Chess

The User Manual

Team 10: **Engineers in Pajamas**

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1.Glossary

1.1 Chess Pieces

Bishop -Move diagonal across the board

King -Move in any direction, but only one step at a time

Knight -Move two steps forward plus one step sideways

Pawn -Move only forwards, and **capture** diagonally. From its initial position, A pawn may move two steps, otherwise only a single step. A pawn can also **promote**.

Queen -Move horizontally, vertically, diagonally across the board

Rook -Move horizontally and vertically across the board

1.2 Chess Terminology

Attack -When you move a piece to a square where you could **capture** an opponent's piece in NEXT move

Capture -to remove opponent's piece away from the board via a legal move

Castling -To move your unmoved **King** 2 squares toward an unmoved **Rook** and to move the **Rook** on the other side of the **King**

Check -An **attack** on the King

Checkmate -An **attack** on the **King** where there is no way for the **King** to get out of the **check**. This ends the game.

En Passant -Capturing a **pawn** that moved 2 spaces with a **pawn** that could have captured it if it had only moved 1 space, on the next turn only

Promote -When a **pawn** reaches the other side of the board, it can promote to a **Queen**, **Rook**, **Bishop**, or **Knight**

2.Computer Chess

2.1 Usage Scenario

This program will simulate a game of computer chess with one player (the user) against an automated player (the computer). The user will be able to interact with the program via the Linux command line and make moves, see what moves have been made, etc.

Following is a usage scenario:

1. The user successfully installs the program.
2. The user starts the program.
3. The user is prompted to choose whether to play against a computer or player, and picks computer.
4. The user picks the white side.
5. The game begins, and the chess board is displayed in the command line.
6. The user makes the first move, moving the white pawn forward by two spaces.
7. The chess board is displayed again.
8. The computer then makes a move, moving a black pawn forward by one space, and the chess board displays the board after the move is made.
9. The user and computer take turns making moves, until the computer checkmates the user.
10. The game then ends, and the log file of the moves is generated and available for the user to peruse.

This image shows the interface the user will be interacting with. In this scenario, a white pawn has been moved from e2 to e4. Picture taken from QV's Slide (A Simple Interface, Slide 2)

2.2 Goals

The goals of this program are that the user will be able to play a game of chess against an either an automated player, the computer, or another human player, that follows the official rules of chess in an interface that is easy and simple to use. The automated player, the computer, will use algorithms to decide which move to make and execute the best one.

2.3 Features

Listed below are some of the features in this computer chess program:

1. **This computer chess game follows the official rules of chess.**

The official rules of chess, such as respecting the allowed movements of each individual piece and more complicated moves such as castling, are followed in this game. No illegal moves will be allowed, and the user will be notified if he/she tries to make an illegal move.

2. **The user will be able to see the board and previous moves displayed in an ASCII representation board.**

   The user player will be able to see what moves have been made in the previous rounds by both himself/herself and the computer in an ASCII representation chess board. Once the user or computer makes a move, the board will again be displayed showing the most recent move.

3. **The user can choose to play against either another player (human) or an automated player (the computer).**

   The user can choose whether they would like to play against another player or against a computer.

4. **The user can choose either the white or black side at the start of the game.**

   Before the game begins, the user will be able to choose whether they want to play on the white side or black side.

5. **A log file of the moves made by both the player(s) and computer is generated.**

   A log file file of the moves made by both the user and computer in chronological order will be available for the user to view.

6. **The computer makes a move in less than one minute.**

The computer will make a move in less than one minute, in order for the game to be played in a timely manner.

7. **A timer is used to keep track of the time it takes for the computer to make a move.**

   A timer will be used for the computer in order to make sure that it makes a move in under a minute.

