Chess Simulation

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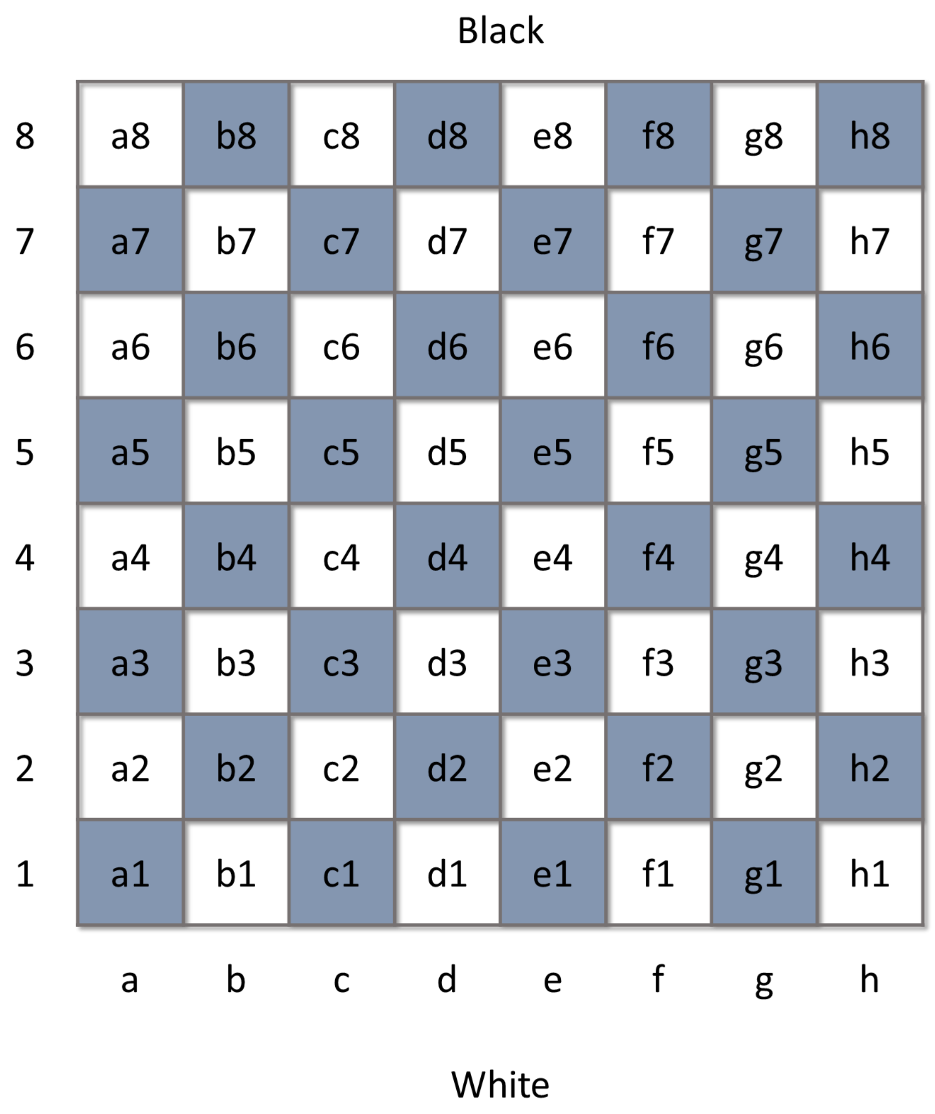
Program Overview

- Simulate a Chess Game
  - Users Input Chess Moves
  - Console Outputs Chess Board
- Simulate Chess Bot
  - Single Player
  - 2 Computers
    - User Choice of Incremental Viewing



