The Best Chess Game Ever

Version 1.0

Team:
Team Charlie

Members:
Devin Pham, Vivian Lam, Allison Cornell, Adrien Guillaume, Michael Yang

EECS 22L (Winter)
University of California, Irvine

Table of Contents:

Glossary:

Bishop: May only move diagonally as many squares as long as the pathway is not blocked.

Castle: A special move which involves moving the king and rook simultaneously. This will be the only time where two pieces can be moved in the same turn. There exists two types of Castle:
-*Castle Long*: *Queenside Castling*
-*Castle Short: Kingside Castling*
Both types of Castling consist of moving the King two squares either right or left depending on the type of Castling, and moving the rook on the square besides the King closest to the center. Keep in mind that this move can only be done if there are no other chess pieces in between the King and Rook, if neither pieces (King and Rook) have already moved, and if the King does not move out of a Check, into a Check, or over a Check. This special move allows the King to be in a safer position while giving the Rook a powerful position in the middle of the board.

Check: the act of attacking the opponent's King. When in Check, the player can call out "Check" to inform his opponent of the threat. In this case, the opponent must either move his King in a safe square, capture the attacking piece, or move another piece in between the King and the attacking piece.

Checkmate: the act of attacking the opponent's King such that it cannot escape by any means. The game is then over, and the attacking side wins.

En Passant: from the French term "in passing". This move only occurs after a pawn moves two squares from its starting position, and passes an enemy pawn. The enemy pawn then has the opportunity to capture the passing pawn as if it had only moved forward one square. The right to capture "en passant" must be made immediately during the next move by the enemy's pawn, or else it will be lost in the following moves.

Fork: an attack where a piece threatens two or even three enemy pieces at the same time.

King: Can only move 1 step in the surrounding squares.

Knight: May only move in the shape of a 'L'. For example, 2 steps forward and 1 step right.

Pawn: For each pawn, the first move may either be 1-2 steps forward. After the first usage of that Pawn, they may only move 1 space forward at a time. The Pawn may also move diagonally forward 1 step to capture the opponent's piece.

Queen: Can move 1 step in the surrounding squares. Can also move vertically, horizontally, and diagonally as many spaces as long as the pathway is not blocked.

Rook: May move vertically or horizontally as many squares in the horizontal or vertical direction as long as the pathway is not blocked.

1: Computer Chess

1.1. <u>Usage Scenario</u>

After the game has been launched, the user will be prompted with two different game modes: Player vs Player or Player vs CPU. Next, the user will have the choice between selecting the White or Black side.

The chess board will then appear and the user will be able to make the move of his/her choice. To do so, the user will have to input the starting position, and the desired final position of a chess piece based on the board's format. For further and more detailed explanations about the usage scenario, please refer to the **Chess Program Functions & Features** in section 3.

When an invalid menu choice/move has been inputted, an error message will pop up, informing you to input a valid menu choice/move.

1. **Player vs Player**
2. **Player vs CPU**

Please enter 1 or 2: 1
You have selected Player vs Player

1. **White Piece**
2. **Black Piece**

Player 1 please enter 1 or 2: 6
Invalid input! Please try again: 2
Player 1: Black
CPU: White

Would you like to use a timer? Answer either yes or no.
Player 1: yes
CPU: yes

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
1	R	N	B	Q	K	B	N	R
	A	B	C	D	E	F	G	H

HELP	UNDO	1:00

Please enter your move (example format: A2 to A4): A2 to A6
Invalid move! Please try again: A2 A3
Successful move!

1.2. <u>Goals</u>

We want to allow users to play a game of chess even without having prior chess knowledge. The interface will be user friendly to guarantee a smooth and fun experience. If any questions or inquiries still remain, a HELP button is available to support our users.

1.3. <u>Features</u>

-Different Game Modes : Player vs Player or Player vs CPU

-Team Option: Black or White

-Activity Log

-Player Time Limit

-Undo Function

2: Installation

2.1. <u>System Requirements (Minimum)</u>

OS: Linux with Display Managers Compatible with X11 and SDK/GTK

Processor: 2 GHz Intel Dual-Core Processor

Memory: 900 MB Available

Graphics: Video Card with at least 1GB VRAM and Supports Shader Model

Storage: 1 GB Available

2.2. <u>Setup and Configuration</u>

The chess software will be compressed into a package with the extension ".tar.gz". To untar please type:

gtar xvzf BinaryArchive.tar.gz

Please read the provided documentation before continuing with the installation process by typing:

evince chess/doc/chess.pdf

Please type the following to run the package:

chess/bin/chess

2.3. <u>Uninstalling</u>

To uninstall the software, please type the following to clear all of the object and executable files:

cd chess
make clean

3: Chess Program Functions & Features

3.1 Official Rules of Chess

During the game, if the user is unsure about the rules, the user may use the cursor and select HELP or use the arrow keys to select HELP. As soon as the HELP button has been selected, the timer will stop and a pop up page will appear showing the rules of the game. The game will continue as soon as the user exits the pop up.

