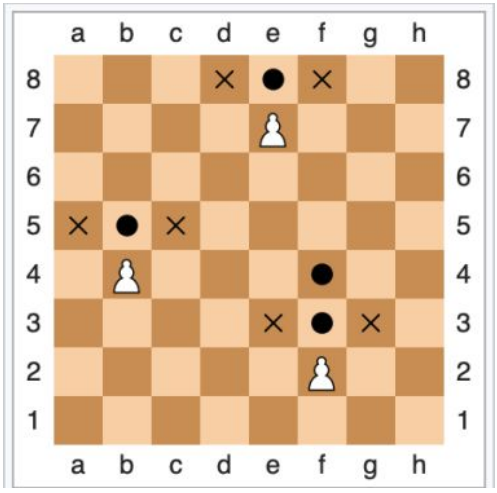
Picture Source: https://en.wikipedia.org/wiki/Chess

Check - When a King is threatened by an opponent's pieces. The player's next move must protect the king in some way.

Picture Source: https://en.wikipedia.org/wiki/Chess

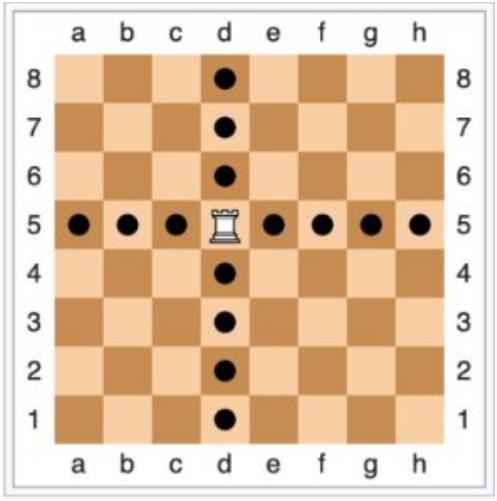
CheckMate - When the King is put in check, but the player has no means of protecting it from being captured on the opponent's next turn. When you are out of moves in this situation, you lose.

Pieces



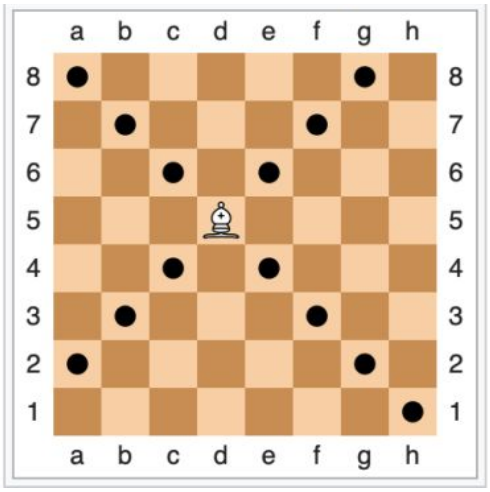
Picture Source: https://en.wikipedia.org/wiki/Chess

Pawn - A piece that is able to move forward two spaces on its first move and only one space forward on subsequent turns. It cannot advance forward if blocked by the enemy or friendly pieces. It is only able to capture in the forward diagonal directions. If it makes it to the enemies end of the board, it can be promoted to another kind of piece except for King or Pawn.



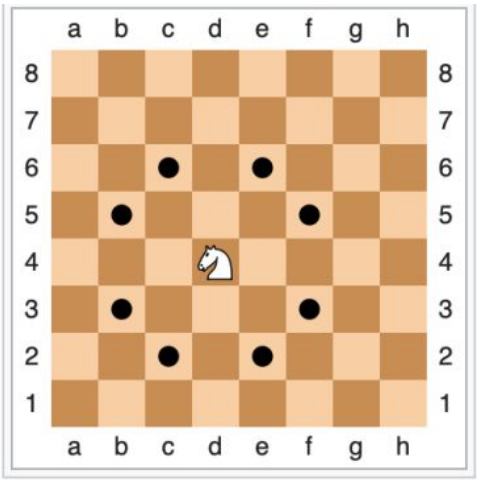
Picture Source: https://en.wikipedia.org/wiki/Chess

Rook - A piece that can move and capture vertically and horizontally unless obstructed by another piece.