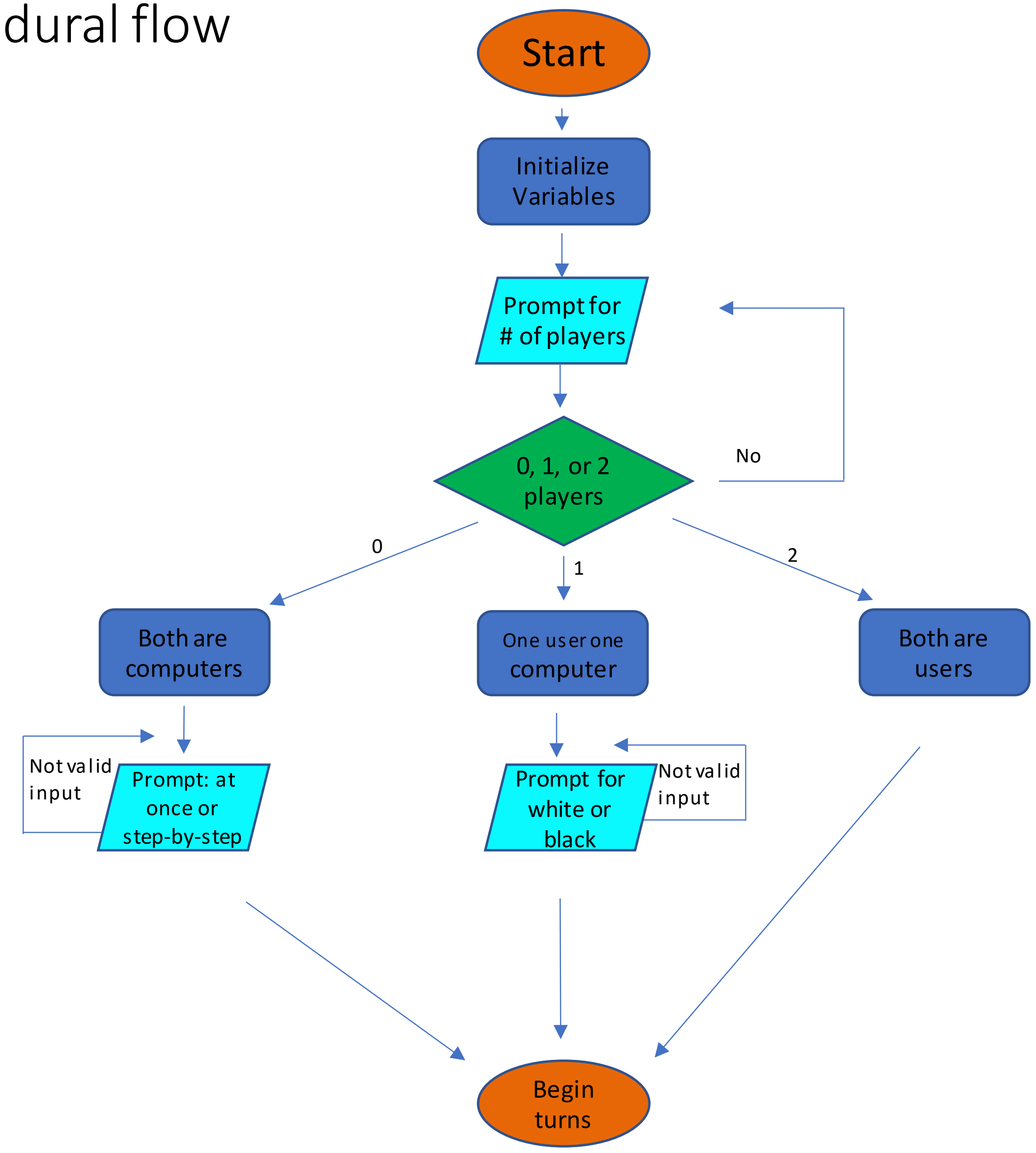
8	a8	b8	c8	d8	e8	f8	g8	h8
7	a7	b7	c7	d7	e7	f7	g7	h7
6	a6	b6	c6	d6	e6	f6	g6	h6
5	a5	b5	c5	d5	e5	f5	g5	h5
4	a4	b4	c4	d4	e4	f4	g4	h4
3	a3	b3	c3	d3	e3	f3	g3	h3
2	a2	b2	c2	d2	e2	f2	g2	h2
1	a1	b1	c1	d1	e1	f1	g1	h1
	a	b	c	d	e	f	g	h