Letters for each piece:
K = King
Q = Queen
B = Bishop
N = Knight
R = Rook
P = Pawn

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

1	R	N	B	Q	K	B	N	R
	A	B	C	D	E	F	G	H

HELP	UNDO	1:00

Chess Rules

Chess Pieces Movement
- ○ Pawn: For each pawn, the first move may either be 1-2 steps forward. After the first usage of that Pawn, they may only move 1 space forward at a time. The Pawn may also move diagonally forward 1 step to capture the opponent's piece.
- ○ Rook: May move vertically or horizontally as many squares in the horizontal or vertical direction as long as the pathway is not blocked.
- ○ Knight: May only move in the shape of a 'L'. For example, 2 steps forward and 1 step right.
- ○ Bishop: May only move diagonally as many squares as long as the pathway is not blocked.
- ○ Queen: Can move 1 step in the surrounding squares. Can also move vertically, horizontally, and diagonally as many spaces as long as the pathway is not blocked.
- ○ King: Can only move 1 step in the surrounding squares.

Gameplay
- ○ The White pieces always make the initial move.
- ○ If the Pawn makes it across the board, the Pawn must be promoted to either: a Queen, Rook, Knight, or Bishop.
- ○ If the player hasn't moved their King and Rook, they may move their King 2 steps towards the Rook and place the Rook on the other side of the King to protect it, known as "Castling". Castling may also be applied with a Queen and a Rook. Castling can't be used to avoid being checked or getting into check.
- ○ If a pawn moves two squares instead of one from its starting position in order to avoid capture, the opponent can capture the just moved pawn as it "passes" through the first square which is also

known as "En Passant". The opponent must do the en passant capture on their next turn or they may not do so. The result of the en passant capture is the same as if the pawn only moved one square instead of two.

- ○ When the King is at risk of being captured, it is "checked".
- ○ If the player is unable to make any moves to get out of being "checked" then the game is "checkmate" with that player losing the match.
- ○ If the play remains unchecked and has no legal moves, the match will result in a draw.

3.2 <u>Game Interface</u>

The board shown below is what the player will see. Each piece is represented by its respective letter (shown below), the black pieces are at the top of the board, and the white pieces are at the bottom of the board. The player can move their pieces by typing position of the piece the player wants to move followed by the position they want to move the piece to. The positions of the pieces are based on the numbers, labeled on the left hand side of the board, and the letters, labeled on the bottom of the board. The board will update accordingly. If the player enters an invalid move the player will be prompted to try again.

Letters for each piece:
K = King
Q = Queen
B = Bishop
N = Knight
R = Rook
P = Pawn

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
1	R	N	B	Q	K	B	N	R
	A	B	C	D	E	F	G	H

HELP		UNDO		1:00

Example 1:

Please enter your move (example format: A2 to A4): A2 to A6
Invalid move! Please try again: A2 A3
Successful move!

8	R	N	B	Q	K	B	N	R
7	P	P	P	P	P	P	P	P
6								
5								
4								
3	P							
2		P	P	P	P	P	P	P
1	R	N	B	Q	K	B	N	R
	A	B	C	D	E	F	G	H

HELP		UNDO		1:00

Example 2:

Please enter your move (example format: A2 to A4): A2 to A3
Successful move!

	A	B	C	D	E	F	G	H
8	R	N	B	Q	K	B	N	R
7	P	P	P	P	P	P	P	P
6								
5								
4								
3	P							
2		P	P	P	P	P	P	P
1	R	N	B	Q	K	B	N	R

HELP	UNDO	1:00

3.3 Player vs Player or Player vs CPU

The program initially asks the user if they would like to play against another user or against a computer. The user will be asked to enter either 1 or 2. If the user enters an invalid option, a warning will display and will ask the user to enter a valid option. The option the user selected will display if the user entered a valid option.

Example 1:

1. Player vs Player
2. Player vs CPU

Please enter 1 or 2: 1
You have selected Player vs Player

Example 2:

1. Player vs Player
2. Player vs CPU

Please enter 1 or 2: 5
Invalid input! Please try again: 2
You have selected Player vs CPU

3.4 <u>Team Option</u>

The program will ask the user if they would like to either make the first move (White) or second (Black). The user will be asked to enter either 1 or 2. If the user enters an invalid option, a warning will display and asks the user to enter a valid option. The option the user selected will display if the user entered a valid option.

