STA371G Homework Assignment 1

(30 Points. Due in class on Wednesday, 09/13/2017. Group homework.)
Please write down the NAME and EID of each group member. Each group consists of up to three members.

Problem 1 (15 points)

A construction company has to complete a project no later than three months from now or there will be significant cost overruns. The manager of the construction company believes that there are four possible values for the random variable X, the number of months from now it will take to complete the project: 2, 2.5, 3 and 3.5. The manager currently thinks that the probabilities for these four possibilities are in the ratio of 1 to 3 to 4 to 2. That is to say, $X = 2.5$ is three times more likely than $X = 2$.

(a) Find the probability distribution of X.

(b) What is the probability that this project will be completed in no more than three months from now?

(c) What is the expected completion time of this project from now?

(d) How much variability exists around the expected completion time? (Hint: calculate the variance/standard deviation)

(e) The project requires a special equipment that the company has already paid 3550 dollars to rent. To continue renting this equipment until the end of the project, for each additional half month, the company will have to pay a rental fee of 500 dollars. What is the expected total rental cost for this equipment? How much variability exists around the expected total rental cost?

Problem 2 (15 points)

Suppose that Jennifer has a 90% probability to eat breakfast and David has a 30% probability to eat breakfast. Moreover, assume whether Jennifer eats breakfast is not related to whether David eats breakfast.

(a) What's the probability that both Jennifer and David eat breakfast tomorrow morning?

(b) What's the probability that Jennifer eats breakfast or David eats breakfast tomorrow morning?

(c) What's the probability that either Jennifer or David (not both of them) eats breakfast tomorrow morning?