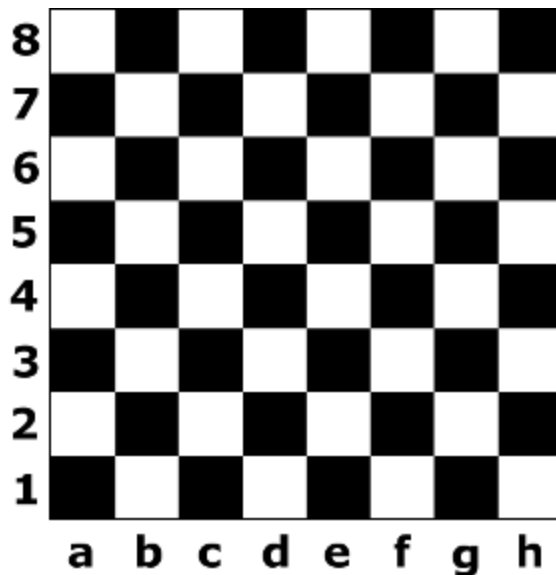# The Chessboard Configuration Turbulence 💀

Total 100 Points

The board layout: A chessboard consists of 64 equal squares arranged in eight rows and eight columns. The squares are arranged in two alternating colors, white and black.

Figure 1: The naming structure on a chessboard

Parts of the board are known by special names:

- Rank - the eight horizontal rows of the chess board are called ranks.
- File - the eight vertical columns of the chess board are called files.
- Diagonal - a straight line of squares of the same color running at an angle from one edge of the board to another edge is called a diagonal.
  - Major diagonal (see figure 2)
  - Minor diagonal (see figure 3)

Conventions

Each individual square has a name so records of the moves of the game can be kept. Several naming systems exist, but "algebraic notation" is the most popular and is the official system. In

this system, each square is named for the row and column in which it is found. The ranks (rows) are numbered from 1 to 8 beginning with white's side of the board and moving to black's side of the board. The files (columns) are labeled by lower case letters from a to h moving from left to right based on the white player's viewpoint. The square is named by the letter followed by the number. Thus the lower left hand square is known as a1 (see figure 1).
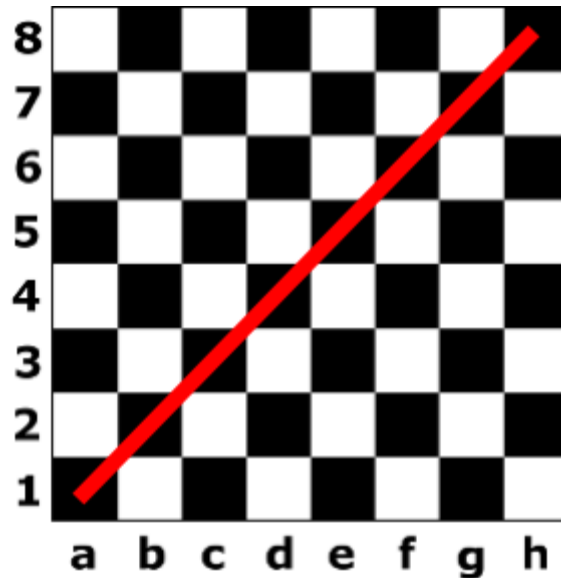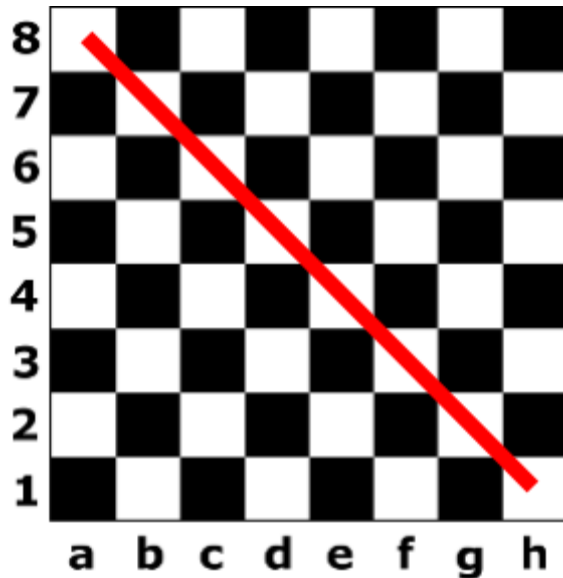

Figure 2: The major diagonal shown in red   Figure 3: The minor diagonal shown in red

Excerpt from: https://docs.kde.org/trunk5/en/knights/knights/board.html

Write a Java program

Write a Java program that has 8 strings denoting the ranks of a chessboard. Each string shall be fulfilled with 8 zeros eight after the initialization.

→ String rank1 = "00000000";   → String rank5 = "00000000";

→ String rank2 = "00000000";   → String rank6 = "00000000";

→ String rank3 = "00000000";   → String rank7 = "00000000";

→ String rank4 = "00000000";   → String rank8 = "00000000";

The character '0' stands for the white square, and the '1' is for the black square. At the very beginning, initialize your chessboard to all white.

Program will prompt the below menu having seven options in total to the user:

MENU:

1- Initialize the board to all white

2- Initialize the board to all black

3- change the minor and major diagonal to white or black (Enter 0 for white, 1 for black):

4- Enter a rank and file together and make that specific square white or black (Enter 0 for white, 1 for black):

5- Initialize a proper chessboard

6- Draw the chessboard on the console

7- EXIT

Code the below methods:

★   ? menu(???????) → when invoked, displays the menu above. (4 points)
★   ? allWhite(???????) → when invoked, returns a string "00000000" (3 points)
★   ? allBlack(???????) → when invoked,   returns a string "11111111" (3 points)
★   ? changeDiagonals(???????) → when invoked, make the major and the minor diagonals white or black as per the given parameter. (25 points)
★   ? changeSquare(???????) → when invoked, change the specific square's condition from one to another. (20 points)
★   ? convertIntoProperChessBoard(???????) → when invoked, make necessary changes on the strings to come up with a proper chess board layout seen in figure 1. (20 points)
★   ? drawVirtualCB(???????) → when invoked, print all the strings to mimic a chessboard (see the example run). (15 points)
★   Main method. (10 points)

Your program runs until the user inputs 7 to halt it.

TIPS 💡 :

Think about the scope of your items (especially the string references may be declared outside of any method, they, then, can be assigned within the method/s!!). A class data field can be used within any class behavior. We like using data fields in the class methods as much as we can to serve high cohesion. Read about cohesion and coupling in OOP.

You may add any other methods if you need to. The divide and conquer methodology may lead you to a well managed holistic.

Integer.parseInt() → check what it does.

You are allowed to use StringBuffer or StringBuilder classes. The non-static setCharAt() method may help a lot. Still this problem can be solved with the String class only, but it is ambitious.

https://docs.oracle.com/javase/7/docs/api/java/lang/StringBuffer.html

https://docs.oracle.com/javase/7/docs/api/java/lang/StringBuilder.html

FAQ ☢️

Q. Can I use ……… ?

    A.   You are only allowed to use programming aspects that we covered in weeks [1-7].

Q. I made a mistake or IMHO this would be problematic in my solution, will you cut off any points?

    A.   You will see your grade when it is announced. Don't rush! If you have objections to your grade, then contact your teaching assistant.

Acknowledgement: Read the assignment carefully, and most probably the answers to your possible questions are already in front of you. The last day to ask questions: 15/11/2022 Tue.

Cheating only insults your intelligence and will not be tolerated!