CS375, Spring 2014
Bonus homework 2
due: April 30, 23:59 EDT.

1. Write a program that, given an integer n and a set FS (forbidden squares) of pairs (i, j), where $1 \leq i, j \leq n$, produces a CNF formula representing the n-queens problem, with an additional requirement that no queen is placed in any of the entries in FS. The output should be in the DIMACS format.

2. Use a SAT solver (such as minisat; see notes on sat solving on the class web-site) to determine if valid arrangements of queens exist in the following cases (in each case, when they do, output at least one valid arrangement):

1. $n = 4$, $FS = \{(1, 2)\}$
2. $n = 4$, $FS = \{(1, 2), (2, 4)\}$
3. $n = 10$, $FS = \{(1, 1), (1, 3), (1, 5), (1, 7), (1, 9)\}$
4. $n = 10$, $FS = \{(1, 1), (1, 2), (1, 3), (1, 4), (1, 5), (1, 7), (1, 8), (1, 9), (1, 10)\}$

3. Write a program that, given a sudoku problem, produces a CNF formula F so that models of F represent correct sudoku solutions (of course, all sudoku problems published have exactly one solution; but if some clues are missing there may be more solutions; if there are too many, there may be no solutions). Use your program to solve this sudoku problem. Show that if some clues are eliminated, multiple solutions arise. Find a way to add clues, so that no solutions exist.

					1			7
9	4			7				
		2	5					8
4								
7	6		9				4	
						9	3	
6					8			
8	9		2	6				
					4	1		

4. Turn in all programs and the documentation. The documentation must provide an overview of all programs, explain how to run them, and should contain all the results and your interpretaton of what these results mean.

Solutions must be submitted as a single zip fil to the csportal