CHESS PROGRAM

Version 0.2

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Glossary of Chess Terms

Units

Pawn ♙ : can move 2 forward from starting position, 1 otherwise. However it captures diagonally
Knight ♘: can move in L pattern (3 in cardinal directions, then 1 perpendicular to original move)
Bishop ♗ : can move diagonally with no limit
Rook ♖ : can move cardinally in any direction with no limit
Queen ♕: can move any number of squares in any direction - horizontal, vertical or diagonal - if her path is not blocked.
King ♔: can move in any direction 1 space, cannot move into danger (check)

Other Terminology

Castling: a special move in chess that uses both a rook and the king. In castling, the king is moved two squares toward the rook, and the rook moves past the king to the square right next to where the king has moved.
En Passant: 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. The opponent captures the just-moved pawn "as it passes" through the first square. The result is the same as if the pawn had advanced only one square and the enemy pawn had captured it normally.
Check: a condition where the king is under threat of being captured, but there are moves in which the king can escape.
Checkmate: a condition where the king is under threat of being captured, and there are no legal moves for the king to escape.

1. Computer Chess

In this section, there are three subsections which will show the usage scenario, the goals of the chess program and the features that are implemented in the program.

1.1 Usage Scenario

While in this computer chess game, users will be presented with a chess board as seen in figure 1. Human users may play against an AI or another player. When a selection of chess pieces is made, figure 2 shows how asterisks are placed in places where the unit could potentially move; however, the alpha release version of this program does not support that feature. Players will continue to make moves (Figure 3) until one wins, but no one is able to win in the alpha release.

```
Welcome to Player vs Player Chess Game!

    ----+----+----+----+----+----+----+----+
8    bR | bN | bB | bQ | bK | bB | bN | bR |
    ----+----+----+----+----+----+----+----+
7    bP | bP | bP | bP | bP | bP | bP | bP |
    ----+----+----+----+----+----+----+----+
6       |    |    |    |    |    |    |    |
    ----+----+----+----+----+----+----+----+
5       |    |    |    |    |    |    |    |
    ----+----+----+----+----+----+----+----+
4       |    |    |    |    |    |    |    |
    ----+----+----+----+----+----+----+----+
3       |    |    |    |    |    |    |    |
    ----+----+----+----+----+----+----+----+
2    wP | wP | wP | wP | wP | wP | wP | wP |
    ----+----+----+----+----+----+----+----+
1    wR | wN | wB | wQ | wK | wB | wN | wR |
    ----+----+----+----+----+----+----+----+
     A    B    C    D    E    F    G    H
```

Figure 1: Chess Board

Figure 1 displays the layout of the chess board in game with the chess pieces in its initial positions.

```
     ----+----+----+----+----+----+----+----+
  8   bR | bN | bB | bQ | bK | bB | bN | bR |
     ----+----+----+----+----+----+----+----+
  7   bP | bP | bP | bP | bP | bP | bP | bP |
     ----+----+----+----+----+----+----+----+
  6      |    |    |    |    |    |    |    |
     ----+----+----+----+----+----+----+----+
  5      |    |    |    |    |    |    |    |
     ----+----+----+----+----+----+----+----+
  4      | *  |    |    |    |    |    |    |
     ----+----+----+----+----+----+----+----+
  3      | *  |    |    |    |    |    |    |
     ----+----+----+----+----+----+----+----+
  2   wP | wP | wP | wP | wP | wP | wP | wP |
     ----+----+----+----+----+----+----+----+
  1   wR | wN | wB | wQ | wK | wB | wN | wR |
     ----+----+----+----+----+----+----+----+
      A    B    C    D    E    F    G    H
White - Please choose your move: B4
```

