This week on the problem set you will get practice applying the law of total probability, Bayes' law and the concept of independance to problems. Especially challenging questions, or questions that are not appropriate for an exam, are indicated with one or more asterisks.

Homework: The first homework will be due on Friday 13 October, at 12pm, the *start* of the lecture. It will consist of questions:

4 and 6.

1. From the textbook, chapter 1, problems 19, 22, 25, 27, 30, 33*, 35, 42.

2. From the supplementary problems, chapter 1, problems 18, 23, 28, 30.

3. The dorm in which you live houses 1% of the total UCLA student population. You know 30% of the students living in your dorm, but you know only 2% of the rest of UCLA student population. A lot of UCLA students go to a party (including you) and a host tells you that you are seated at a table with 3 other people you know. What is the probability that at least one other student at your table is from your dorm? The number of people is very large, so you can assume that the events of knowing different people at the party are independent.

4. Today there are five trains labeled 1 to 5 that come to a train station in a uniformly random order. Two of your friends come to a train station, and you have no idea have many trains (of these five), if any, have already left - any possibility is equally likely. Each of your friends have the intention of boarding the first train which will take him/her to his/her destination. The trains which take your first friend to his destination are those labeled with 1, 2 and 3, and trains that take your second friend to her destination are those labeled with 2, 3 and 4. If you learn that they both ended up boarding the same train, what is the probability that they arrived at the train station just before the first train of the day?

5. Bus lines 1 through 4 all make stops at a bus stop. During a given time interval, each bus arrives once, but in a uniformly at random order. Alice needs to take either bus 1 or 2 to reach her destination and Bob needs to take bus 2 or 3 to reach his destination.

   During this time interval, they both arrive to the bus stop together and plan to take the first bus that will take them to their destination. They might have missed a buses arrival, but suppose you are told they both left during this given time interval on the same bus. What is the probability they arrived before any of the buses did?