

Chess

A timeless classic...

Section 1: Movement

Kings:

Kings are able to move in increments of 1 grid square in all directions.

Queens:

Queens are able to move in a vertical, horizontal and diagonal fashion.

Bishops:

Bishops are able to move in a diagonal pattern.

Knights:

Knights are able to move in a “L” shaped pattern.

Rooks:

Rooks are able to move in a horizontal or vertical direction.

Pawns:

Pawns can only move forward and at increments of 1. However they can “take” diagonally.

Special Cases:

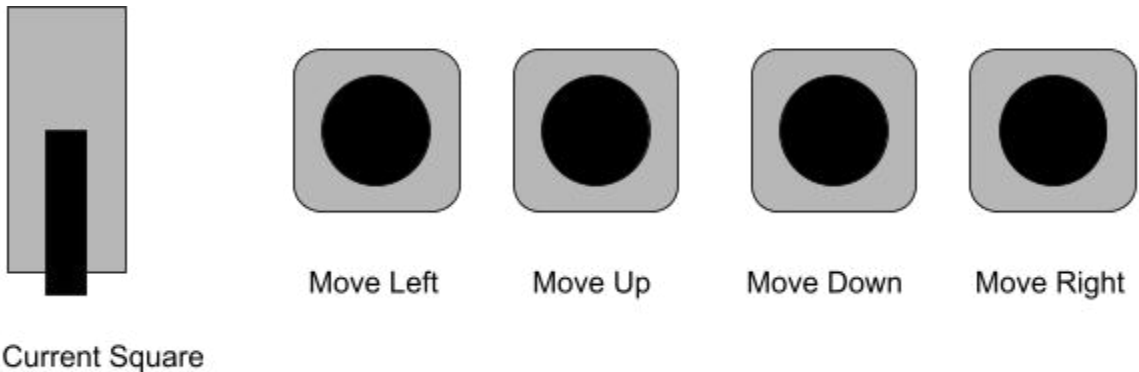
- For their starting move, a pawn is able to move 2 grid squares.
- Kings and Rooks are able to swap places in a move known as “castling”.
- If a starting pawn moves 2 grid squares and bypasses the opponent's pawn, the opponent is able to take the pawn in a move known as “en passant”.
- If a pawn reaches the back row of the opponent's side it can be promoted into a piece of any type excluding kings.

Section 2: How to Play

Our implementation of chess uses the push buttons and the switches on the fpga. The buttons are used to navigate the board as shown by a red square and the switch is used to select a piece/position.

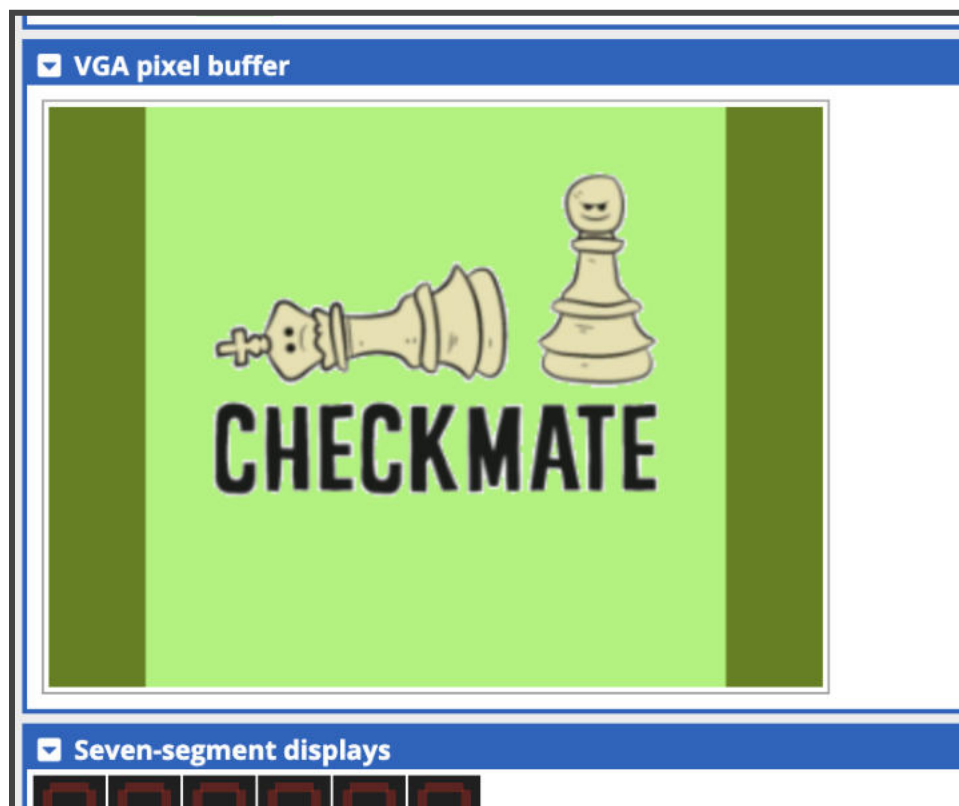
To move a piece, you first navigate to the desired piece with the push buttons. A flip of the switch will indicate that you want to “select” the current piece and the red box will turn orange. Then you are able to navigate the red box onto an empty space or an opponent's piece to complete the move.

There are 4 push buttons and 1 switch and their mapping is shown below.



Players will alternate interacting with the FPGA to move either white or black pieces. **Moving a black piece during white turn will result in an illegal move and vice versa.** The starting turn is white.

Once checkmate or stalemate has been reached the vga will display an end screen as shown below.



Illegal moves will be ignored followed by a terminal prompt.

Section 3: Attribution of Work

Benjamin:

- Final Integration
- Interfacing with switches
- Move Piece
- Check For Mate
- Check Move For Check
- Bishop Check Legal
- Queen Check Legal
- Castling Function
- Promotion and En Passant
- Game Logic

Jim:

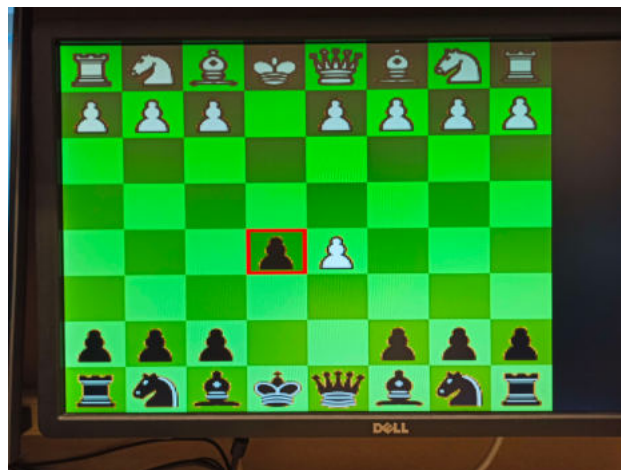
- Drawing board
- Drawing pieces
- Drawing game over screen
- Interfacing with push buttons
- Reset Function
- Rook Check Legal
- Knight Check Legal
- Pawn Check Legal
- King In Check
- Game Logic

Section 4: Game Features

- Move legality
- Castling
- Check and Checkmate
- En Passant
- Pawn Promotion
- Turn based logic

Section 5: Additional Images

En Passant



Pawn Promotion



Castling

