TIE4203 Decision Analysis in Industrial & Operations Management
Tutorial #1

Question 1

P1.2 Suppose you were the highest bidder at $45 in an open bidding (highest bidder wins) for the thumb tack tossing deal (payouts: $100 or nothing) demonstrated in class. After winning the deal, you determined that your personal indifferent selling price for the deal is $75. At the end of the class, the thumb tack is tossed under cover and the outcome is observed by a classmate. He offers to truthfully tell you the results before you make your call. What is your personal indifferent buying price for this information?

Question 2

P1.3 John bids $46 for the coin tossing deal demonstrated in class ($100 or nothing). What must be true at the moment about John?

    I.   His personal indifferent buying price = $46
    II.   His personal indifferent selling price = $46
    III.   His personal indifferent buying price $\geq$ $46
    IV.   His personal indifferent buying price $\leq$ $46

Question 3

P2.1 (Clement and Reilly 2001, Exercise 7.15 p 283)
Julie Myers, a graduating senior in accounting is preparing for an interview with a Big Eight accounting firm. Before the interview, she sets her chances of eventually getting an offer from this firm at 50%. Then on thinking about her friends who have interviewed and gotten offers from this firm, she realizes that of the people who received offers, 95% had good interviews. On the other hand, of those who did not received offers, 75% said they had good interviews. If Julie Myers has a good interview, what are her chances of receiving an offer?

Question 4

P2.2 In the city, there are only two taxicab companies, the Blue and the Green. As you may suppose, the Blue cabs are blue and the Green cabs are green. The Blue Company operates 90% of all cabs in the city and the Green Company operates the rest. One dark evening, a pedestrian is killed by a hit-and-run taxicab.

There is one witness to the accident. In court, the witness's ability to distinguish cab colors in the dark is questioned, so he is tested under conditions similar to those in which the accident occurred. If he is shown a green cab, he says it is green 80% of the time and blue 20% of the time. If he is shown a blue cab, he says it is blue 80% of the time and green 20% of the time.

The judge believes that the test accurately represents the witness's performance at the time of the accident, so the probabilities he assigns to the vents of the accident agree with the figures reported by the test.

(***a***) Construct the probability tree representing the judge's state of information. Label all endpoints, supply all branch probabilities, and calculate and label all endpoint probabilities.

(***b***) Flip the tree. Label all endpoints, supply all branch probabilities, and calculate and label all endpoint probabilities.

(***c***) If the witness says "The cab involved in the accident was green," what probability should the judge assign to the cab involved in the accident being green?

(***d***) How does the answer to part *c* compare to the witness' accuracy on the test? Does this result seem surprising? Why or why not?

Question 5

P2.3 Tommy is a contestant on the game show "Let's Make a Deal." Up on stage there are three boxes, one of which contains a valuable prize; the other two are empty. The rules of the game are that Tommy first chooses one of the boxes. Then Paul, the game show host, opens one of the remaining two boxes, making sure to open an empty one. If both the remaining boxes are empty, then he opens either one at random. Tommy then gets to decide if he wants to stick with his initial selection or switch to the remaining unopened box. If the prize is in the box that he chooses, he wins the prize.

Suppose Tommy has been watching every show for the entire season and he believes that there is a 0.6 chance that the prize will be in Box A, a 0.1 chance that it will be in Box B, and a 0.3 chance that it will be in Box C. What is Tommy's best strategy?

Question 6

P2.4 Your friend Ella is unsure about her plans for Friday night, although she knows that either John or Peter will ask her to see a movie (either "Cinderella Man" or "Red Eye"). John and Peter are friends, so only one of them will ask her to see a movie. You believe that Peter is twice as likely as John to ask her. If John asks, you believe that they will see "Cinderella Man" with probability 1/4. If Peter asks, you believe they will see "Cinderella Man" with probability 5/8. Suppose you found out later that Ella actually saw the movie "Red Eye", which of the following statements must be true?

I.   Ella has a higher probability of seeing the movie with John than with Peter

II. Ella has a higher probability of seeing the movie with Peter than with John

III. Ella is equally likely to have seen the movie with either John or Peter

IV. Ella ate popcorns at the movies