

CS246 Chess Demo

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Before we start, always remember the command “help” can be called at any time!

When the program is launched, we enter the main menu, with available commands:

```
e62zhang@0E10x2:~/Chess-AI/src$ ./chess
help
-----
Available commands:

> setup
PURPOSE: Enter setup mode, where you may set up the initial board configurations
If a game hasn't started, you may call setup multiple times to re-edit the board
Example: setup to enter setup mode

> game [white player] [black player]
PURPOSE: Start a game with the given two players
where each player can be one of [human|computer1|computer2|computer3|computer4]
Example: game computer3 human to start a game with computer3 as white and human as black
-----
```

We may first enter setup mode to specify the initial configuration of the board that we would like to start with. Again, we may use “help” in setup mode to check out the syntax of all available commands:

```
setup
help
-----
Available setup commands:

> + [Piece] [Location]
PURPOSE: Add a piece to the given location
where piece can be one of lowercase or uppercase [k|q|r|b|n|p]
Use uppercase for white pieces, lowercase for black pieces
where location consists of one character and one number
Example: + B d7 to add a white bishop to d7

> - [Location]
PURPOSE: Remove any piece at the given location
where location consists of one character and one number
Example: - d7 to remove any piece at d7

> = [colour]
PURPOSE: Specify which side has the first move
where colour is one of [w|b]
By default, white has the first move
Example: = b for black to have the first move

> c
PURPOSE: Toggle the rule of castling to be allowed
Command may be called multiple times to flip the allowance
By default, castling is allowed
Example: c for castling to be disallowed if it was allowed beforehand

> e
PURPOSE: Toggle the rule of en passant to be allowed
Command may be called multiple times to flip the allowance
By default, en passant is allowed
Example: e for en passant to be disallowed if it was allowed beforehand

> done
PURPOSE: save and exit setup mode
Setup mode may only be exited if the configuration of the chess board is valid
Example: done to exit setup mode
```

We may add any pieces to specific locations on the chessboard, and remove the piece at the given location if it was entered incorrectly.

<pre>+ K a1 +abcdefgh 8 7 6 5 4 3 2 1K + k h8 +abcdefgh 8 k 7 6 5 4 3 2 1K █</pre>	<pre>+ Q c4 +abcdefgh 8 k 7 6 4 Q 3 2 1K - c4 +abcdefgh 8 k 7 6 5 4 3 2 1K █</pre>
---	---

We can also see how the program handles mistyped commands:

```
+ m b1
Invalid piece to add!
+ q b0
Invalid row letter!
+ q i2
Invalid column letter!
- j15
Invalid position!
█
```

Furthermore, we can set the colour that has the first move:

```
= w
White starts!
= b
Black starts!
= b
Black starts!
█
```

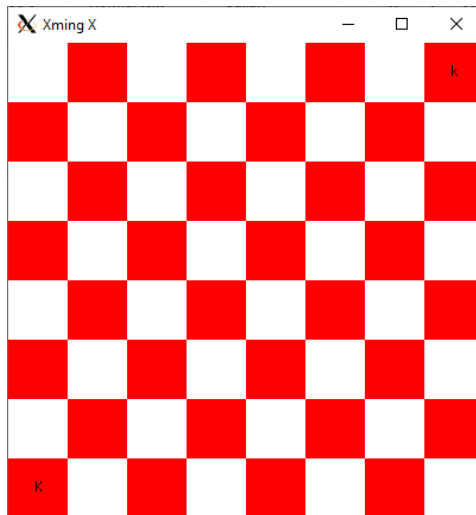
Finally, we can allow or ban the special rules of castling and en passant. Use “c” for castling and “e” for en passant:

```

c
Castling not allowed!
c
Castling allowed!
c
Castling not allowed!
e
En passant not allowed!
e
En passant allowed!

