



Team 2

Chess Please

Version Manual V 0.0.2



Team Kingsmen

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Glossary:

- Pieces:
 - Pawn: This piece moves forward by one step. The only exception is when the piece is initially in starting position, it has the option to move either one or two spaces forward. Also, the piece moves forward diagonally to attack. At any point, this piece is not allowed to move backwards.
 - Rook: This piece can move horizontally and vertically across the board until it crosses another piece. In this case, it may attack or stop before hitting that piece.
 - Bishop: This piece can move diagonally across the board and must stop when it hits another piece. Like the rook, it may either attack or stop in this instance.
 - Knight: This piece moves in an “L” shape, created by a variation of two and one steps vertically and horizontally, or visa versa. This gives it at most eight legal moves to make. This is the only piece that can legally move over other pieces on the board.
 - Queen: This piece can move horizontally, vertically, and diagonally across the board for any legal number of spaces.
 - King: This piece can move in any direction for one space. It is not allowed to move into check.
- Terms:
 - Check: When one player threatens the other team’s King for capture. The King must move out of check within its next turn to avoid checkmate.
 - Checkmate: When a King in check is unable to avoid check once it’s threatened with capture. The King will never actually come off the board; the game will end with the player who called check as winner.
 - Draw or Tie: This can happen under multiple conditions: a stalemate, a three-fold repetition, the fifty-rule move or if checkmate is impossible.
 - Stalemate: This occurs when a player has no possible legal moves and is not in check.
 - Three-fold repetition: This occurs when a player moves to the same spot for three repetition cycles (after every two moves).
- Special Moves:
 - Castling (Kingside): This is a move that can simultaneously move the King and the Rook. This move can only be done if the King and Rook have not moved from their initial positions, and if there are no pieces between them. If these conditions are met, the King can move two spaces toward the Rook, and then the Rook will move past the King to the space next to it, moving two spaces from its original spot. This is the only time when the

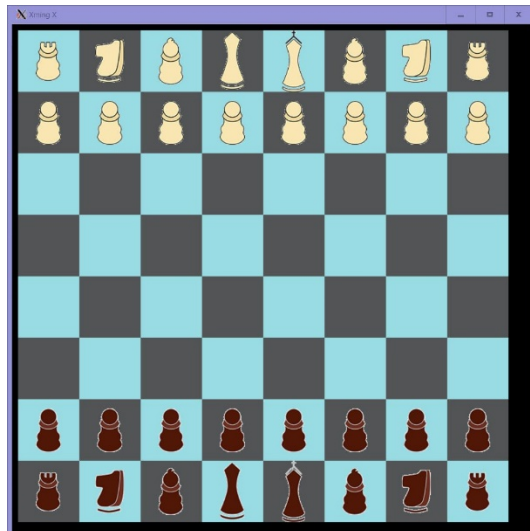
Rook can legally move over another piece. This move cannot be executed though, if the king is in check or will move into check.

- Castling (Queenside): This move is the same as the Kingside version, except the Rook moves three spaces and the King moves two.
- Promotion: This occurs when a pawn moves to the opposite end of the board, the 8th rank, and can be swapped out with any other piece of the players choice (Queen, Rook, Bishop, or Knight). This is not restricted to captured pieces.
- En Passant: A special move type specific to the pawn piece. If an opposing pawn chooses to move forward two spaces on its first turn and an opponent's pawn would have had the opportunity to attack that pawn had it chosen to move one space forward, the opposing pawn may take the pawn by moving diagonally in front of it only on the turn immediately after that first pawn moved. This is the only attack in chess wherein the attacker doesn't stop on the victim's spot.

1. Computer Chess

1.1 Usage scenario

- Chess Please incorporates next-gen graphics bringing your game of chess to life:



1.2 Goals

Chess is a two player game in which one player wins by putting the other player "in check mate". There are many different methods of winning

chess, but the main goal is to take your opponent's king piece. This particular chess program is designed not only to be an enjoyable chess experience, but also to help you, the user, learn to play chess! It will offer a gamut of helpful features, including a hint button suggesting the best move to make, an undo feature, and other exciting add-ons to a standard chess game.

1.3 Features

Chess Please includes some fun and helpful add-ons to your plain vanilla game of chess. Here are some features designed to aid the user in bettering their chess skills:

Difficulty Modes: Chess Please provides three distinct difficulty modes (Easy, Medium, Hard) in order to allow anyone to enjoy the game of chess. It also helps you learn to play chess by increasing the difficulty of the AI.

The Undo Button: Did you make a mistake? Today is your lucky day because you can undo it! The undo button will allow you to undo your bad move to help you learn from your mistakes and become a better chess player.

Save Files: With Chess Please, you don't need to finish your game in one go, you can save it in our state-of-the-art save files (saved as a .txt file). Even better, the files are written in a user-readable format allowing you to study past games and even picking up an old game you never had the chance to finish.

A Worthy Opponent: The crowning feature of Chess Please is its artificially intelligent chess opponent. As we've found it's hard to play chess alone, and that's exactly the problem our binary buddy solves. Here at Team_2, we've had our top engineers work for weeks on developing a smart chess opponent for your enjoyment. With features like Difficulty Modes, The Undo Button, Save Files, and a smart AI opponent, Chess Please takes chess to the next level.