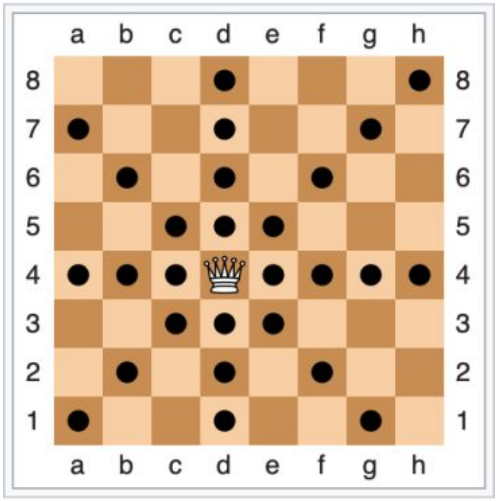
Picture Source: https://en.wikipedia.org/wiki/Chess

Bishop - A piece that can move and capture diagonally unless obstructed by another piece.



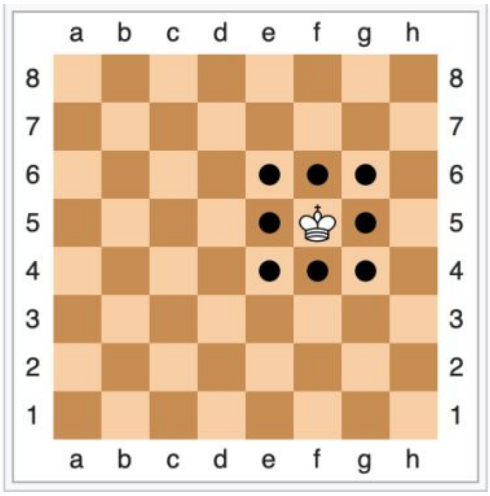
Picture Source: https://en.wikipedia.org/wiki/Chess

Knight - A piece that can move in an 'L' shape of two spaces in one of the cardinal directions, then one in a perpendicular direction to its original heading. It can jump over other pieces and can capture enemy pieces on the space it lands. It cannot land on a space occupied by a friendly piece.



Picture Source: https://en.wikipedia.org/wiki/Chess

Queen - A piece that can move both horizontally, vertically and diagonally like both the Rook or Bishop. Along these directions, she can capture as well as move as long as she is unobstructed.



Picture Source: https://en.wikipedia.org/wiki/Chess

King - The King is the most valuable piece. It can move and capture within one space horizontally, vertically as well as diagonally. It cannot move to a space that would put it in check, which would be considered an illegal move. The game is lost if the king is put into checkmate, where the player cannot make a move that would save it.

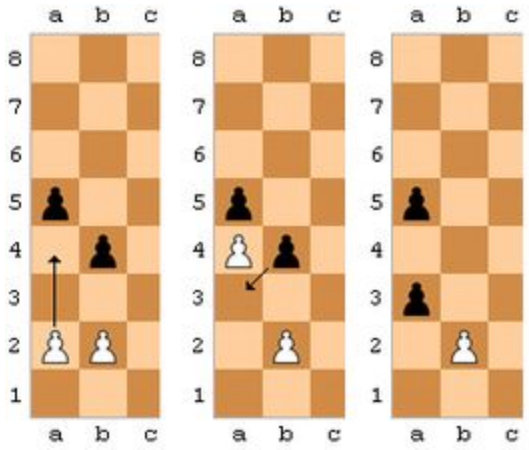
Advanced Moves

Picture Source: https://en.wikipedia.org/wiki/Chess

Castling - An advanced move that can be used when a king is separated from a Rook of its own color by two or three empty spaces in the horizontal direction. You are allowed to move both the King and Rook at the same time by moving the king two spaces in the direction of the Rook as well moving the Rook to space next to the king's new position on the opposite side of the Rook's original position.