```

At the same time, the chessboard is displayed graphically as well. Check out the Xming window:



Now that we've played around with setup mode, let's exit and start a game!

```

done
Setup mode is complete!
game human human
+abcdefgh
8      k
7
6
5
4
3
2
1K
Black's turn!

```

Let's try out some moves. White starts by default, so I'll try moving the king at a1:

```

+abcdefgh
8      k
7
6
5
4
3
2
1K
Black's turn!
move a1 b1
Invalid piece colour!

```

Right! We specified in setup mode that black starts first! Let's rewrite the starting move for the black king. We can try more commands:

```

move h8 h7
Black played h8 to h7
+abcdefgh
8
7      k
6
5
4
3
2
1K
White's turn!
move a1 a2
White played a1 to a2
+abcdefgh
8
7      k
6
5
4
3
2K
1
Black's turn!

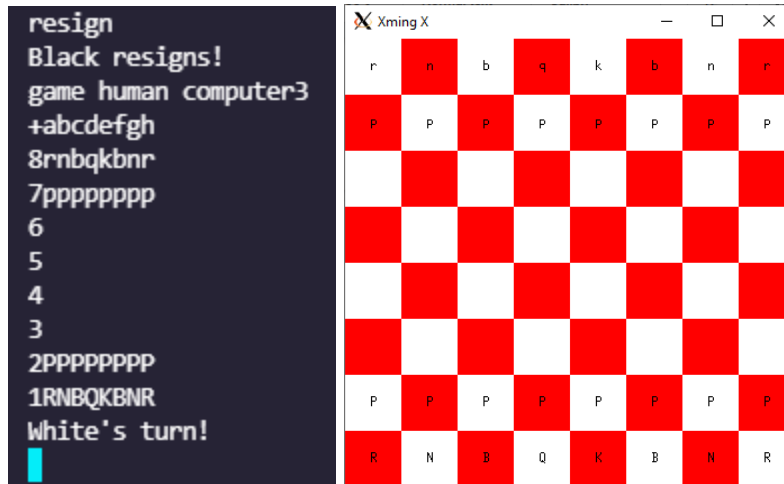
```

```

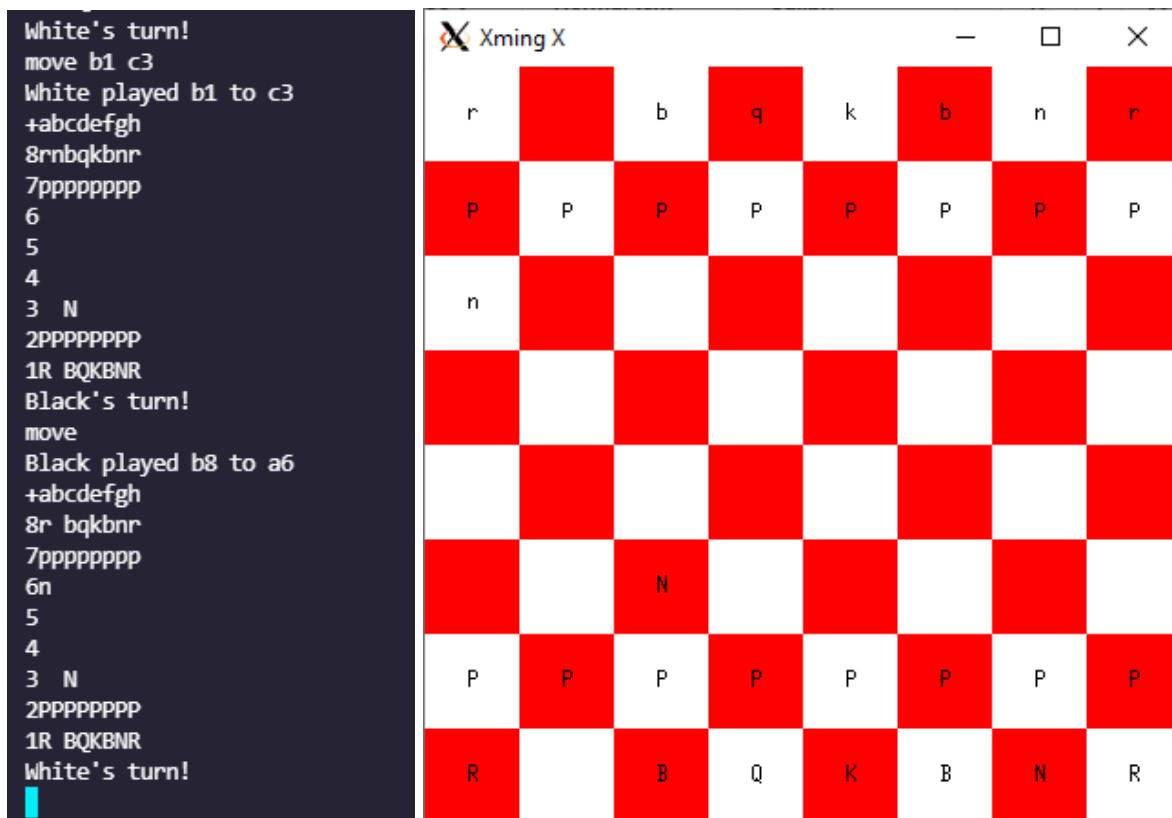
+abcdefgh
8
7      k
6
5
4
3
2K
1
Black's turn!
move h7 h5
Invalid move!
move h7 h9
Invalid row letter!
move h7 i7
Invalid column letter!