2. Installation

2.1 System requirements

- CentOS release 6.9 (Final)
- Linux Kernel Version: 2.6.32-696.18.7.el6.x86_64
- Runs on any OS
- System that supports bash and Linux
- Storage requirements: > 1 MB of storage and >1GB of RAM
- Installation Screen Shot:

```
[team2@crystalcove ~/TESTDIR]$ ls -la
total 1260
drwx----- 2 team2 ugrad 4096 Jan 29 10:22 .
drwx--x--x 20 team2 ugrad 4096 Jan 29 10:21 ..
-rw----- 1 team2 ugrad 1273288 Jan 29 10:21 Chess_Alpha.tar.gz
[team2@crystalcove ~/TESTDIR]$ tar -xzf Chess_Alpha.tar.gz
bin/
bin/ChessPlease_0.1D
doc/
doc/Chess_SoftwareSpec.pdf
COPYRIGHT.txt
README.txt
INSTALL.txt
[team2@crystalcove ~/TESTDIR]$ ls -la
total 1276
drwx----- 4 team2 ugrad 4096 Jan 29 10:22 .
drwx--x--x 20 team2 ugrad 4096 Jan 29 10:21 ..
drwx----- 2 team2 ugrad 4096 Jan 28 23:22 bin
-rw----- 1 team2 ugrad 1273288 Jan 29 10:21 Chess_Alpha.tar.gz
-rw----- 1 team2 ugrad 271 Jan 29 10:15 COPYRIGHT.txt
drwx----- 2 team2 ugrad 4096 Jan 29 10:18 doc
-rw----- 1 team2 ugrad 8 Jan 29 10:15 INSTALL.txt
-rw----- 1 team2 ugrad 527 Jan 29 10:13 README.txt
[team2@crystalcove ~/TESTDIR]$ ./bin/ChessPlease_0.1D
-----Welcome to Chess Please!-----
Please choose your color :
      W = White      B = Black

w
Play in (2) player mode or (1) player mode? 1
+-----+
8 | R | N | B | Q | K | B | N | R |
+-----+
7 | P | P | P | P | P | P | P | P |
+-----+
6 | | | | | | | |
+-----+
5 | | | | | | | |
+-----+
4 | | | | | | | |
+-----+
3 | | | | | | | |
+-----+
2 | P | P | P | P | P | P | P | P |
+-----+
```

2.2 Setup and configuration

- Connect to any linux server
- Unpack the TAR file
- Type “make all”
- Run the executable file
 - Type “./ChessPlease_1.0”

2.3 Uninstalling

- On Linux server
 - Type “make clean”

- Type "rmdir project/chess"

3. List of Functions

3.1 Choose to Load Game

```
[team2@zuma ~/version_1]$ ./ChessPlease_0.9
-----Welcome to Chess Please!-----
Do you want to load previous game? (y/n) : █
```

- Given the option to load your previous game
- Type "y" to load last game or "n" to start a new one

3.2 Choose Your Color

```
Please choose your color :
      W = White      B = Black      █
```

- Asks you to select your color
- Select "W" for white and "B" for black
 - Remember: white always moves first

3. Choose 1 or 2 Players

```
Play in (2) player mode or (1) player mode? █
```

- Select the number of players
- Enter "1" to play against the AI or "2" to play 2-player mode

4. Choose Mode: ASCII or GUI

```
Mode (A)scii or (G)UI?
█
```

- Choose between ASCII mode or GUI mod
- ASCII displays on the terminal and has more advanced features
- GUI is more basic and is still in beta version

5. Choose Your Difficulty

```
Difficulty (E)asy, (M)edium, or (H)ard?
█
```

- Pick the difficulty level of the computer between:

- ii. Easy
- iii. Medium
- iv. Hard

3.6 The Undo Button (ASCII Mode)

- a. Input Undo button
- b. Withdraw only one move of the human player at the time
Withdraw AI player move

3.7 Save Option (ASCII Mode)

- a. Display what chess moves to what position on the interface

3.8 Hint Option (ASCII Mode)

- a. Type “hint” for a helpful suggestion from the computer

3.9 Quit Option (ASCII) / Exit Button (GUI)

- a. Type “quit” in the terminal to exit or select the exit button in the GUI

Error Messages:

This program is designed for you to play an official game of chess and will prevent any moves breaking the traditional rules of chess.

Possible error messages:

- “Invalid input” - The game locates a piece’s position using a grid system from A-H and 1-8. It first looks to the column, then the row in which to find or move a piece.

If you received this error, you have inputs outside the range of A-H and/or 1-8. Re-enter the input with values within the range.

- “At the current most move” - The program has a redo button in order to recover moves you undid. This error will be presented if your board resembles the most recent move made.
- Illegal moves
 - “Invalid move!”- In chess, if a piece A is in the path of piece B, piece B cannot be moved in that path. This applies to any piece except the knight. When presented with this error, you must move the piece in a different path or choose a different piece.
 - “Invalid move!” - When a player is in check, the next move must be to prevent checkmate. It is an invalid move if you move a piece that keeps you in check.

Copyright:

A list of references used in the making of the program.

Glossary Definitions/ Rules:

[https://en.wikipedia.org/wiki/Draw_\(chess\)](https://en.wikipedia.org/wiki/Draw_(chess))

<https://eee.uci.edu/18w/18020/tas/letsplay.pdf>

Artificial Intelligence:

<https://medium.freecodecamp.org/simple-chess-ai-step-by-step-1d55a9266977>

<https://en.wikipedia.org/wiki/Minimax#Pseudocode>

SDL References:

http://lazyfoo.net/SDL_tutorials/index.php

<https://www.libsdl.org/>

<https://www.libsdl.org/release/SDL-1.2.15/docs/html/reference.html>

<https://www.youtube.com/user/thecplusplusguy/playlists>

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