

AI1110 - Assignment 2

Nimai Parsa
CS22BTECH11044

Question *Exemplar 11.16.3.9* :

Four candidates A , B , C and D have applied for the assignment to coach a school cricket team. If A is twice as likely to be selected as B , and B and C are given about the same chance of being selected, while C is twice as likely to be selected as D , what are the probabilities that

- 1) C will be selected?
- 2) A will not be selected?

Solution :

Given,

$$\Pr(A) = 2 \Pr(B) \quad (1)$$

$$\Pr(B) = \Pr(C) \quad (2)$$

$$\Pr(C) = 2 \Pr(D) \quad (3)$$

Now,

From (2) and (3),

$$\Pr(B) = 2 \Pr(D) \quad (4)$$

$$\implies \Pr(A) = 4 \Pr(D) \quad (5)$$

From the Law of Total Probability,

$$\Pr(A) + \Pr(B) + \Pr(C) + \Pr(D) = 1 \quad (6)$$

Substituting (3), (4), (5) in (6)

$$4 \Pr(D) + 2 \Pr(D) + 2 \Pr(D) + \Pr(D) = 1 \quad (7)$$

$$\implies \Pr(D) = \frac{1}{9} \quad (8)$$

1) From (3),

$$\Pr(C) = 2 \times \frac{1}{9} \quad (9)$$

$$\implies \Pr(C) = \frac{2}{9} \quad (10)$$

2) From (5)

$$\Pr(A) = 4 \times \frac{1}{9} \quad (11)$$

$$\implies \Pr(A) = \frac{4}{9} \quad (12)$$

$$\implies \Pr(A') = \frac{5}{9} \quad (13)$$