Christopher LaJon Morgan

CS 470

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1. (Adapted from Pearl (1988) ). Three prisoners, A, B, and C, are locked in their cells. It is common knowledge that one of them is to be executed the next day and the others are to be pardoned. Only the Governor knows which one will be executed. Prisoner A asks the guard a favor: "Please ask the Governor who will be executed, and then take a message to one of my friends B or C to let him know that he will be pardoned in the morning." The Guard agrees, and comes back later and tells A that he gave the pardon message to B. What are A's chances of being executed, given this information? Show how you obtain this answer using Bayes rule.

2. Suppose that you were going to write a small program that simulates what message the Guard gives to prisoner A. What message would the Guard bring if prisoner C was being executed? If prisoner B was being executed? If prisoner A was being executed?

3. Write a small program that randomly selects which of the three prisoners will be executed. (Hint, use tmp=rand(); if tmp<=0.33 A is executed; elseif tmp<0.67 B is executed; else C is executed.) Use the model of the Guard that you created in part 2 and report which message is delivered to prisoner A. Run the program several times, keeping track of which prisoner would actually be executed whenever the Guard delivers a message to prisoner A stating that prisoner B gets pardoned. What percentage of time was prisoner A the one who would have been executed? Prisoner B? Prisoner C?