
CHESS CLASSIC

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Introduction

We have implemented the traditional chess game for both DOUBLE PLAYER and SINGLE PLAYER using mini-max algorithm and alpha-beta pruning.



Overall design of the program

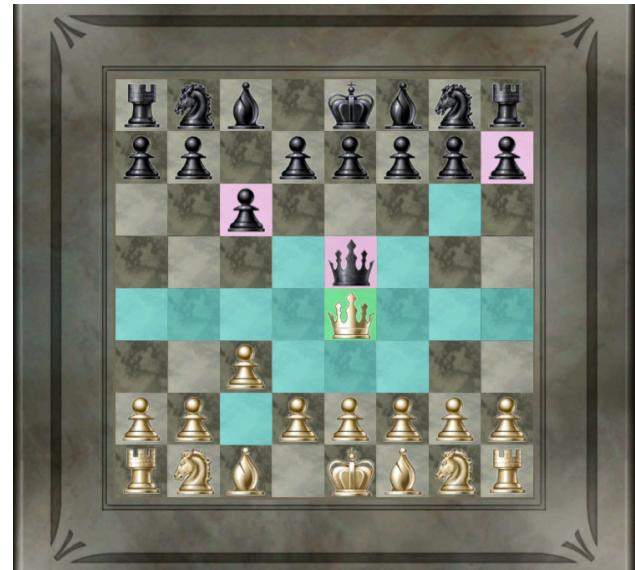
Broadly, the program is divided into three parts :-

- 1) **Graphics** :-We have used 2htdp/image and 2htdp/universe libraries for graphics. It has been abstracted into two parts . All the graphics functions are subset of this:-

a. **to-select** : Once a piece is selected, cells are highlighted into different colours accordingly.

b. **to-move** : In case the user has clicked on a highlighted cell, then the corresponding move is made.

When there is checkmate or stalemate, a message stating that appears on the screen.

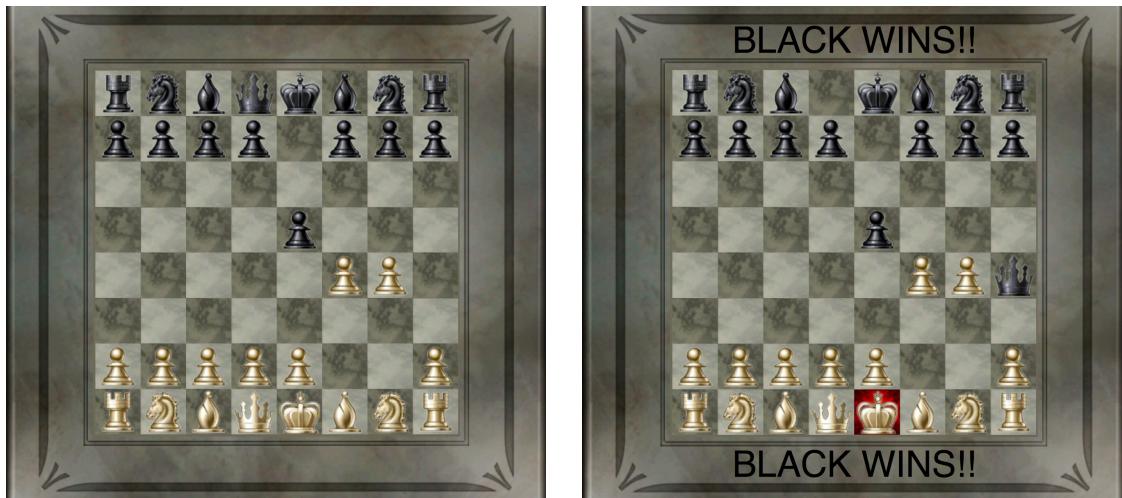


The horse is pinned so it cannot move anywhere.

- Endgame conditions like checkmate and draw

3) **Artificial Intelligence** :- This has been implemented using the **mini-max algorithm** and **alpha-beta pruning**. Given a state, our program returns the best possible move at that position (the program thinks upto a certain ply).

The **board evaluator function** evaluates material values of all pieces, positional values of pawn and knight etc.



Checkmate by Computer

Sample input and output

Initially, the choice (one-player, two-player, instructions or credits) to be played should be clicked.

To move a piece, we have to click the moving piece. It highlights all the valid positions of the piece. The clicking one of the blocks moves the piece to that position.

In the one-player format, after moving the piece, it is necessary to press **ENTER** for the computer to play its move.

Any move can be **undone** by pressing **Z**.

To get a **hint**, press **ENTER**. It automatically executes the best move for the player. If the user feels it to be useful, press **ENTER** for the computer to play or press **Z** and make your own move.

Limitations and bugs

- 1) Pawn can be promoted only to queen.
- 2) Some evaluator functions like mobility value, rook-queen taxicab distance etc. have been defined but not used as they were taking up too much computation time.
- 3) Artificial intelligence does not think of castling.
- 4) We are evaluating only till ply 4 for faster computation (it can be increased by compromising on time).
- 5) Three-fold repetition draw is not implemented in our program.
- 6) Due to so much of cases and functions there may be some borderline cases in which our program gives error.