3. Installation

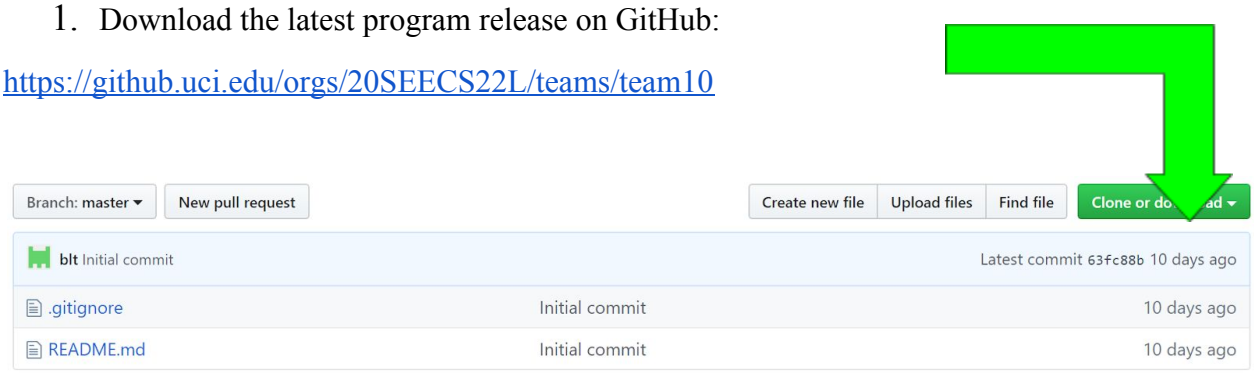
3.1 System requirement

- RedHat Linux that runs on CentOS release 6.10 or later
- 64-bit CPU
- Enough storage for program

3.2 Setup and Configuration

1. Download the latest program release on GitHub:

https://github.uci.edu/orgs/20SEECS22L/teams/team10



2. Allow permission to compile the file
3. Untar (or unzip) the downloaded file and run the program through linux command line:

```
% gtar xvzf Chess_V1.0.tar.gz
% evince chess/doc/Chess_UserManual.pdf
% cd chess
% cd bin
% ./chess
```

3.3 Uninstalling

1. Remove the chess file on linux command line in the bin directory:

```
% rm -f chess
```

4. Chess Program Functions and Features

4.1 Starting the game

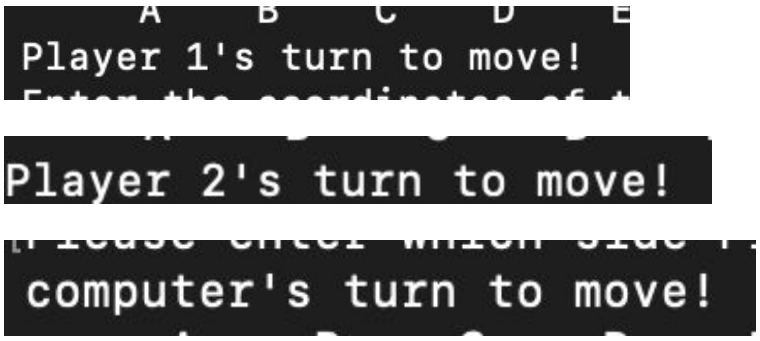
- The program first asks the user whether they would like to play against another player or the computer

```
Would you like to play against another (player or computer)?: player
```

- The program asks the user to choose their side before the game starts. The user can pick Black or White by entering ‘black’ or ‘white’ in the linux terminal.

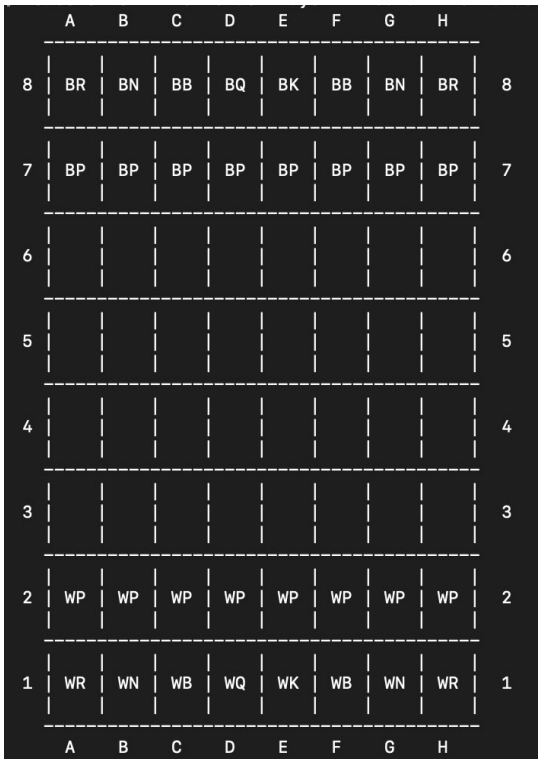
```
Please enter which side Player 1 would like to be on (white or black)?: white
```

- Between the player(s) and the computer, the player with white pieces starts the game.
- After a move has been made and the board is displayed again, a message will be printed to prompt the player on his/her turn to move or when the computer has made a move:

