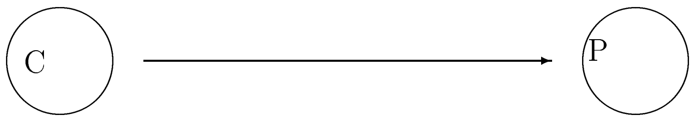

CSCE 582–Fall 2002
Some Sample Questions

1. (Adapted from J. Pearl via Exercise 14.11 of: Russell, Stuart and Peter Norvig. *Artificial Intelligence: A Modern Approach.* Englewood Cliffs: Prentice Hall, 1995.) You are a witness of a night-time hit-and-run accident involving a taxi in Athens. Half of the taxis in Athens are blue, while half are green. You testify, under oath, that the taxi was blue. Extensive testing under dim lighting conditions indicates that the probability of seeing a blue taxi when the taxi is actually blue is 75% and the probability of seeing a green taxi when the taxi is actually green is also 75% [10 points in total].

   (a) Draw a DAG modeling the story. The DAG has two nodes, representing the true color of the taxi (call it C) and the perceived color of the taxi (call it P) [5 points]. **Answer:** See figure.

   (b) Quantify the network by giving the two required probability tables [5 points]. **Answer:** $P(C) = (0.5, 0.5)$, and $P(P \mid C)$ as given in the following table:

	blue	green
blue	0.75	0.25
green	0.75	0.25

2. (Based on Exercise 15.3 part (b) in: Russell, Stuart and Peter Norvig. *Artificial Intelligence: A Modern Approach.*) Two astronomers, in different parts of the world, make measurements M_1 and M_2 of the number N of stars in some small region of the sky, using their telescopes. Normally, there is a small probability of error of up to one star. Each telescope can also (with a slightly smaller probability) be badly out of focus (events F_1 and F_2), in which case the scientist will underscore the count by three or more stars. Draw a Bayesian network structure that represents this story. [10 points]