CIS 473/573: Probabilistic Methods in AI

Homework #5 – Programming

Due via Gradescope, 11:59pm on Friday, February 26, 2021

Guidelines: Implement the variable elimination algorithm with the min-neighbors heuristic for variable ordering (see pg.314). Begin with the template code in Python. After you have implemented the required functions, the complete program will read in a model file in the UAI file format and print out the partition function, just as in homework 4. However, using variable elimination, it should be much more efficient on some networks.

Start early! Programming assignments such as this one can take a very long time to complete.

Here are some recommended steps for completing this project:

1. First, write a routine to sum out a variable from a factor.
2. Implement variable elimination with an arbitrary order (say, the order in which the variables are defined). Try it on some really simple graphs to debug it.
3. Implement the min-neighbors heuristic (delete the variable with the fewest neighbors in the graph). Your code should now work well on chains, trees, and also some more complex graphs.

The autograder will have tests for each of these components, so you can get credit for a working sum function even if your min-neighbors heuristic is incorrect.