Team 13 User Manual

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EECS 22L

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Glossary of Chess Terms

Pieces:

King - Can move one square in any direction. When the King is captured, the player loses the game. The King may never move into check

Queen - Can move in any number of squares in any direction (horizontal, vertical or diagonal) if path is not blocked by ally piece

Rook - Moves any number of squares vertically or horizontally if path is not blocked

Bishop - Moves any number of squares diagonally if path isn't blocked. Note Bishops on light-squares can only move to other light squares and black-square Bishops can only move to black-square spots

Knight - Moves two squares horizontally or vertically and makes a right-angle turn for one more square (think of an "L"). The Knight always lands on a square opposite of its color from its former square. The Knight can also jump over other pieces between its old and new squares.

Pawn - always moves straight ahead (never backwards). Captures diagonally and moves only one-square at a time. On its first move however, it has the option of moving one or two spaces forward. Only the pawn piece is applicable for En Passant and Promotion (see "Special Moves" section on pg. 8)

General Terms:

Capture - a move by a piece that removes an opponent piece from the board. The capturing piece occupies the square of the captured piece (except by En Passant)

Computer move - a term to indicate a move played by a computer rather than a human player.

Blocked Square - a square where a player's piece is occupied and is restricting the player from placing other pieces in the same square

White Square - the 32 light-colored squares on the board such as b1 and d1.

Black Square - the 32 dark-colored squares on the chessboard such as a1 and c1.

Diagonal - line of squares of same color touching corner to corner. Squares that a queen or a bishop can move.

Records- refers to the record of games to indicate the number of times each player has won.

Human Move - a move a human would make and not a computer.

Piece - one of the chessmen or figures used to play the game. For example, king, queen, rook, bishop, knight or pawn.

Space - a square controlled by a player.

Stalemate - a position in a game where neither player has a legal move available. In which case the game results in an immediate draw.

Develop - a movement to another square by non-pawn pieces where they can be more active in clearing the objectives of the game.

Kingside - the side of the board where the king is on

Queenside - the side of the board where the queen is on

Checkmate - position in which a player's king is in check (see definition for "Check" below) and the player has no legal move

Castling - move in which the king and a rook are moved at the same time in the same turn. It moves the king from the center to a flank and develops the rook. Castling can be done by either the kingside or queenside. Castling cannot be done in response to a check or if either the king or rook has already moved.

Promotion - advancing a pawn to the end of the board, converting it to a queen, rook, bishop or knight.

Check - When a king is threatened with capture (but can protect himself or escape), it's called check. If a king is in check, then the player must make a move that eliminates the threat of capture and cannot leave the king in check.

En Passant - It is a special pawn capture that can only occur immediately after a pawn makes a move of two squares from its starting square, and it could have been captured by an enemy pawn had it advanced only one square

Log - an in game feature that records the history of moves made within the game

Rules of Chess

White is always first to move and players take turns alternately moving one piece at a time. Movement is required. If a player's turn is to move, he is not in check but has no legal moves, this situation is called "Stalemate" and it ends the game in a draw. Stalemate also occurs when a player makes the same move three times.

Each type of piece has its own method of movement. Go to the glossary to check the moves of each of the pieces. A piece may be moved to another position or may capture an opponent's piece, replacing on its square (en passant being the only exception, check special moves section). With the exception of the knight, a piece may not move over or through any of the other pieces.

When a king is threatened with capture (but can protect himself or escape), it's called check. If a king is in check, then the player must make a move that eliminates the threat of capture and cannot leave the king in check.

Checkmate happens when a king is placed in check and there is no legal move to escape. Checkmate ends the game and the side whose king was checkmated loses.

