

AI1103: Assignment 4

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Download all python codes from

<https://github.com/Bharadwaja-rao-D/AI1103/blob/main/assignment4/assignment4.py>

and latex-tikz codes from

<https://github.com/Bharadwaja-rao-D/AI1103/blob/main/assignment4/assignment4.tex>

$$p_z(n) = \begin{cases} 0, n < 13 \\ \frac{1}{20} \times (n - 12), 13 \leq n < 16 \\ \frac{1}{20} \times 4, 16 \leq n \leq 17 \\ 0, n > 17 \end{cases} \quad (0.0.8)$$

$$\therefore p_z(16) = \frac{1}{5} \quad (0.0.9)$$

PROBLEM GATE-CS(2015)-Q3(GENERAL APTITUDE):

Given set $A = \{2, 3, 4, 5\}$ and set $B = \{11, 12, 13, 14, 15\}$, two numbers are randomly selected, one from each set. What is the probability that sum of two numbers is equal to 16?

SOLUTION:

Let X and Y be a random variable which takes values from set A and B respectively. We want to calculate $\Pr(X+Y=16)$

$$p_X(n) = \begin{cases} \frac{1}{4}, & \text{if } 2 \leq n \leq 5. \\ 0, & \text{otherwise.} \end{cases} \quad (0.0.1)$$

$$p_Y(n) = \begin{cases} \frac{1}{5}, & \text{if } 11 \leq n \leq 15. \\ 0, & \text{otherwise.} \end{cases} \quad (0.0.2)$$

$$p_z(n) = \Pr(X + Y = n) = \Pr(Y = n - X) \quad (0.0.3)$$

$$p_z(n) = \sum_{k \in A} \Pr(Y = n - k | X = k) \times \Pr(X = k) \quad (0.0.4)$$

$$\Pr(Y = n - k | X = k) = \Pr(Y = n - k) = p_Y(n - k) \quad (0.0.5)$$

$$p_z(n) = \sum_k p_X(k) p_Y(n - k) = p_X(n) * p_Y(n) \quad (0.0.6)$$

$$p_z(n) = \frac{1}{4} \sum_{k=2}^5 p_Y(n - k) = \frac{1}{4} \sum_{k=n-5}^{n-2} p_Y(k) \quad (0.0.7)$$