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Data Science Assessment

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19BEECH122

1] Probability of diamond [one card] = $\frac{13}{52} = 0.25$

Probability of heart [one card] = $\frac{13}{52} = 0.25$

Probability of Spade [one card] = $\frac{13}{52} = 0.25$

Total Probability = $\frac{13}{52} + \frac{13}{52} + \frac{13}{52} = 0.25 + 0.25 + 0.25 = 0.75$

2] $P[\text{action}] = \frac{42}{100}$

$P[\text{comedy}] = \frac{54}{100}$

$P[\text{drama}] = \frac{36}{100}$

$P[\text{horror}] = \frac{12}{100}$

a] Either action or drama = $\frac{42}{100} + \frac{36}{100} = \frac{78}{100} = 0.78$

b] Either Comedy or horror = $\frac{54}{100} + \frac{12}{100} = \frac{66}{100} = 0.66$

3]

Bag A

Red - 3

Black - 5

Bag B

White - 4

Black - 7

$$P(A) = 1/2 \quad P(B) = 1/2$$

$$P\left[\frac{\text{Black}}{A}\right] = 5/8 \quad P\left[\frac{\text{Black}}{B}\right] = 7/11$$

$$P\left[\frac{B}{\text{Black}}\right] = \frac{P(B) \times P\left[\frac{\text{Black}}{B}\right]}{P(A) \times P\left[\frac{\text{Black}}{A}\right] + P(B) \times P\left[\frac{\text{Black}}{B}\right]}$$

$$= \frac{1/2 \times 7/11}{[1/2 \times 5/8] + [1/2 \times 7/11]}$$

$$= \frac{7/22}{\frac{5}{16} + \frac{7}{22}} = \frac{7/22}{\frac{110 + 112}{352}}$$

$$= 7/22 \times \frac{352}{222}$$

$$= \frac{2464}{4884}$$

$$= 0.5045$$

$$P\left[\frac{B}{\text{Black}}\right]$$

6] $\frac{1}{\lambda} = \frac{1}{0.675}$

$0.675 = \frac{X - 350870}{12105}$

$X = 350870 + (0.675 \times 12105)$

$X = 357237.045$
 75% Perc = 357237.045

i] 450 application in 1 hour

a] $\lambda = \frac{450}{60} = \frac{45}{6}$

$\lambda = \frac{15}{2}$

$P(X=10) = \frac{e^{-15/2} \cdot (15/2)^{10}}{10!}$
 $= 0.10858$

b] $P(X=x) = \frac{e^{-15/2} \cdot (15/2)^{17}}{17!}$
 $= 0.6321$