Computer Chess

Usage Scenario
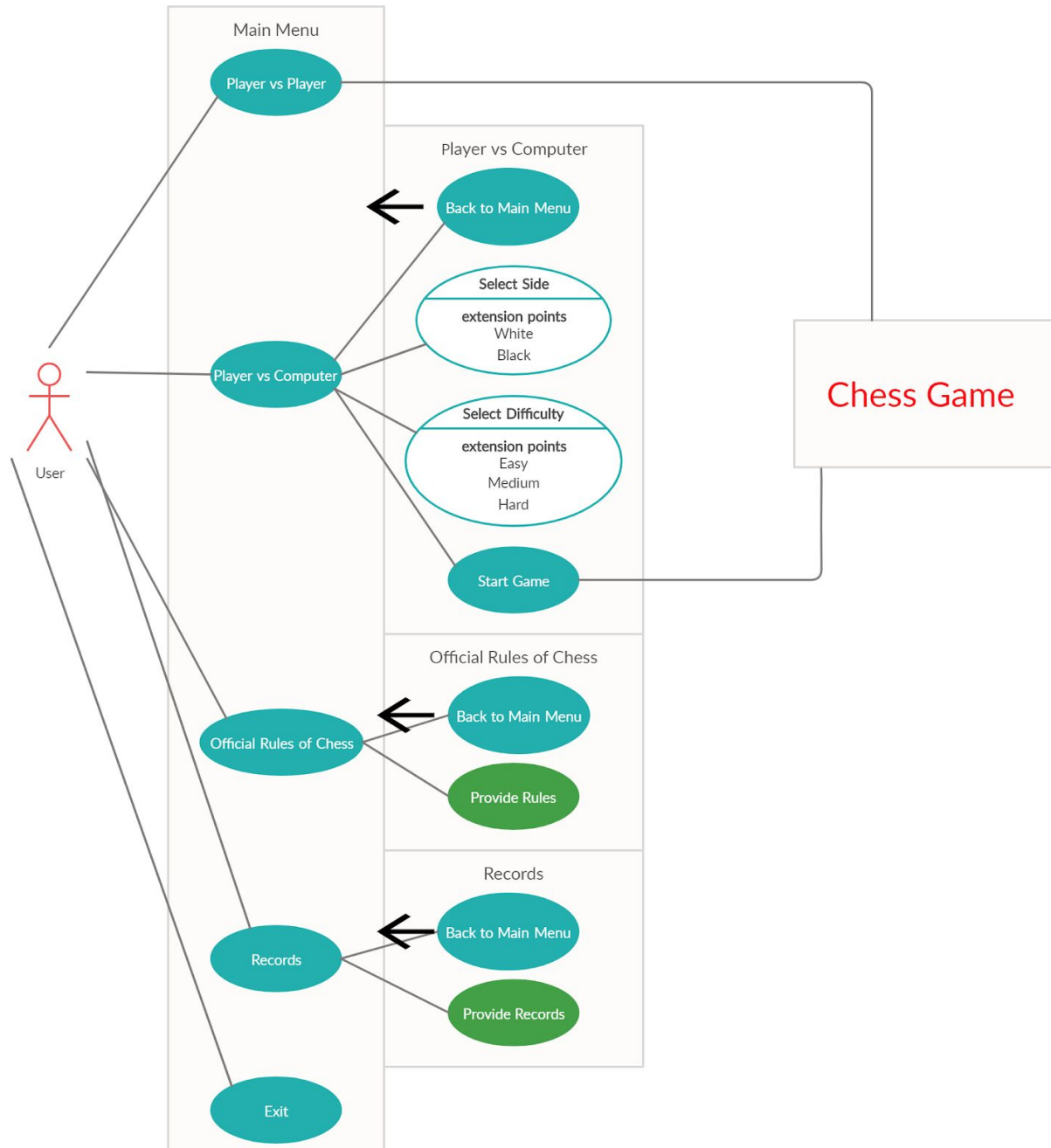
Chess Program Use Cases drawn on *creately.com*

Goal

The goal of this chess software is to play a chess game and understand the rule of chess.

Features

❖ **Main**
- Player vs Computer - Support human user versus computer
- Player vs Player - Support human user versus human user
- Record - Display number of wins and loses
- Side Selection - Choose a side, either black or white, to play
- Level of Difficulty - 3 different level of difficulty are available for the player to play
- Graphical User Interface - the program shows a game board and the pieces

❖ **In-Game**
- Official Rule - The game follows official rule while playing
- Readable Log - A log displays for all the moves
- Computer Move - The computer makes its move properly less than a minute
- Official Algebraic Notation - display algebraic notation when making moves

Installation

System Requirements

- Any OS that allows you to SSH into the EECS linux servers
- Standard Library (C Programming)
- Math Library
- User Interface (e.g. GUI)
- C programming compiler (e.g. gcc)

Setup and Configuration

- Log into any of the uci eecs servers accessible
  - If you are at a remote location, you need to download cisco anyconnect and connect to the uci vpn
- Create a directory locally to keep the game file
- Type in the linux server:
  > git pull
  > make
  > ./chess

Uninstalling

- Login to the eecs server on an ssh client (putty, etc)
- Go to the directory with the project inside visible(will be in folder Team13)
- Then type
  > make clean
  > rm -rf Team13

Chess Program Functions and Features

Main Menu (Selection Interfaces)
- User input: choose an option
- Program output: pan to the next selection interface
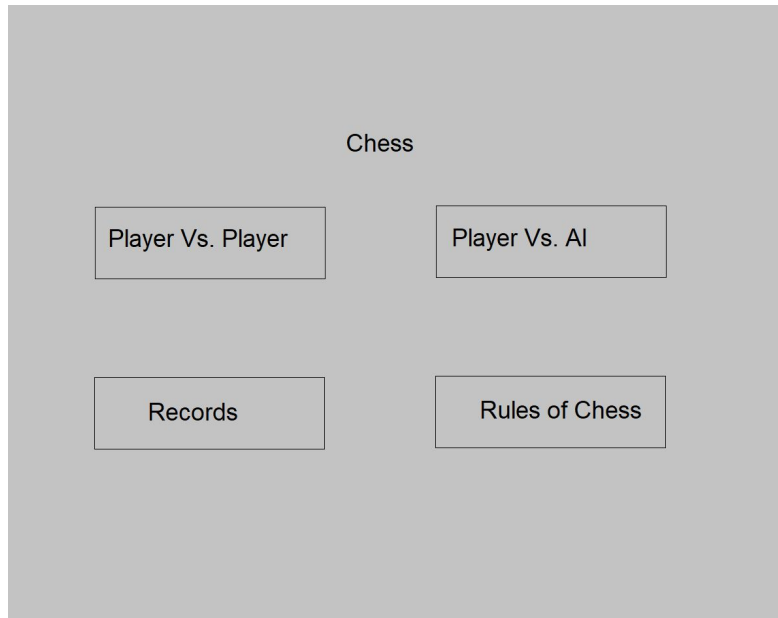
- Player vs player
  - Click on "player vs player" button and game will automatically start
  - A new board with an user interface will be displayed
  - The log of both the players in algebraic notation will show up on the side

