# CS 480 Spring 2022

**Assignment #2**

## Due: Monday, 12:00 AM (midnight) Beijing Time

**Apr 4, 2022**

Submit before 11:59 PM April 3rd Beijing time. Points: **100**

## Problem : Constraint Satisfaction Problem - NQueens (Eg: [8queens](https://en.wikipedia.org/wiki/Eight_queens_puzzle))

Attached is Python code for solving N-queens using simple backtracking, assigning the queen columns row-by-row (as a .py and .txt file). You may start with this code for the assignment, or you may add / modify the methods you feel fit.

All places labeled as TODO are to be modified.

Q1: Modify the code to count the total number of assignments attempted during a solution run. (20 points)

1. How many assignments are made solving 8-queens?

113

1. How many assignments are made solving 10-queens?

102

1. How many assignments are made solving 15-queens?

1359

1. How many assignments are made solving 20-queens?

199635

Q2: Modify the code to include the least-constraining-value heuristic for determining which order to check new column assignments in. (40 points)

1. How many assignments are made solving 8-queens?

55

1. How many assignments are made solving 10-queens?

10

1. How many assignments are made solving 15-queens?

79

1. How many assignments are made solving 20-queens?

93

Q3: Modify the code to include arc-consistency checking (AC-3 algorithm) (40 points)

1. How many assignments are made solving 8-queens?

20

1. How many assignments are made solving 10-queens?

28

1. How many assignments are made solving 15-queens?

207

1. How many assignments are made solving 20-queens?

25925

## Instructions :

* 1. Make sure your code is clear and well-documented. Points will be deducted for poorly-structured, undocumented, or impossible-to-read code.
  2. Feel free to change/add methods as you see fit.
  3. Your code MUST run in Python 3.
  4. There should be 3 python files named Anumber\_NQueens\_Q1.py, Anumber\_NQueens\_Q2.py , Anumber\_NQueens\_Q3.py. Each python should run with the below command:

python Anumber\_NQueens\_Q1.py - -size 4

* 1. Feel free to include a README.md or README.txt or README.docx file if any explanations are necessary. Explanations can also be given as comments in the respective python files.
  2. Edit this document to have the answers for questions 1 ,2 and 3. Rename this file to Anumber\_NQueens.docx
  3. Submit all files in a zipped folder named FirstName\_LastName\_ANumber\_CS480\_Assignment2.