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

- Homework 1 due Friday 11:59 PM
- Reading response due Monday 7:00 AM
- Canvas Quiz 2 due next Friday 11:59 PM
- Office hours: 11:30 AM - 1:30 PM ECJ 6.406. I won’t be answering late Friday night emails, so please do not wait till the last minute to finish the homework.

Week 3: Question

You're hanging out with your friend, and you are just fidgeting with a (fair) coin, flipping it repeatedly. Your friend says, "I bet you 10$ that if you record the coin flip outcomes in order, the sequence THH is more likely than HHH". Should you take the bet?

Example coin flip: HTHTTHH

The flipping game ends when either HHH or THH shows up.

Week 3: Question

Please turn in your “Bet/ Don’t Bet” answer with your wager and name. Current standings: Link

Week 3: Answer

- You SHOULD NOT take the bet.
- The sequence THH is 7 times more likely to show up as HHH.
- HHH can only happen on the first three tries, else THH always wins.
- Does everyone see why this is the case?

Any questions so far?

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

Concept Revision

- Conditional probability
- Counting and Combinatorics
- Example problems

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 (ordered pairs)?
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

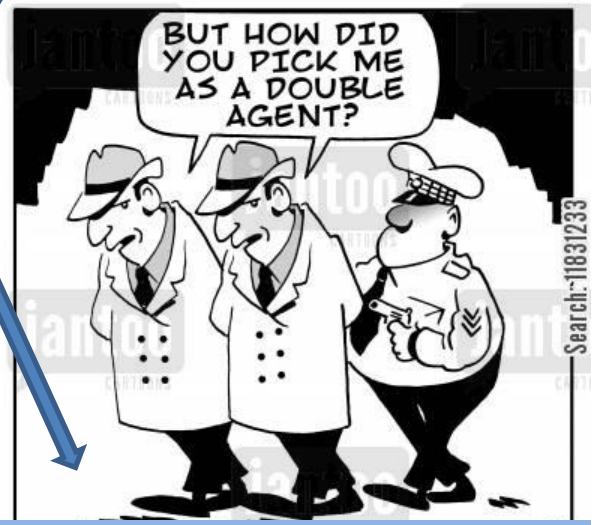
Probability Example

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

Spy

You must be in one of the three countries (**exhaustive**)
If you are in one of the country, then you cannot be in another (**mutually exclusive**)

- You are a North Korean spy and unsurprisingly a warrant is issued for your arrest. You are forced to flee the country
- The only three countries you think will let you enter are **China, Germany, and Russia**.
- To the best of your knowledge, the **probability you will end up in these three countries are 0.5, 0.3, and 0.2**, respectively.
- If you enter China, **the probability you will eventually be caught** and is 0.2; in Germany 0.3; and in Russia 0.1.



Being caught is another **event** which can happen in any of the country

- Determine the following:
  - What is the probability you will be caught in Russia? Ans=0.02
  - What is the probability you will be caught? Ans=0.21
  - If you are caught, what is the probability you were caught in Russia? Ans=2/21

Do I speak the truth?

- Bag I contains 3 red and 4 black balls while another Bag II contains 5 red and 6 black balls. One ball is drawn at random from one of the bags and is found to be red. Find the probability that the ball was drawn from Bag II.
- Hints:
  - B1: Event the ball is from bag I; B2: Event the ball is from bag II; R: Event the ball is red
  - What is P(B1) and P(B2)? And what is P(R|B2) and P(R|B1)
  - Use Bayes theorem to find the asked probability
- Ans= 35/68

Identify what case applies and Solve

Case 1

No. of ways 5 people can sit on chairs marked A, B and C in a classroom

Case 2

No. of ways a team of 4 can be chosen from a group of 8 players

Case 3

No. of ways a 5 digit number can be framed using numbers 2, 4, 5 and 7

Your friends visit Austin for 7 days. Each evening you can take them to one of A, B, C, or D restaurant for dinner. No. of ways of picking restaurants over 7 days.

Case 4

Win a game

- Anna and Beth throw a die alternatively till one of them gets a ‘6’ and wins the game. What is the probability that Anna wins, if Anna starts first?

Ans: 6/11

Thank you

Any Questions?