AI1110 Assignment 2 in LaTeX

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10.15.1.9: Question A box contains 5 red marbles, 8 white marbles and 4 green marbles. One marble is taken out of the box at random. What is the probability that the marble taken out will be

(i) red ?

(ii) white ?

(iii) not green?

Solution:

Given :

Number of red marbles = R = 5

Number of white marbles = W = 8

Number of green marbles = G = 4

Total number of marbles = T = 5 + 8 + 4 = 17

Where r,g,w respectively represents the number of red, green and white marbles within n.

$$\Pr(r, w, g) = \frac{{}^{R}C_r\, {}^{W}C_w\, {}^{G}C_g}{{}^{R+W+G}C_{r+w+g}} \tag{1}$$

(i) Probability that the marble taken out is red

$$\Pr(1, 0, 0) = \frac{{}^{5}C_1\, {}^{8}C_0\, {}^{4}C_0}{{}^{17}C_1} \tag{2}$$

$$= \frac{5}{17} \approx 0.2941 \tag{3}$$

(ii) Probability that the marble taken out is white

$$\Pr(0, 1, 0) = \frac{{}^{5}C_0\, {}^{8}C_1\, {}^{4}C_0}{{}^{17}C_1} \tag{4}$$

$$= \frac{8}{17} \approx 0.4706 \tag{5}$$

(iii) Probability that the marble taken out is not green

$$1 - \Pr(0, 0, 1) = 1 - \frac{{}^{5}C_0\, {}^{8}C_0\, {}^{4}C_1}{{}^{17}C_1} \tag{6}$$

$$= 1 - \frac{4}{17} = \frac{13}{17} \approx 0.7647 \tag{7}$$

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