- Player vs computer
  - Select Side (Program output: highlight selection)
    - Black
    - White

  - Selecting Difficulty (Program output: highlight selection)
    - Easy
    - Medium
    - Hard

  - Start Game (Program output: starts the game with the player's side on the bottom of the screen and computer side on top. The log of both the player's and the computer's moves in algebraic notation will show up on the side of the screen.)

- Official Rules
  - Click on "Rules of Chess" button
  - Click on "Exit" button to return to Main Menu
  - A list of rules will be displayed in text
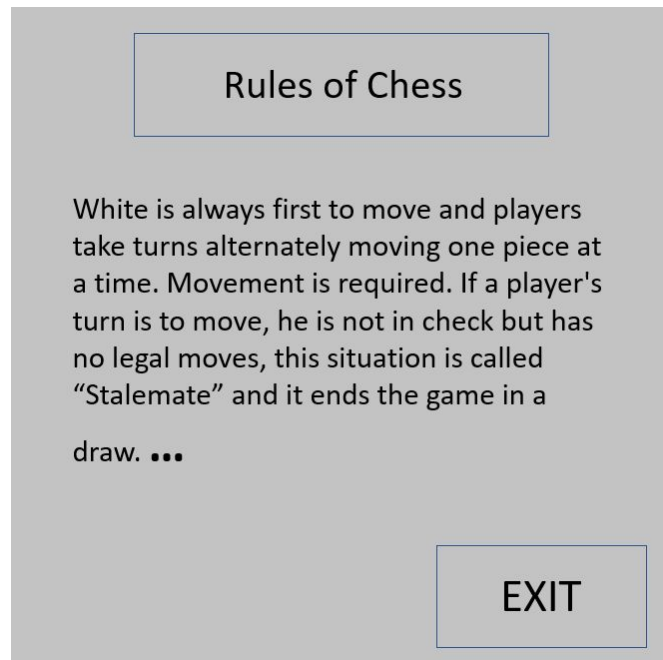
In-game Mechanics
- <u>Move a Piece</u> - to move a piece you click on the piece first and the places then click on a legal place position the piece can move to. The log will record the move. If you decide to make an illegal move the program will output in the log that the move you are attempting is illegal and will ask you to make another move.

- ○ <u>User input</u>: left - mouse click a chess and then make clicks on an unoccupied square. (User is expected to make a legal move)
- ○ <u>Program output</u>: Writes in the log "{piece} moved to {new position}". If an illegal move was made, displays in the log in text "This is an illegal move" and the user is expected to try again.
- ● <u>Capture a Piece</u> - if a piece is in the position to capture an opponent's piece, click on that piece to capture it. (Captures must also be a legal move)
  - ○ <u>User input</u>: left-click on an opponent's piece
  - ○ <u>Program output</u>: Remove opponent's piece from the board

In-game Conditions
- ● <u>Check</u> - the user's king is in position to be captured. The user must make a move that puts the king in a safe position.
  - ○ <u>User input</u>: none
  - ○ <u>Program output</u>: Log will output: "Black king is in check" or "White king is in check" and will prompt the player to make a legal move in order to protect the king.
- ● <u>Checkmate</u> - if there is no possibility for the user to get their king out of "check." The user loses.
  - ○ <u>User input</u>: none
  - ○ <u>Program output</u>: Log will output text "Checkmate! Black Wins" or "Checkmate! White Wins"

Special Rules

- Castling - click the king and the space next to the rook for the kings side
  - For the queens side, click 2 spaces to the queenside to perform a queenside castle
- En Passant
  - User input: click the position behind the pawn that just moved two spaces forward from its initial position
  - Program output: the pawn will be captured and the event will be noted in the game log
- Promotion - When a pawn reaches the opponent's last row, it can promote to either a queen, rook, bishop, or knight based on the user's choice.
  - User Input 1: A pawn moves to the last row of the opponent's side
  - User Input 2: User clicks which piece they want to replace the pawn with that was captured in previous moves
  - Program output: Pawn is replaced with chosen piece

Copyright Notice

Error Messages

- all the error messages will be printed out in the log (where each piece movement is kept track of)
- Each error will have a printed message following the error

  Example:
- If a player attempts to make an illegal move, then the following message will be printed: "That is an illegal move. Please make another move."

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