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# Probability Assignment 1

## EE22BTECH11210 - KUMAR ARYAN

# QUESTION:

Given two independent events A and B such that P(A) = 0.3, P(B) = 0.6. Find

- (i) P(A and B)
- (ii) P(A and not B)
- (iii) P(A or B)
- (iv) P(neither A nor B)

### Solution:

Given 
$$P(A) = 0.3$$
,  $P(B) = 0.6$ .

(i) P(A and B)

As A and B are independent events.  $p(A \text{ and } B) = P(A \cap B) = P(A) \times P(B)$   $= 0.3 \times 0.6$ = 0.18

(ii) P(A and not B)

$$P(A \text{ and not } B) = P(A \cap B') = P(A) - P(A \cap B)$$
  
= 0.3 - 0.18 = 0.12

(iii) P(A or B)

$$P(A \text{ or } B) = P(A \cup B)$$
  
As we know,  $P(A \cup B) = P(A) + P(B) - P(A \cap B)$   
 $P(A \cup B) = 0.3 + 0.6 - 0.18$   
 $P(A \cup B) = 0.72$ 

(iv) P(neither A nor B)

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p(neither A nor B) = P(A' \cap B')
As, A' \cap B' = (A \cup B)' P(neither A nor B) = P((A \cup B)')
= 1-P(A \cup B) = 1-0.72 = 0.28
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#### Code

The python code is as follows:

```
def main():
    a = float(input('Enter_probability_of_A_:'))
    b = float(input('Enter_probability_of_B_:'))

P_A_and_B = a*b
P_A_andNot_B = a - a*b
P_A_or_B = a + b - a*b
P_neither_A_nor_B = 1 - P_A_or_B

print('P(A_and_B)_=_',P_A_and_B)
    print('P(A_and_not_B)_=_',P_A_andNot_B)
    print('P(A_or_B)_=_',P_A_or_B)
    print('P(neither_A_nor_B)_=_',
        P_neither_A_nor_B)

if __name__ =='__main___':
    main()
```