AI-1110 Assignment-1

NAME: M Bhavesh Chowdary
ROLLNO: cs22btech11041

12.13.1.11 Question: A fair die is rolled. Consider events E = {1,3,5}, F = {2,3} and G = {2,3,4,5} Find

1) $\Pr(E|F)$ and $\Pr(F|E)$
2) $\Pr(E|G)$ and $\Pr(G|E)$
3) $\Pr((E + F)|G)$ and $\Pr((EF)|G)$

Solution: Sample space when a die is rolled = {1,2,3,4,5,6}.

$$(E + F) = \{1, 2, 3, 5\} \tag{1}$$

$$(E + F)G = \{2, 3, 5\} \tag{2}$$

$$\Pr((E + F)G) = 1/2 \tag{3}$$

$$(EF) = \{3\} \tag{4}$$

$$(EF)G = \{3\} \tag{5}$$

$$\Pr((EF)G) = 1/6 \tag{6}$$

E = {1,3,5}	Pr(E) = 1/2
F = {2,3}	Pr(F) = 1/3
G = {2,3,4,5}	Pr(G) = 2/3
EF = {3}	Pr(EF) = 1/6
EG = {3,5}	Pr(EG) = 1/3
(E+F)G = {2,3,5}	Pr((E + F)G) = 1/2
(EF)G = {3}	Pr((EF)G) = 1/6

TABLE 3: From given data

1)

$$\Pr(E|F) = \frac{\Pr(EF)}{\Pr(F)} \tag{7}$$

table 3,

$$\Pr(E|F) = \frac{1/6}{1/3} \tag{8}$$

$$\Pr(E|F) = 1/2 \tag{9}$$

2)

$$\Pr(F|E) = \frac{\Pr(EF)}{\Pr(E)} \tag{10}$$

table 3,

$$\Pr(F|E) = \frac{1/6}{1/2} \tag{11}$$

$$\Pr(F|E) = 1/3 \tag{12}$$

3)

$$\Pr(E|G) = \frac{\Pr(EG)}{\Pr(G)} \tag{13}$$

table 3,

$$\Pr(E|G) = \frac{1/3}{2/3} \tag{14}$$

$$\Pr(E|G) = 1/2 \tag{15}$$

4)

$$\Pr(G|E) = \frac{\Pr(EG)}{\Pr(E)} \tag{16}$$

table 3,

$$\Pr(G|E) = \frac{1/3}{1/2} \tag{17}$$

$$\Pr(G|E) = 2/3 \tag{18}$$

5)

$$\Pr((E + F)|G) = \frac{\Pr((E + F)G)}{\Pr(G)} \tag{19}$$

table 3,

$$\Pr((E + F)|G) = \frac{1/2}{2/3} \tag{20}$$

$$\Pr((E + F)|G) = 3/4 \tag{21}$$

6)

$$\Pr((EF)|G) = \frac{\Pr((EF)G)}{\Pr(G)} \tag{22}$$

table 3,

$$\Pr((EF)|G) = \frac{1/6}{2/3} \tag{23}$$

$$\Pr((EF)|G) = 1/4 \tag{24}$$

Answer:

$$\Pr(E|F) = 1/2, \qquad (25)$$
$$\Pr(F|E) = 1/3, \qquad (26)$$
$$\Pr(E|G) = 1/2, \qquad (27)$$
$$\Pr(G|E) = 2/3, \qquad (28)$$
$$\Pr((E + F)|G) = 3/4, \qquad (29)$$
$$\Pr((EF)|G) = 1/4 \qquad (30)$$