Assignment -2 in LaTeX

Muzaan Mohammed Faizel A P
EE22BTECH11036

Question 10.13.1.26: A school has five houses A, B, C, D and E. A class has 23 students, 4 from house A, 8 from house B, 5 from house C, 2 from house D and rest from house E. A single student is selected at random to be the class monitor. The probability that the selected student is not from A, B and C is
Solution:

A	B	C	D	E
4	8	5	2	4

TABLE 0: Student distribution in each house

$$W = \text{student selected is not from A,B and C} \tag{1}$$

$$\implies W = \left(\overline{A}\right)\left(\overline{B}\right)\left(\overline{C}\right) \tag{2}$$

$$\text{Total no of students} = n\left(T\right) = 23 \tag{3}$$

By DeMorgan's Law and Axiom 3 of probability

$$\Pr\left(\left(\overline{A}\right)\left(\overline{B}\right)\left(\overline{C}\right)\right) = \Pr\left(\overline{(A + B + C)}\right) \tag{4}$$

$$\Pr\left(\overline{(A + B + C)}\right) = 1 - \Pr\left((A + B + C)\right) \tag{5}$$

$$\Pr\left((A + B + C)\right) = \Pr\left(A\right) + \Pr\left(B\right) + \Pr\left(C\right) \tag{6}$$

$$\Pr\left(\text{selecting a student from house A}\right) = \frac{n\left(A\right)}{n\left(T\right)} \tag{7}$$

$$\Pr\left(A\right) = \frac{4}{23} \tag{8}$$

$$\Pr\left(B\right) = \frac{8}{23} \tag{9}$$

$$\Pr\left(C\right) = \frac{5}{23} \tag{10}$$

$$\Pr\left((A + B + C)\right) = \frac{4}{23} + \frac{8}{23} + \frac{5}{23} \tag{11}$$

$$= \frac{17}{23} \tag{12}$$

$$\Pr\left(\overline{ABC}\right) = 1 - \frac{17}{23} = \frac{6}{23} \tag{13}$$

Therefore,probability of not selecting a student from A,B and C is,

$$\Pr\left(W\right) = \frac{6}{23} \tag{14}$$