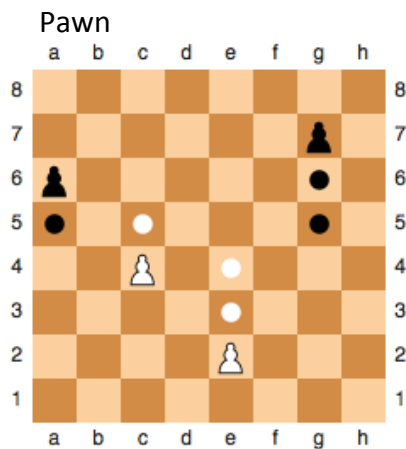
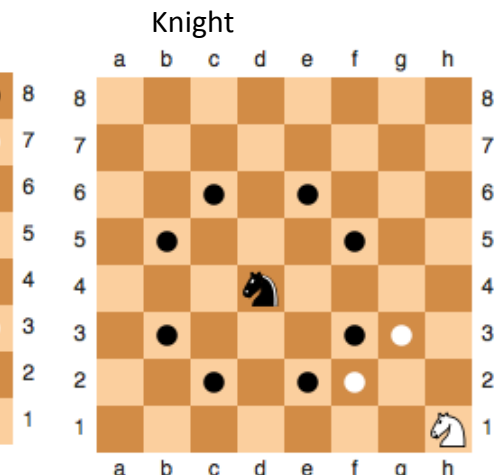
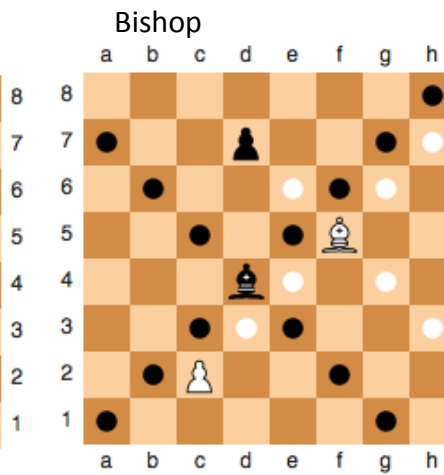
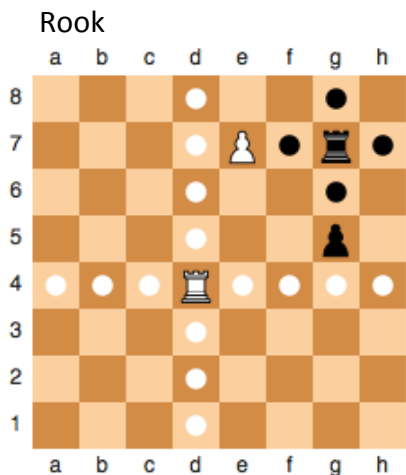
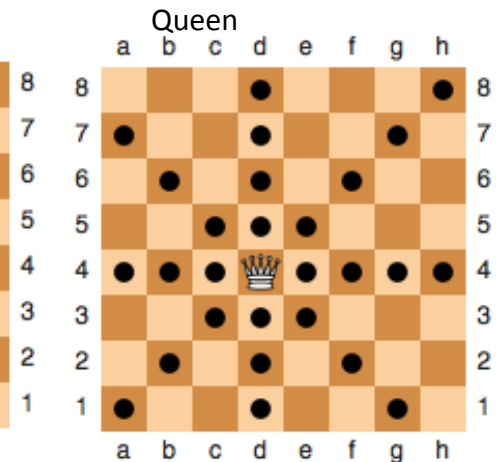
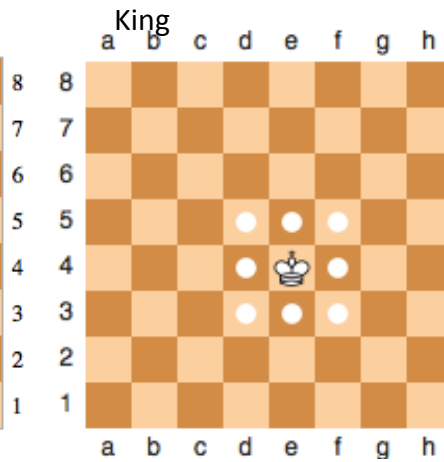
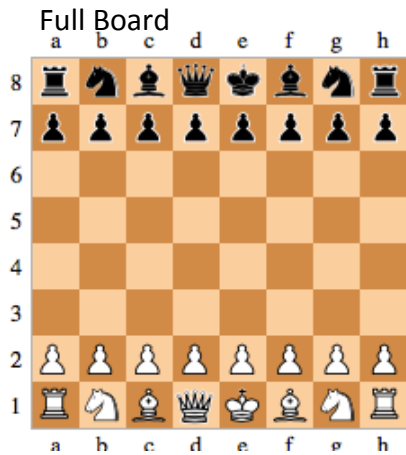


Chess Problems

Author: Elliot Krause

For: Chapel Hill Math Circle Grades 6-7

Chess Piece Movement:



The pawn is one of the trickiest pieces in chess. It only moves forward once space at a time, however it can only capture the opponent's piece if it 1 space away on either forward diagonal. If there is a piece blocking the pawn's forward movement, it can't move through unless the blocking piece moves or it can capture along one of its forward diagonals. There are a few more rules to a pawn's movement, however you should look them up on your own time, they can get tricky.

Independence: Maximum number of pieces that can be placed on a board without attacking each other (when all pieces are of the same type).

Find the independence board for...

- a. Pawn
- b. King
- c. Bishop
- d. Rook
- e. Knight
- f. Queen

Dominance: Minimum number of pieces to cover board where all squares are attacked by at least one piece (when all pieces are of the same type).

Find the dominance board for...

- a. King
- b. Rook
- c. Bishop
- d. Knight
- e. Queen
- f. Pawn

Tour: A path a piece can take to go around to each square on the board without going on the same square twice.

Find the tour for...

- a. King
- b. Bishop
- c. Rook
- d. Queen
- e. Pawn
- f. Knight

Is it possible to return to the square you began at? Verify for each piece. Why or why not?

If you vary the dimensions of the board to 7×7 , 9×9 , 10×10 , 4×6 , 3×10 , and so on, how does that affect the ability of a piece to take a tour? Please focus on the knight tour. Does it matter where you start? And are there dimensions where it is impossible? What if you remove 2 corners? 4 corners?