Requirements and Challenges

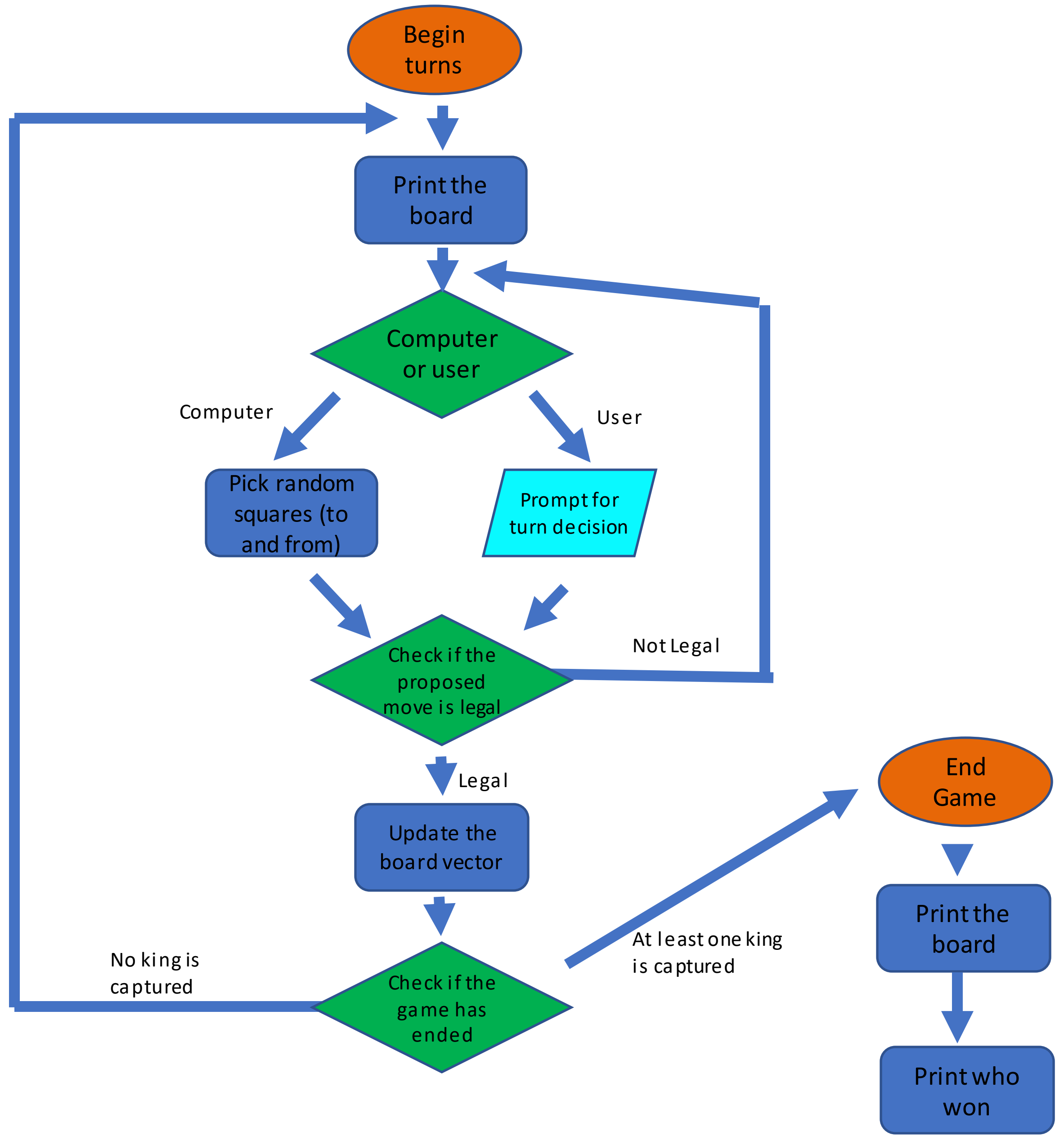
- Board Convention
  - 2-Dimensional Vector of Strings
  - Element indices represent piece location
- Piece Differentiation

- Error Checking for Valid Chess Moves
- Checks and Checkmates
- Group Cooperation and Roles

