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:

1) The probability that both Shyam and Ekta will visit the shop on the same day is given by:

$$P(\text{Same day}) = \frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}} \tag{1}$$

$$= \frac{5}{5 \times 5} \tag{2}$$

$$= \frac{1}{5} \tag{3}$$

2) The probability that both Shyam and Ekta will visit the shop on consecutive days is given by:

$$P(\text{Consecutive days}) = \frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}} \tag{4}$$

$$= \frac{8}{5 \times 5} \tag{5}$$

$$= \frac{8}{25} \tag{6}$$

There are 8 favorable outcomes, as Shyam and Ekta can visit the shop on Tuesday-Wednesday, Wednesday-Thursday, Thursday-Friday, Friday-Saturday, Saturday-Friday, Friday-Thursday, Thursday-Wednesday, or Wednesday-Tuesday.

3) The probability that both Shyam and Ekta will visit the shop on different days is given by:

$$P(\text{Different days}) = \frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}} \tag{7}$$

$$= \frac{20}{5 \times 5} \tag{8}$$

$$= \frac{20}{25} \tag{9}$$

There are 20 favorable outcomes, as Shyam and Ekta can visit the shop on any two different days out of the 5 days from Tuesday to Saturday.