```

This game is getting nowhere, so let's restart the game! Type "resign" to exit the current game and back to the main menu. Let's try a standard game this time, without setup mode, against some computer AI:



Let's see how the computer performs:



Finally, let's exit again, and see how checkmate is done. We will try Fool's Mate with the standard board:

```

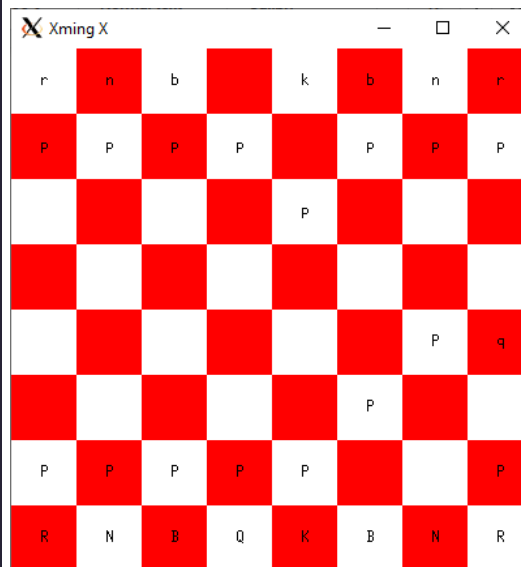
resign
White resigns!
game human human
+abcdefgh
8rnbqkbnr
7pppppppp
6
5
4
3
2PPPPPPPP
1RNBQKBNR
White's turn!
move f2 f3
White played f2 to f3
+abcdefgh
8rnbqkbnr
7pppppppp
6
5
4
3    p
2PPPPP PP
1RNBQKBNR
Black's turn!

```

```

Black's turn!
move e7 e6
Black played e7 to e6
+abcdefgh
8rnbqkbnr
7pppp ppp
6    p
5
4
3    p
2PPPPP PP
1RNBQKBNR
White's turn!
move g2 g4
White played g2 to g4
+abcdefgh
8rnbqkbnr
7pppp ppp
6    p
5
4    p
3    p
2PPPPP P
1RNBQKBNR
Black's turn!
move d8 h4
Black played d8 to h4
+abcdefgh
8rnb kbnr
7pppp ppp
6    p
5
4    Pq
3    p
2PPPPP P
1RNBQKBNR
White's turn!
Checkmate! Black wins!

