

CS2300 Assignment 2 (50 points)

Due Date: 9/30 (11:59pm)

Description: The **eight queens puzzle** is the problem of placing eight **chess queens** on an 8×8 chessboard so that no two queens threaten each other. Thus, a solution requires that no two queens share the same row, column, or diagonal. The eight queens puzzle is an example of the more general **n queens problem** of placing non-attacking queens on an $n \times n$ chessboard, for which solutions exist for all natural numbers n with the exception of $n=2$ and $n=3$. (https://en.wikipedia.org/wiki/Eight_queens_puzzle)

Requirement: In this assignment, you MUST use a recursion to solve this problem. There is a function called “draw” provided that will draw the board. The draw function has one argument which is an integer array containing the y position. The x position is indicated from the index. You should call the draw function when you have found the solution. Note that the position is starting from zero.

In this assignment, you are provided the “StdDraw.java” for drawing a board. To compile with the source file,

```
>> javac Queens.java StdDraw.java
```

In addition, your program should read the size of the board (N) from the command prompt. All you need is to test the size between 4 and 16.

```
>> java Queens 8
```

Grading:

Submit your source files along with a readme indicating how to compile your files via blackboard.

Successfully compile and link (10 points)

Solve the n queens puzzle correctly (40 points)

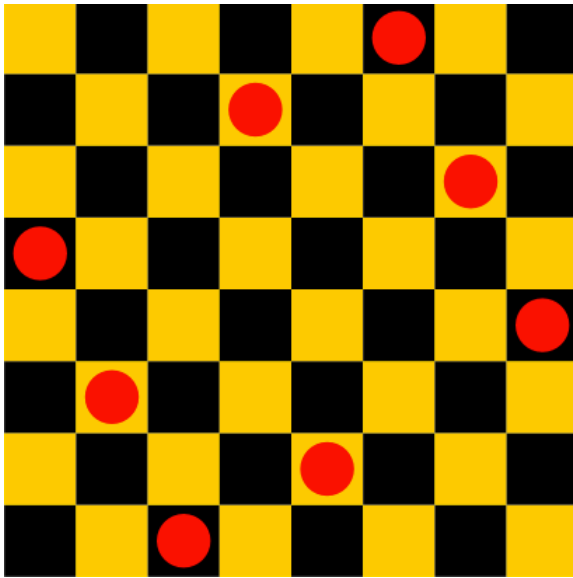
**** If you do not use recursion to solve this problem, you will receive zero point.**

Bonus (20 points)

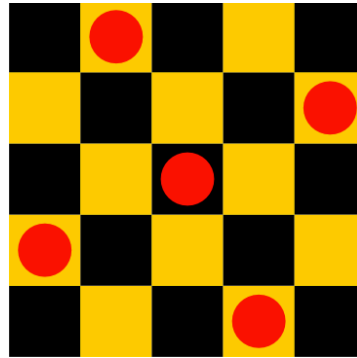
To extend the N queens problem, we could add more constraints to the solutions. There exist solutions of the N queens problem, which is 180° symmetry. In other words, all you need is to solve $N/2$ when N is an even number or $N/2+1$ when N is an odd number.

See the following examples.

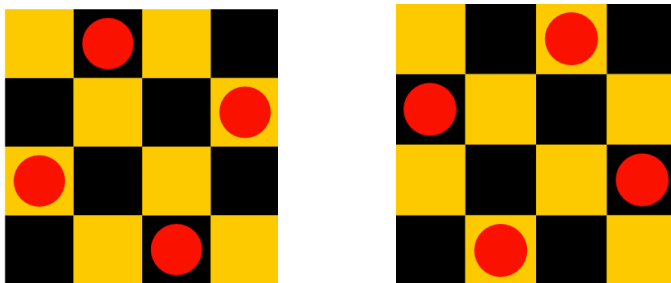
N = 8 (92 possible solutions)



N = 5 (10 possible solutions)



N = 4 (2 possible solutions)



If you can solve the 180° symmetry N queens problem recursively, you will receive additional 20 points. Write me a note in blackboard if you are submitting the symmetry solution.