SPRING 2019

TEXAS
The University of Texas at Austin

CE 311S : PROBABILITY AND STATISTICS

Discussion session

M 1:00 – 2:00 PM

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Administrative Stuff

- Canvas assignment due Tuesday 11:59PM
- Homework 1 due Friday 11:59PM
- Group created on Canvas (People -> Groups), lab material will be posted there. Contact me if you haven't been added there yet
- Download the .csv file in the files tab from our lab session page

Week 2: Question

Suppose you're on a game show, and you're given the choice of three doors: behind one door is a car; behind the others, goats. You pick a door, say no. 1, and the host, who knows what's behind the doors, opens another door, say no. 3, which has a goat. He then says to you, “Do you want to stay with door no.1 or switch to door no. 2?”

Should you switch to the door you did not pick?

Week 2: Question

Please turn in your “Switch/ Don’t Switch” answer with your wager and name

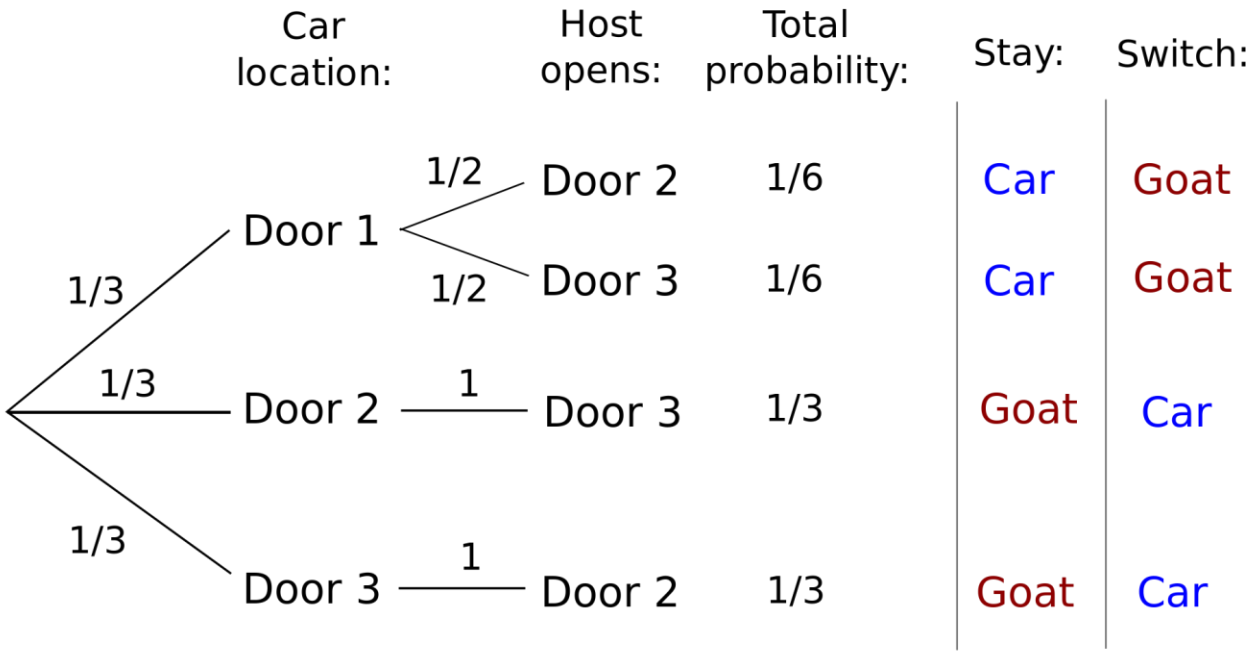
Week 2: Answer

- You SHOULD switch to the unopened door.
- The probability of winning the car is 2/3rd when you switch, 1/3rd when you don't switch.
- Surprised? Can anyone guess what is the crucial factor that changes the probabilities?

Week 2: Answer

- The important aspect to note here is that the host knows what is behind each door, and is constrained to use that information to never open the door with the car.
- Let us now see how this changes things

Week 2: Answer



Week 2: Answer

- More intuitive explanation: Initially, door 1 had a 1/3rd chance of having the car behind it. The probability of the car being behind the rest of the doors combined was 2/3. Now, even after the host opening one door, this does not change.
- Is this logic intuitive? Think about 10000 doors. If you choose door 1, and the host opens all doors one by one except door 1579, would or would you not switch?

Any questions so far?

- About this specific problem, course material covered so far, R commands covered so far, etc.

Let’s switch to R first

- Today, we shall tackle creating sequences, some vector algebra, libraries and functions, reading CSV files, and making plots

Concept Revision

- Conditional probability
- Venn diagrams: an example
- Work on this in groups of 2

Probability Example

There are 2 six sided dice. One has numbers 1,1,2,3,4,5 and other has numbers 2,4,4,5,5,6.

1. What is sample space?
2. Let event A be we get number greater than 4 on one of the dice. What are outcomes in A? Find $P(A)$.
    1. A={(1,5),(1,6),(2,5),(2,6),(3,5),(3,6),(4,5),(4,6),(5,2),(5,4),(5,5),(5,6)}
    2. P(A)= 7/12

Probability Example

1. Let event B be we get numbers that add more than 10. What are outcomes in B? Find $P(B)$
   B={(5,6)}, P(B)=1/36
2. What is $P(A \cap B)$?
   =1/36
3. What is $P(A|B)$?
   = 1
4. Are A and B independent?
   No