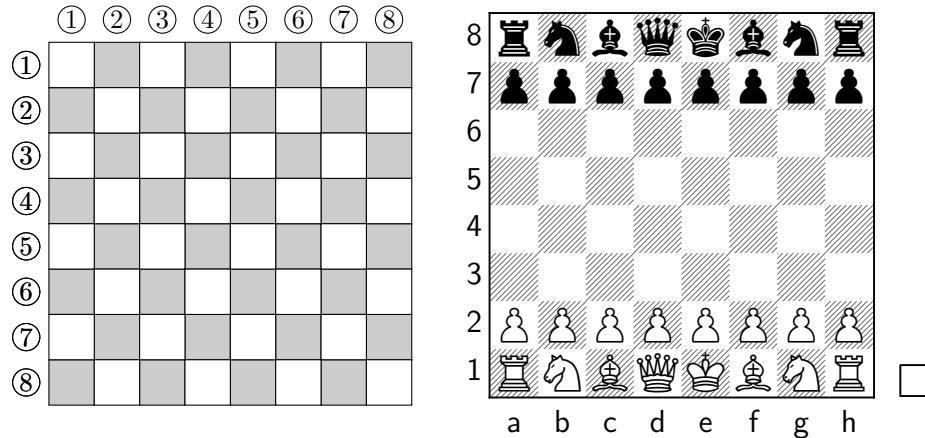


1 Chess (100 points)

Let's assume the state of a chessboard (right) is represented using an 8x8 matrix (left). The rows of the matrix represent the ranks (rows) of the chessboard, but notice that the indices are flipped upside down. The columns of the matrix represent the files (columns) of the chessboard.



The chess pieces and empty locations are represented according to the following list:

- 0 Empty
- 1 White Pawn
- 2 White Rook
- 3 White Knight
- 4 White Bishop
- 5 White Queen
- 6 White King
- 7 Black Pawn
- 8 Black Rook
- 9 Black Knight
- 10 Black Bishop
- 11 Black Queen
- 12 Black King

1.1 initialize

Write a function that returns an initialized chessboard. (10 points).

You should upload a function file `initialize.m` to the CMS which returns the matrix corresponding to an initialized chessboard.

1.2 isvalid

Write a function that checks whether a given matrix represents a valid chess-board state. (20 points).

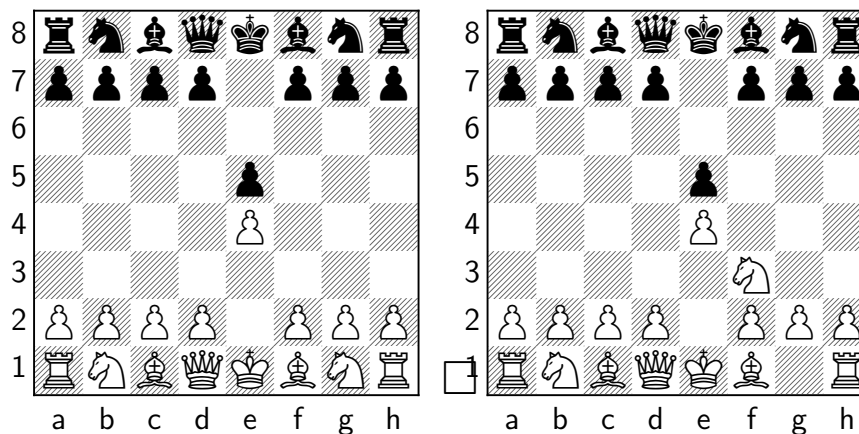
You should upload a function file `isvalid.m` to the CMS which takes a chess-board matrix as input and returns a boolean value.

1.3 move_piece

Chess moves can be represented using multiple notations. Coordinate notation is relatively easy: Initial and final locations of the piece moved is provided in the following form:

`[InitialFile] [InitialRank] - [FinalFile] [FinalRank]`

For example, if the initial state of the board is given as in the left figure, and White moves her knight at G1 to F3, this move is recorded as: **G1-F3**. The state of the board after the move is shown in the right figure.



Write a function which takes the current state of the board and a string of length 5 which encodes a move, as inputs. Your function should return the final state of the board. (20 points).

You should upload a file named `move_piece.m` to the CMS.

1.4 read_moves

A chess game is usually recorded by writing moves made by White and Black in a notation. Let's assume we are given a text file which includes five character

strings at each line. The odd numbered lines correspond to the moves made by White and the even numbered lines correspond to Black's moves.

For example, a chess game listed as follows has the state shown in the figure after move 6.

E2-E4

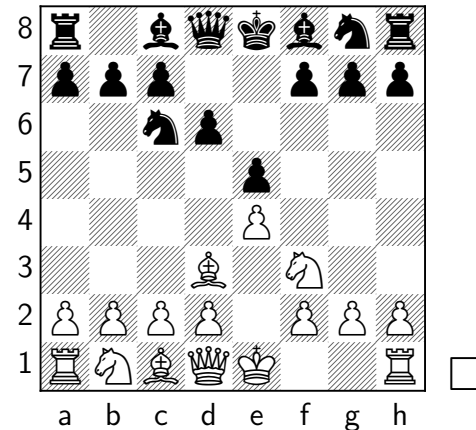
E7-E5

G1-F3

B8-C6

F1-D3

D7-D6



Write a function which reads a text file containing a chess game in coordinate notation and returns the chessboard after a given move number. Filename should be provided as a string input and the move number corresponds to the line number in the file. (20 points).

You should upload a function file `read_moves.m` to the CMS.

1.5 possible_moves

Write a function which writes all possible moves of black or white to a text file given a valid chessboard. (30 points).

You should upload a function file named `possible_moves.m` to the CMS.