ICS 171, Summer 2000: Lecture 8 Homework

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(1) Problem 14.1 on page 433 in the textbook.

(2) Problem 14.2 on page 433 in the textbook.

(3) Suppose that an agent is renewing her car insurance for the next year. She has two choices: to buy insurance converage and to not buy insurance coverage (suppose that insurance is not required by law). It is known that in the next year with probability $p_1 = 0.96$ the agent will not get into an accident, with probability $p_2 = 0.03$ the agent will get into a minor accident and with probability $p_3 = 1 - p_1 - p_2$ that the agent will get into a serious accident.

If the agent pays \$1000 for insurance then she will be covered in case of any accident and will not have to pay anything else. However, if the agent doesn't buy insurance, she will have to pay \$2000 in case of a minor accident and \$90000 in case of a serious accident and nothing if there is no accident.

(a) Set up a table with utilities for this problem (similar to the one we considered in class).

(b) Use the Maximum Expected Utility Principle (with the table) to answer the question of whether the agent should buy insurance coverage for the next year given the data provided.

(c) Suppose that the agent is unsure of exactly how much a major accident will cost and the \$90000 figure used was just an estimate. How much lower or higher could the cost of a major accident be before the decision of the agent to buy or not to buy insurance changes?

(4) You are a participant in Monty Hall's *Lets make a deal* game show. He offers you the choice of one of three doors. Behind one door is a \$100 prize which you get to keep if you select that door, otherwise you will win nothing.

(a) What is your expected earnings if you select a door at random?

(b) After you select a door, Monty opens one of the two doors which you did not pick and shows you that it is empty. He then offers to let you switch your choice of doors. Should you switch doors? What is your expected earnings of this action? You can assume that Monty always shows you an empty door regardless of whether or not you picked the correct door initially. (Hint: break the problem down into two situations: (1) you selected the correct door initially, and (2) you did not select the correct door.)

(5) Problem 14.3 on page 433 in the textbook. Note this problem requires the use of Bayes Rule.