**Problem Statement 1:**

Two balls are drawn at random in succession without replacement from an urn containing 4 red balls and 6 black balls. Find the probabilities of all the possible outcomes.

**Solution**

Number of Red Balls = nR = 4

Number of Black Balls = nB = 6

Total Number of Balls = n = 10

If two balls are drawn randomly then the possible outcomes would be as per below

1. Both the balls are red

P(r,r) = (nR/n)\*(nR-1/n-1) = 4/10\*3/9 = 12/90 = **6/45** = 2/15

1. First ball is red, second ball is black

P(r,b) = (nR/n)\*(nB/n-1) = 4/10\*6/9 = 24/90 = **12/45** = 4/15

1. First ball is black, second ball is red

P(b,r) = (nB/n)\*(nR/n-1) = 6/10\*4/9 = 24/90 = **12/45** = 4/15

1. Both the balls are black

P(b,b) = (nB/n)\*(nB-1/n-1)= 6/10\*5/9 = 30/90 = **15/45** = 5/15