```



Finally, let's exit and see how white and black performed in all three games:

```

White's turn!
Checkmate! Black wins!
Final score:
White: 1
Black: 2
e62zhang@OE10x2:~/Chess-AI/src$

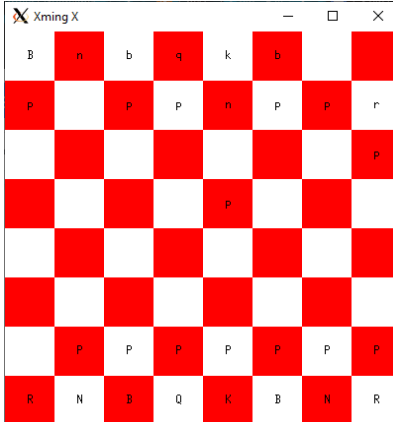
```

Let's re-enter the program, and test out some special rules. Since the output is relatively long, we will instead put the test case inputs here, and display the output only.

Case 1: Pawn promotion

```
game human human
move a2 a4
move h7 h6
move a4 a5
move e7 e5
move a5 a6
move g8 e7
move a6 b7
move h8 h7
move b7 b8 b
```

```
move b7 a8 b
White played b7 to a8
Promoted to bishop!
+abcdefgh
8Bnbqkb
7p pnprr
6      p
5      p
4
3
2 pppppp
1RNBQKBNR
Black's turn!
```



Case 2: Castling

```
setup
+ K e1
+ R a1
+ R h1
+ k e8
done
game human human
move e1 g1
```

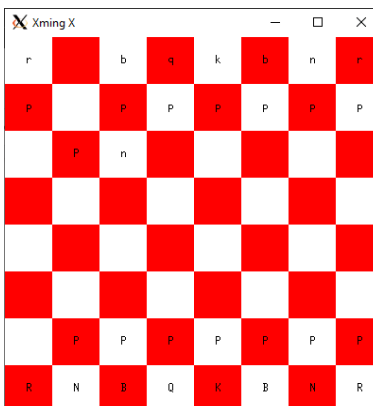
```
White played e1 to g1
+abcdefgh
8      k
7
6
5
4
3
2
1R      RK
Black's turn!
```



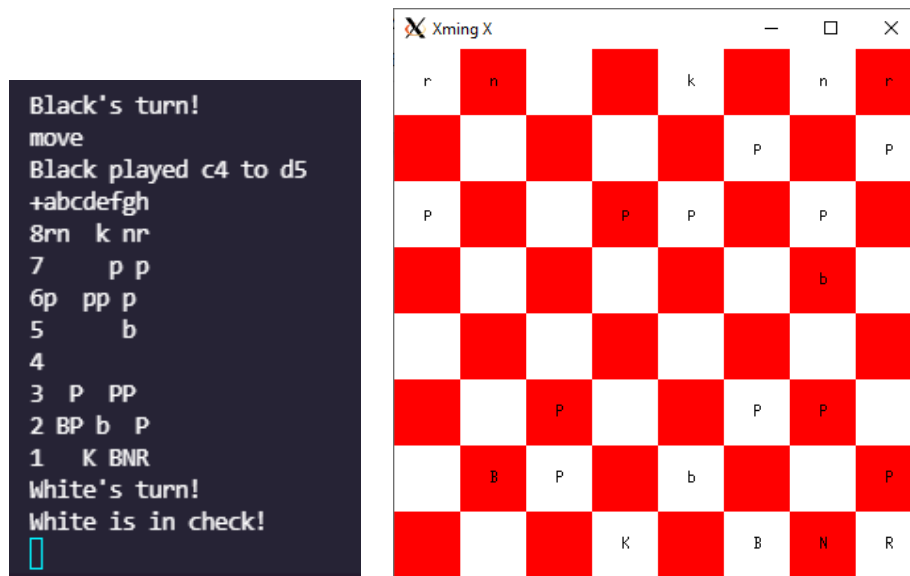
Case 3: En Passant

```
game human human
move a2 a4
move b8 c6
move a4 a5
move b7 b5
move a5 b6
```

```
move a5 b6
White played a5 to b6
+abcdefgh
8r bqkbnr
7p pppppp
6 Pn
5
4
3
2 pppppp
1RNBQKBNR
Black's turn!
```

