AI1110 ASSIGNMENT-1
PROBABILITY AND RANDOM VARIABLES

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NCERT(10.15.2.1)

QUESTION: Two customers Shyam and Ekta are visiting a particular shop in the same week (Tuesday to Saturday). Each is equally likely to visit the shop on any day as on another day. What is the probability that both will visit the shop on
(i) the same day?
(ii) consecutive days?
(iii) different days?

Solution:
Let the five days of the week be labeled as T, W, Th, F, S, corresponding to Tuesday, Wednesday, Thursday, Friday, and Saturday, respectively.

Since each customer is equally likely to visit the shop on any day, the total number of possible outcomes for their visits is $5 \times 5 = 25$.

1.To find the probability that both customers will visit the shop on the same day, there are five possible outcomes: both customers can visit on T, W, Th, F, or S. Therefore, the probability that both customers will visit on the same day is:

$$P(\text{same day}) = \frac{5}{25} = \frac{1}{5} = 0.2$$

2.To get the number of ways in which both visit on consecutive days, we count the number of pairs of consecutive days (4) and the number of ways in which Shyam and Ekta can visit on each pair (2, since they can visit in either order). Therefore, there are 8 ways in total.

$$P(\text{consecutive days}) = \frac{8}{25} = 0.32$$

3.To find the probability that both customers will visit the shop on different days, there are 20 possible outcomes, since each customer has five possible days to visit and we've already counted the five cases where their visits overlap. Therefore, the probability that both customers will visit on different days is:

$$P(\text{different days}) = \frac{20}{25} = \frac{4}{5} = 0.8$$

Therefore, the probabilities are:

- $P(\text{same day}) = 0.2$
- $P(\text{consecutive days}) = 0.32$
- $P(\text{different days}) = 0.8$