

# Extra Credit EC2: Arc Consistency Algorithms

*CS 4300*  
*Fall 2015*

**Assigned:** 1 September 2015

**Due:** 17 September 2015

For this problem, handin a lab report pdf (include name, date, assignment and class number in pdf). Perform the following two comparisons of AC-3 and AC-4:

- For  $N = 4 : 15$ , for each  $N$  generate 5000 random  $D$  matrixes, where the percentage,  $p$ , of ones varies from 0 to 1 in steps of 0.1, and for each matrix record:
  - The number of ones before and after the application of the constraint algorithms, and
  - The execution time of each algorithm for each trial (using tic and toc).

Study the conditional expected reduction in ones for a given starting number of ones. Find the best regression fit and report the constants in the complexity functions of the two algorithms, and find the relative execution time ratio of the two algorithms (as a function of  $p$  and  $N$ ).

You should handin the report pdf as well as the code used in the study. The code should conform to the style requested in the class materials (no matter what language). In addition, please turn in a hardcopy of the report in class before the start of class on September 17, 2015.

Write a lab report in the format (please do not deviate from this format!) described in the course materials. Discuss the statistical framework to establish a confidence interval on the means, and the hypothesis test.