Castling is only permissible if all of the following conditions hold:

1. The king and rook involved in castling must not have previously moved
2. There are no pieces between the king and the rook
3. The king may not currently be in check, nor may the king pass through or end up in a square that is under attack by an enemy piece, although the rook is permitted to be under attack and to pass over an attacked square.
4. The king and the rook must be on the same row.



Picture Source: https://en.wikipedia.org/wiki/Chess

En Passant - An advanced move that allows a pawn to capture a pawn under very specific conditions. It can occur when a pawn is moved for the first time two spaces to avoid being captured on the space directly in front of it by an opposing pawn that is two spaces in front and one space to either side. The enemy pawn is only able to pull off this move immediately on the next turn. If the enemy pawn is allowed to move diagonally behind the first pawn and can capture the first pawn from behind.

Computer Chess

Usage Scenario

Main Menu for the program

Main Menu

Background image used: https://www.udemy.com/learn-chess/

1. Game Mode Selection - Player can choose the game mode here. Left-click it to select this mode.
    - One Player - Player will play against the computer. More options can be found in One Player Menu
    - Two Players - Two Human Players can play against each other, proceeds to game.
    - Computer vs Computer - Let two AI play against each other automatically and proceeds to game.

One Player Menu

One Player Menu

Background image used: https://www.udemy.com/learn-chess/

The One Player Menu, which will appear after the player chooses the one player option in the Main Menu. Left-click it to select this option.

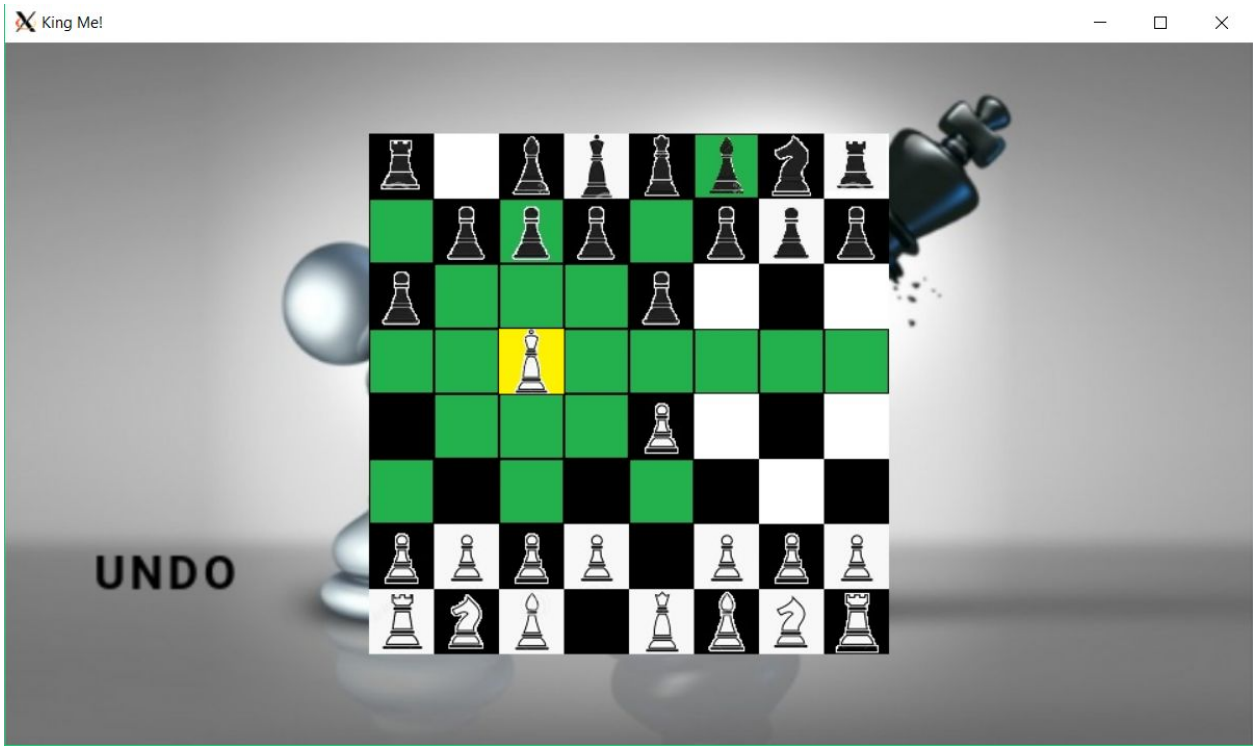
1. Difficulty - Only one of the 3 options: Easy, Medium, Advanced can be chosen. This option determines the intelligence of the AI. Easy will be selected by default.
    - Easy - the computer will make legal moves randomly.
    - Medium - the computer will consider only the current board state, and make a move in response to your last move.
    - Advanced - the computer will consider and simulate several moves in advanced and select the best strategy.