Figure 2: Available Moves for chess piece

All the possible moves are displayed with an asterisk if the user chooses a piece. This feature is not available in the alpha release.

```
White - Please choose your move: B2B4

     ----+----+----+----+----+----+----+----+
  8   bR | bN | bB | bQ | bK | bB | bN | bR |
     ----+----+----+----+----+----+----+----+
  7   bP | bP | bP | bP | bP | bP | bP | bP |
     ----+----+----+----+----+----+----+----+
  6      |    |    |    |    |    |    |    |
     ----+----+----+----+----+----+----+----+
  5      |    |    |    |    |    |    |    |
     ----+----+----+----+----+----+----+----+
  4      | wP |    |    |    |    |    |    |
     ----+----+----+----+----+----+----+----+
  3      |    |    |    |    |    |    |    |
     ----+----+----+----+----+----+----+----+
  2   wP |    | wP | wP | wP | wP | wP | wP |
     ----+----+----+----+----+----+----+----+
  1   wR | wN | wB | wQ | wK | wB | wN | wR |
     ----+----+----+----+----+----+----+----+
      A    B    C    D    E    F    G    H
Black - Please choose your move: |
```

Figure 3: Player Inputting Move

Once a user inputs a move, the board will be printed according to the coordinates the user desires.

1.2 Goals

- The chess program goal is to create a platform where people can learn how to play chess.
- In order to win the game, you must checkmate the opponent's king.

1.3 Features

- The program is text based input and output where the user can use letter A-H as column and 1-8 as rows for their chosen unit and move spot. The board will be printed after each move.
- The game provided the features where the user can choose black side or white side as an indication of who will be the first player.
- Features that have yet implemented in Alpha Release:
  - Show all possible moves that the chosen piece can make
    - Not in alpha release
  - Game log that outputs the moves played in a match
    - Not in alpha release
  - Supports player being black side or white side
  - Supports a computer/AI player
    - Not in alpha release

2. Installation

2.1 System Requirements

- Operating System: Linux
- Storage Requirements: 10mb

2.2 Setup and Configuration

1. Download the release tarball from https://github.uci.edu/EECS-22L-S-21-Team-Projects/Team03
2. Navigate to the bin folder using "cd bin"
3. Run the game `./chessgame`

2.3 Uninstalling

1. Navigate to the folder containing the chess game folder
2. Run the delete command `rm -rf chessgame`

3. Chess Program Functions and Features

3.1 Player vs. AI Match

The game begins when you choose the side you want to play - white or black - by inputting 'w' for white and 'b' for black (Figure 4). When it comes your turn, enter a move. Figure 5 shows a move selection. For example, you input two coordinates in chess notation like 'B2B4' with capital letters. After inputting the coordinates with a chess unit on it, the chess board will be updated and printed. When it is the computer's turn, the move will be made automatically followed by an updated printed chess board of the current game. The AI will not make any moves in the alpha release. This process continues until either side's kings are checkmated which is not implemented in the alpha release version. Thus, in order to terminate the chess program, use the command control C. In addition to what is not available in the alpha release, the process of entering the coordinates of a chess piece that you want to move - for example, 'B2' - will not have asterisks provided that are placed on each possible move for the respective chess piece.

Figure 4: White or Black Selection

Right at the beginning of the Player vs. AI match, the user is to choose between having the white or black side.

