Problem Set 3
Due Sunday January 26, 2020 at 11:55pm

This assignment has been divided into two parts on Gradescope.

Submit your answer to problem 1 as a single PDF file at `https://gradescope.com/` under PS 3.1 and submit your answer to problem 2 as a zip file of **only** `naiveinf.py` and `testnaiveinf.py` under PS 3.2.

Problem 1. [3 pts]

Exercise 4.1 from the book.

Problem 2. [5 pts]

The supplied zip file includes codes that implements the factor operations in Python 3 (using the numpy libraries). `ch4ex.py` shows how these can be used to generate a number of the factor examples from Chapter 4 in the textbook. Make sure you can run this Python script and check that you understand how to use the factor library.

The goal of this problem is just to get you familiar with the factor library and to map some simple ideas from class to it.

Implement the missing code (marked with "YOUR CODE HERE") in `naiveinf.py` and `testnaiveinf.py`. The first should implement a very naïve (and therefore potentially very slow) method for computing the conditional distribution of one set of variables, given another set of variables. Do this by multiplying all of the factors together (to get the joint) and then marginalizing and conditioning the resulting factor correctly to get a factor that represents the desired conditional marginal distribution. The required code is quite small.

The `testnaiveinf.py` file runs the "robot" example from problem set 1 through your naïve inference method, as well as running a couple of queries about the student network from the textbook (Figure 3.4) through your inference code. You will need to implement the function that constructs the student network.

Submit only your versions of `naiveinf.py` and `testnaiveinf.py`.