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

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)

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

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

$$p_z(n) = \Pr(X + Y = n) = \Pr(Y = n - X) \tag{0.0.3}$$

$$p_z(n) = \sum_k p_x(k)p_y(n-k) = p_x(n) * p_y(n) \tag{0.0.4}$$

$$p_z(n) = \frac{1}{4}\sum_{k=2}^{5} p_y(n-k) = \frac{1}{4}\sum_{k=n-5}^{n-2} p_y(k) \tag{0.0.5}$$

$$p_z(n) = \begin{cases} 0, n < 13 \\ \frac{1}{20} \times (n-12), 13 \le n < 16 \\ \frac{1}{20} \times 4, 16 \le n \le 17 \\ \frac{21-n}{20}, 18 \le n \le 20 \\ 0, n > 20 \end{cases} \tag{0.0.6}$$

$$\therefore p_z(16) = \frac{1}{5} \tag{0.0.7}$$