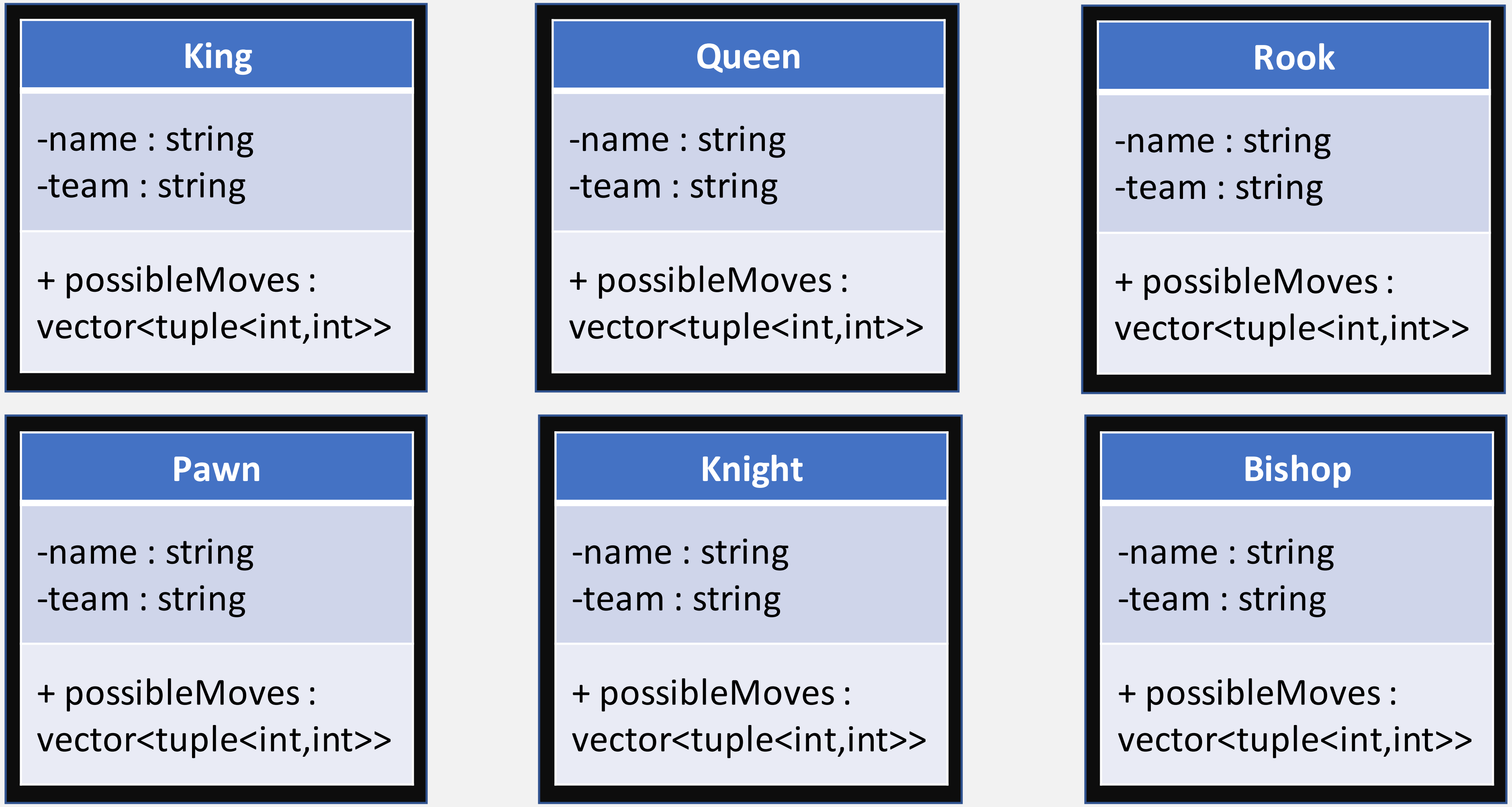
Procedural flow



Turn Action


Begin turns
Print the board
Computer or user
Computer
User
Pick random squares (to and from)
Prompt for turn decision
Check if the proposed move is legal
Not Legal
Legal
Update the board vector
Check if the game has ended
No king is captured
At least one king is captured
End Game
Print the board
Print who won

Class Hierarchy (UML)