3.2 Player vs. Player Match

The game begins when one player enters a move. See Figure 5. When it is one player's turn, enter a move. For example, you can input the coordinates 'B2B4' like in figure 5 with capital letters in chess notation. After inputting the two coordinates with a chess unit on it, the chess board will be updated and printed. Each player will go through this process until either side's kings are checkmated. Checkmates will not be checked in the alpha release. Thus, in order to terminate the chess program, use the command control C. As with the Player vs. AI match, the process of entering the coordinates of a chess piece that you want to move - for example, 'B2' - will not have asterisks provided that are placed on each possible move for the respective chess piece.

```
   ---+----+----+----+----+----+----+----+----+
8   bR | bN | bB | bQ | bK | bB | bN | bR |
   ---+----+----+----+----+----+----+----+----+
7   bP | bP | bP | bP | bP | bP | bP | bP |
   ---+----+----+----+----+----+----+----+----+
6      |    |    |    |    |    |    |    |
   ---+----+----+----+----+----+----+----+----+
5      |    |    |    |    |    |    |    |
   ---+----+----+----+----+----+----+----+----+
4      |    |    |    |    |    |    |    |
   ---+----+----+----+----+----+----+----+----+
3      |    |    |    |    |    |    |    |
   ---+----+----+----+----+----+----+----+----+
2   wP | wP | wP | wP | wP | wP | wP | wP |
   ---+----+----+----+----+----+----+----+----+
1   wR | wN | wB | wQ | wK | wB | wN | wR |
   ---+----+----+----+----+----+----+----+----+
    A    B    C    D    E    F    G    H
White - Please choose your move: B2B4


   ---+----+----+----+----+----+----+----+----+
8   bR | bN | bB | bQ | bK | bB | bN | bR |
   ---+----+----+----+----+----+----+----+----+
7   bP | bP | bP | bP | bP | bP | bP | bP |
   ---+----+----+----+----+----+----+----+----+
6      |    |    |    |    |    |    |    |
   ---+----+----+----+----+----+----+----+----+
5      |    |    |    |    |    |    |    |
   ---+----+----+----+----+----+----+----+----+
4      | wP |    |    |    |    |    |    |
   ---+----+----+----+----+----+----+----+----+
3      |    |    |    |    |    |    |    |
   ---+----+----+----+----+----+----+----+----+
2   wP |    | wP | wP | wP | wP | wP | wP |
   ---+----+----+----+----+----+----+----+----+
1   wR | wN | wB | wQ | wK | wB | wN | wR |
   ---+----+----+----+----+----+----+----+----+
    A    B    C    D    E    F    G    H
Black - Please choose your move:
```

Figure 5: Move Selection

Figure 5 above displays the process of selecting a move. The input will be two coordinates in chess notations with capital letters. The image specifically shows how the beginning of a Player vs. Player match may start.

3.3 Game Log

There will be a game log that keeps track of all legal moves made during the match. At the end of every chess game, you may choose to create an output text file in the root directory of the game. It will contain the file information, player information - whether the player was an AI or human - and the list of all the moves in the chess game. The game log feature is not going to be in the alpha release.

Back Matter

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Error Messages

- Input illegal character in game menu

Figure 6: Illegal Menu Option

When inputting any other character from the menu options, there will be an error message and the user has to input again.

- Input illegal characters other than 'w' or 'b' in the beginning of Player vs. AI match

Figure 7: Illegal Side Color

At the start of the Player vs. AI game, the program will ask if you want to have the white or black side of the chess board.

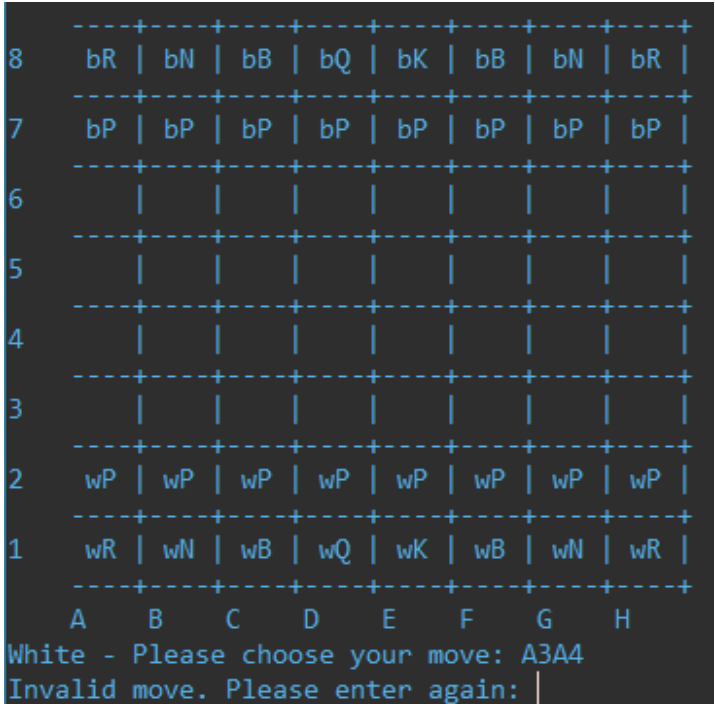- Input illegal move in chess game board for any chess piece

Figure 8: Illegal Move

During any game, if you input incorrect coordinates as a player, the program will give you an invalid move message, and you have to enter a valid move again. In the alpha release, not all invalid moves are checked.

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