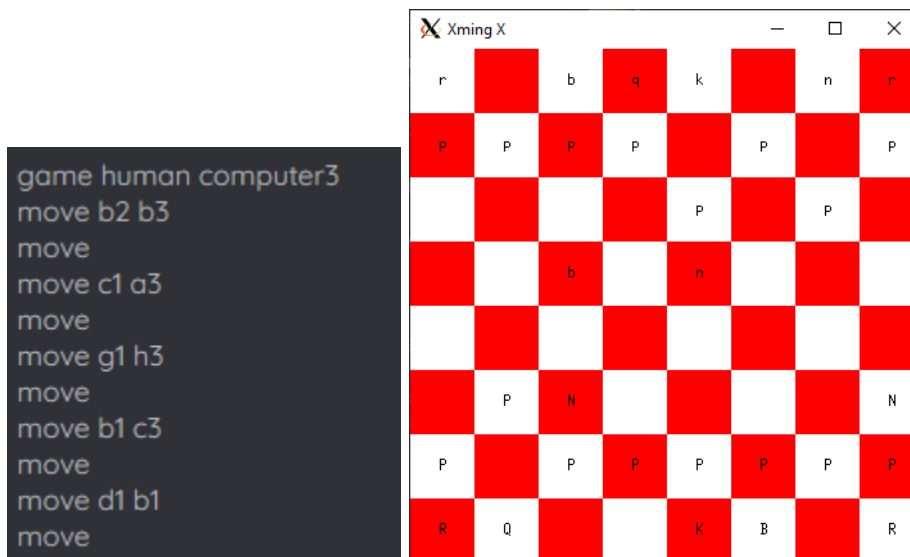


Case 4: Computer (level 2) vs Computer (level 4) (the chessboard after 30 total moves)

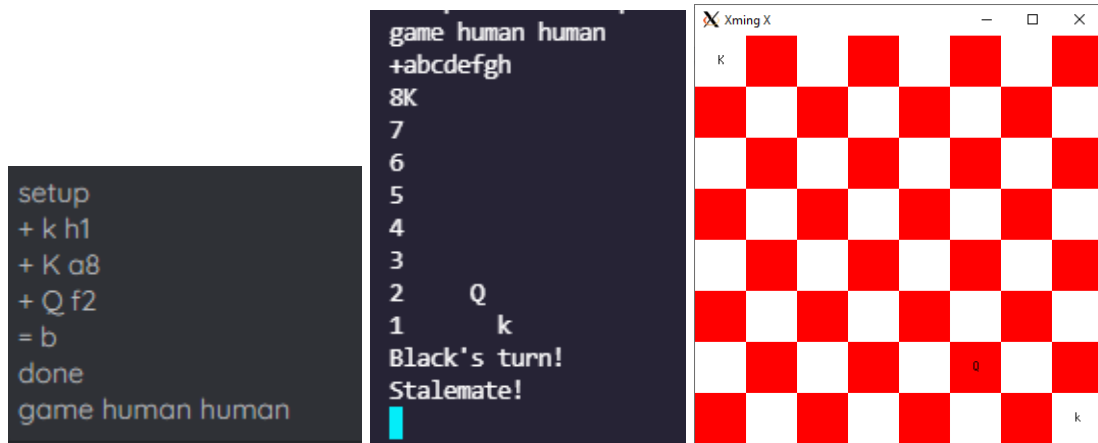


Note: from the board, we see that white (level 2) is in check, thus black (level 4) seems to have the upper hand at the moment.

Case 5: Human vs Computer (level 3) (the chessboard after 10 total moves)



Case 6: Stalemate



Lastly, enjoy! We had tons of fun while doing this project, so we hope you, the user, would have fun with chess too!