2. Color - Players can choose between one of the 2 options: Black and White. This option determines the color that the player will play as. White will be selected by default.
    - Black - the player will play with black pieces. The status window of black will be placed on the top left. Upon beginning the game, the black moves second, and the game starts automatically after the computer makes the first move as white.

- White - the player will play with white pieces. The status window of white will be placed on the bottom right. Upon beginning the game, the white moves first, and the game will start after the player make the first move.

3. Play - left-click to proceed to the gameplay window.

Gameplay Board



Board image used: https://en.wikipedia.org/wiki/Chess

1. Window title - Shows the current mode of the game. In the example above, the player has chosen white and is currently playing against the computer.

2. Chess board - an interactive area where the player plays the game. The player can use only the mouse to play the game.
    - Moving with the mouse - click the piece that the player wants to move, and then all possible legal moves will be displayed on the board. Click the legal destination again to finish a move. An error message will occur if an illegal move is attempted to be made and the game state will stay unchanged.

3. Undo moves - the player can undo their moves when this option is clicked. The board will immediately revert to its previous state.

Goals

- Victory is achieved by capturing the opponent's King through checkmate.

Features

- Player Color Choice
- Graphical User Interface
- Player versus Player mode
- Player versus Computer mode
- Computer versus Computer mode
- Multi-level Computer player difficulty
- Displays legal moves
- Undo option
- Advanced moves

Installation

System Requirements

- Hardware: PC Hardware (x86_64 server)
- Operating system: Linux OS (RHEL-6-x86_64)
- Dependent third-party software:
    - i. gcc
    - ii. GNU make
- Dependent libraries:
    - GTK for graphical user interface

Setup and Configuration

- GTK + 2.0 library installation: Instructions can be found at https://www.gtk.org/download/index.php

Installation and Running

- The software comes in a tar.gz package. After downloading, extract the package by running:
    - tar –zxvf Chess.tar.gz
- Change into the directory by running:
    - cd Chess
- Run the program running
    - cd bin
    - ./chess

Chess Program Functions and Features

User Interface - Users can navigate a readable set of menus to select game modes and other options.

Game Modes - Users can choose between multiple game modes from the menus. Game modes include Player versus Player, Player versus Computer and Computer versus Computer

Difficulty - Users can select their desired difficulty from Easy to Advanced.

Piece Color Choice - Users can choose their desired color and first turn advantage

Back Matter

Copyright

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Error Messages

Illegal Move: Appears when a player attempts a move that is not permitted by the rules of chess. See Glossary on page 3 for more information.

Illegal Selection: Appears when a player selects a piece that does not belong to the current player or is unoccupied.

King in Check: Appears when a player makes a move that does not resolve check. See the entry for King in the Glossary on page 5 for more information

Error: a catch-all for unforeseen errors in the game program.

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