Homework Assignment 1
Due date: Thursday, February 7 (at the beginning of class)

1 - Read the article entitled Sudoku Science.

1 –Consider the statement in the article:

"No matter the difficulty level, however, a dedicated puzzler can eventually crack a 9-by-9 Sudoku game."

Comment the above statement. What if we considered a 25x25 Sudoku game?

The class P corresponds to the problems that can be solved efficiently, in polynomial time. The class NP corresponds to the problems whose solution can be efficiently checked, in polynomial time.

2 – Consider the problem of sorting a list of numbers increasing order. Is the problem in the class P? Is this problem in the class NP?

3 – Consider a variation of Sudoku that we call Sudoku_Empty_N. (N is a perfect square number) In this variation you are given an NxN empty matrix. The goal is to fill in the NxN cells of the matrix using numbers 1, 2, …, N and following the Sudoku rules (no repetition of a number in a row, column, or block). Show that this problem is in P and also in NP.

(Hint: Show how to complete a Sudoku_Empty_2 (i.e., a 2x2 empty matrix), a Sudoku_Empty_4 (i.e., a 4x4 empty matrix), a Sudoku_Empty_9 (i.e., a 9x9 empty matrix) and a Sudoku_Empty_N (i.e., a NxN empty matrix).

4 – How would you represent a NxN Sudoku (regular Sudoku, but for arbitrary N) instance, as a graph coloring problem.

4.2 – How many nodes are there in the graph?
4.1 – What does a node in the graph represent?
4.3.- What does an edge in the graph represent?
4.4 – How many edges are there?
4.5 – Draw the graph for a 4x4 Sudoku instance.