SESSION PLAN 10	
Session Name	Introduction to Probability

Learning Outcomes

- Understand how to calculate probability
- Learn how probability can be utilized in decision making
- Understand and differentiate between various probability distributions
- Apply principles of probability to answers questions on real data

Prerequisites for the Student

- Introduction to Probability

Student Activities

- Ask learners what they have learned from the concept?
- How many ways are there to split 10 people into 2 teams so that they can play 5 on 5 basketball?
  Ans:- 126
  Explanation: What actually means is that you select 5 things from 10 things (here, things = people) . So when you select a group of 5 people , simultaneously another group of 5 is formed . So if (let's say) you choose ABCDE then simultaneously another group of FGHIJ is formed .
  Now included in the selections are the cases when you select ABCDE (the other group formed is FGHIJ) and when you select FGHIJ (the other group formed is ABCDE) , you see you are selecting the same groups of people twice , so we divide by 2 .
- One hundred people line up to board an airplane. Each has a boarding pass with assigned seat. However, the first person to board has lost his boarding pass and takes a random seat. After that, each person takes the assigned seat if it is unoccupied, and one of unoccupied seats at random otherwise. What is the probability that the last person to board gets to sit in his assigned seat?
  Solution:- Look at the situation when the k'th passenger enters. Neither of the previous passengers showed any preference for the k'th seat vs. the seat of the first passenger. This in particular is true when k = n. But the n'th passenger can only occupy his seat or the first passenger's seat. Therefore the probability is 1/2.
- A classic example: **The famous Monty Hall Problem**
  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 pick door No. 2?" Is it to your advantage to switch your choice? Will you switch or stay with your door?
- Take weather data and perform probability operations on weather data in the classroom so that learners can understand how to convert probability into coding.
- Overview of Introduction to Probability
  - Conditional Probability & Bayes Theorem
  - Probability Distributions
- Practice problems on Conditional Probability & Bayes Theorem and Probability Distributions.
  - Refer the GitHub repo for problems
- Quiz on Introduction to Probability.
- Questions and Discussion on doubts - AMA

Next Session

- Concept - Making Inference from Data
- Key topics to be highlighted - highlight where they would need to spend more time and importance w.r.t Data Science.
  - Basics of inferential statistics
  - Central Limit Theorem
  - Confidence Intervals
  - Hypothesis Testing