Example 1: (Player vs Player)

1. White Piece
2. Black Piece

Player 1 please enter 1 or 2: 1
Player 1: White
Player 2: Black

Example 2: (Player vs CPU)

1. White Piece
2. Black Piece

Player 1 please enter 1 or 2: 6
Invalid input! Please try again: 2
Player 1: Black
CPU: White

3.5 Activity Log

A log will be kept after each movie is made in a text file. The log will say which player made the move and where the piece was moved to. The positions the pieces were moved are based on the number and letter labels on the board.

Example:
White: A2 to A3
Black: C7 to C6
White: ….
Black: ….

3.6 Computer Player Time Limit

If the player is playing against the computer player, the computer will have up to 1 minute to make a move. If the 1 minute timer runs out, the other player will win.

3.7 Undo Function

If the player is a human player (i.e. not the computer player) then the player will be allowed to use the undo button. The player can use the undo by clicking on the undo button or using the arrow keys to navigate to the undo button and using the spacebar to select the button. The player can only undo a move they just made, not a move that was made multiple turns ago. If a player chooses to undo, the piece will move back to where it was before it was moved and the player will be prompted to move again. The player may only undo once per turn.
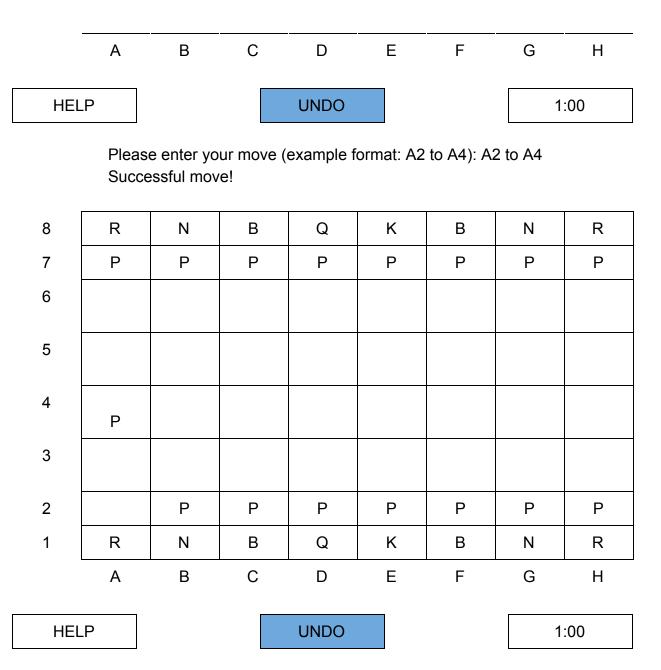
Example:
Please enter your move (example format: A2 to A4): A2 to A3
Successful move!

8	R	N	B	Q	K	B	N	R
7	P	P	P	P	P	P	P	P
6								
5								
4								
3	P							
2		P	P	P	P	P	P	P
1	R	N	B	Q	K	B	N	R
	A	B	C	D	E	F	G	H

HELP		UNDO		1:00

Undo has been selected.

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
1	R	N	B	Q	K	B	N	R

	A	B	C	D	E	F	G	H

HELP	UNDO	1:00

Please enter your move (example format: A2 to A4): A2 to A4
Successful move!

	A	B	C	D	E	F	G	H
8	R	N	B	Q	K	B	N	R
7	P	P	P	P	P	P	P	P
6								
5								
4	P							
3								
2		P	P	P	P	P	P	P
1	R	N	B	Q	K	B	N	R
	A	B	C	D	E	F	G	H

HELP	UNDO	1:00

3.8 Timer

If the player chooses, they can be timed like the computer player is being timed. Each player will have 1 minute to make a move. If the player is human and they run out of time, a random move will be made for them. If the player is the computer and it runs out of time then the other player will win. The user will be prompted to either answer yes or no to using a timer. If they enter an invalid input they will be asked again. Both players do not need to use a timer if it is Player vs. Player.

Example 1: (Player vs Player)

16

Would you like to use a timer? Answer either yes or no.
Player 1: yes
Player 2: no

Example 2: (Player vs CPU)
Would you like to use a timer? Answer either yes or no.
Player 1: a
Invalid input! Please try again.
Player 1: yes
CPU: yes

Back Matter:

Copyright

Error Messages

1. Illegal Moves
   "Invalid move! Please try again:"

2. Invalid inputs
   "Invalid input! Please try again:"

3. Undoing a move when there isn't anything to undo
   "No moves to undo"

4. Using opponent's pieces instead of your own
   "Invalid move! Please try again:"

Index:

U

Undo, 6, 14