King
-name : string
-team : string
+ possibleMoves : vector<tuple<int,int>>

Queen
-name : string
-team : string
+ possibleMoves : vector<tuple<int,int>>

Rook
-name : string
-team : string
+ possibleMoves : vector<tuple<int,int>>

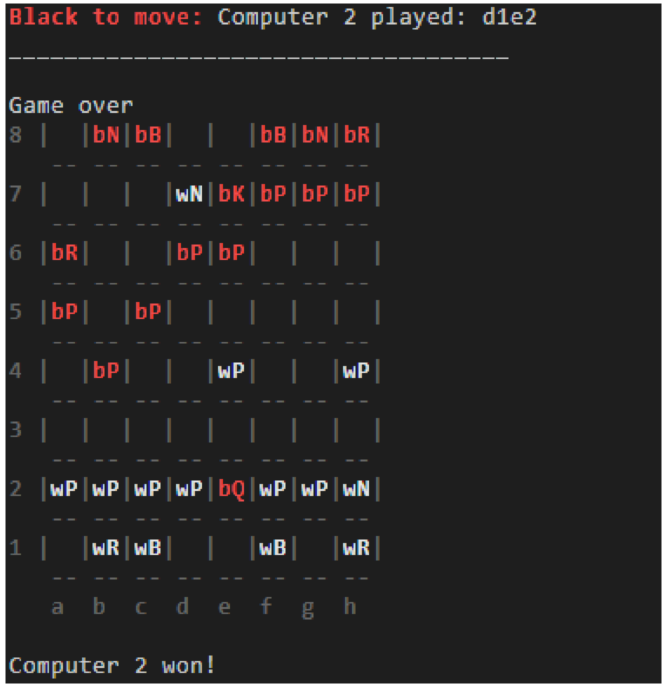
Pawn
-name : string
-team : string
+ possibleMoves : vector<tuple<int,int>>

Knight
-name : string
-team : string
+ possibleMoves : vector<tuple<int,int>>

Bishop
-name : string
-team : string
+ possibleMoves : vector<tuple<int,int>>

The 'Cool' Factor

You can see the computer fight itself



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Black to move: Computer 2 played: d1e2

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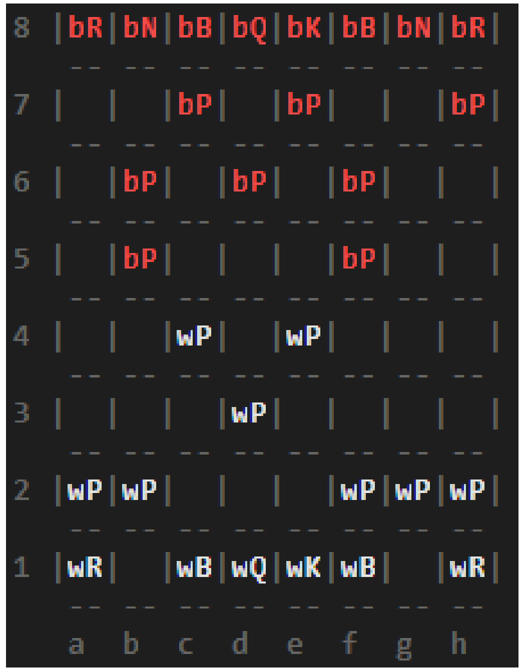
Game over
8 |  |bN|bB|  |  |bB|bN|bR|
   -- -- -- -- -- -- -- --
7 |  |  |  |wN|bK|bP|bP|bP|
   -- -- -- -- -- -- -- --
6 |bR|  |  |bP|bP|  |  |  |
   -- -- -- -- -- -- -- --
5 |bP|  |bP|  |  |  |  |  |
   -- -- -- -- -- -- -- --
4 |  |bP|  |  |wP|  |  |wP|
   -- -- -- -- -- -- -- --
3 |  |  |  |  |  |  |  |  |
   -- -- -- -- -- -- -- --
2 |wP|wP|wP|wP|bQ|wP|wP|wN|
   -- -- -- -- -- -- -- --
1 |  |wR|wB|  |  |wB|  |wR|
   -- -- -- -- -- -- -- --
   a  b  c  d  e  f  g  h

Computer 2 won!
```

And we have cool colors

(not just the boring black and white)



```
8 |bR|bN|bB|bQ|bK|bB|bN|bR|
   -- -- -- -- -- -- -- --
7 |  |  |bP|  |bP|  |  |bP|
   -- -- -- -- -- -- -- --
6 |  |bP|  |bP|  |bP|  |  |
   -- -- -- -- -- -- -- --
5 |  |bP|  |  |  |bP|  |  |
   -- -- -- -- -- -- -- --
4 |  |  |wP|  |wP|  |  |  |
   -- -- -- -- -- -- -- --
3 |  |  |  |wP|  |  |  |  |
   -- -- -- -- -- -- -- --
2 |wP|wP|  |  |  |wP|wP|wP|
   -- -- -- -- -- -- -- --
1 |wR|  |wB|wQ|wK|wB|  |wR|
   -- -- -- -- -- -- -- --
   a  b  c  d  e  f  g  h
```

Program Demonstration

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