Digital Assignment - 2

19/10/2024

1) It is a multinomial trial because -

a) i) There is fixed number of trials, 6 air planes,

ii) Each plane land on 3 runways,

$\therefore k = 3$

iii) Probability of ~~fang~~ landing of plane on each runway is given,

rw1 : $2/9$

rw2 : $1/6$

rw3 : $11/18$

iv) The choice of runway for each plane does not effect others, thats why, they are independent.

b) key components :

$n = 6$ (number of planes)

$k = 3$ (number of RW)

Probabilities,

$P_1 = 2/9$, $P_2 = 1/6$, $P_3 = 11/18$

c) $P(x_1 = 2, x_2 = 1, x_3 = 3) = \frac{6!}{2! \cdot 1! \cdot 3!} \left(\frac{2}{9}\right)^2 \cdot \left(\frac{1}{6}\right)^1 \cdot \left(\frac{11}{18}\right)^3$

$= 60 \times \frac{4}{81} \times \frac{1}{6} \times \frac{1331}{5832}$

$= 0.11$

2)

Given Probabilities:

$P(air) = 0.4$

$P(bus) = 0.2$

$P(am) = 0.3$

$P(train) = 0.1$

total delegates = 9

air = 3

bus = 3

am = 1

train = 2

a- $P(x_1 = 3, x_2 = 3, x_3 = 1, x_4 = 2)$

$$= \frac{9!}{3!\,3!\,1!\,2!} \cdot (0.4)^3 \cdot (0.2)^3 \cdot (0.3)^1 \cdot (0.1)^2$$

$$= \frac{362880}{72} \times 0.064 \times 0.008 \times 0.3 \times 0.01$$

$$= 0.0077$$