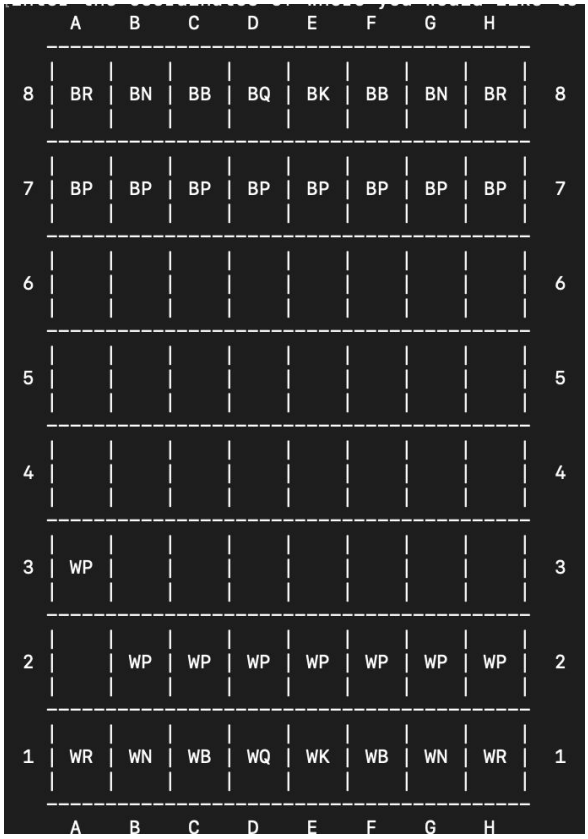


4.2 Chess board

- The chess board consists of an 8x8 grid with rows from 1 to 8 and columns marked by alphabets from A to H.



- The chess board is displayed before the game begins and after each move made by the computer and the user, with updated positions of all pieces



4.3 Moves

- The user can move a piece by entering the coordinates of the current location of the piece and the coordinates of the new location in the format:

  (column)(row)

  Ex. B4 for second column and fourth row

- If the piece is moved successfully, the board will be displayed again for the next player to make their move.
- The program also supports special moves such as en passant and castling. Just like regular moves, these moves can be made by entering the coordinates of the initial and final locations of the piece. The program checks internally if the move is valid.

```
Enter the coordinates of the piece you would like to move (Use Capital Letters): A2
```

4.4 Check and Checkmate

- The program displays a warning when one player checks the other.

  ```
  Check!!
  ```

- When either king is checkmated, the game ends and a notification appears on the screen to tell the user they have won/lost.

  ```
  Checkmate!! You won!
  ```

4.5 Timer

- The computer has at most 1 minute to make a move. A timer keeps track of the time to make sure the computer is within the time limit. However, the time taken is not displayed to the user.

4.6 Human-readable log file

A human-readable log file “Log.txt” will be generated, recording all activities of the player(s) and the computer.

```
A2 to A3: Player 1 moves white pawn at A2 to A3
H7 to H5: Player 2 moves black pawn at H7 to H5
A2 to A4: Player 1 tried making move that was not possible
B2 to B4: Player 1 moves white pawn at B2 to B4
```

Error Messages

Invalid Player/Color Selections: If the user enters an invalid player or computer selection when prompted to enter whether they want to play against another player or computer or enters an invalid color selection when prompted to choose their desired side, an error message will appear and prompt the user to enter a valid selection.

```
Welcome to the game of chess!
[Would you like to play against another (player or computer)?: playe
Please input a valid input (player or computer)
[Would you like to play against another (player or computer)?: player
```

```
[Please enter which side Player 1 would like to be on (white or black)?: whtie
Please input a valid side (white or black)
[Please enter which side Player 1 would like to be on (white or black)?: white
```

Illegal Coordinate: If the user enters an illegal coordinate that does not exist on the board, an error message will appear.

```
ERROR: Please enter valid coordinates!
```

Illegal Move/Invalid Coordinate Selection: If the user attempts to make an illegal move or attempts to enter coordinates in which there exists no piece, an error message will appear. The user will be prompted again to enter coordinates.

```
Player 1's turn to move!
Enter the coordinates of the piece you would like to move (Use Capital Letters): A2
Enter the coordinates of where you would like to move this piece (Use Capital Letters): A3
Not a possible move! Try again!
Enter the coordinates of the piece you would like to move (Use Capital Letters): D2
Enter the coordinates of where you would like to move this piece (Use Capital Letters): D4
```

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