Probability Assignment 1

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1 Problem statement

Two balls are drawn at random with replacement from box containing 10 black and 8 red balls. Find the probability that

1) both balls are red
2) first ball is black and second ball is red
3) one of them is black the other one is red

2 Explanation

Given A box containing 10 black and 8 red balls. Total number of balls in box = 18

1) Both balls are red. Probability of getting a red ball in first draw $= \frac{8}{18} = \frac{4}{9}$ As the ball is replaced after first throw, Hence, Probability of getting a red ball in second draw $= \frac{8}{18} = \frac{4}{9}$ Now, Probability of getting both balls red $= \frac{4}{9} \times \frac{4}{9} = \frac{16}{81}$

2) First ball is black and second is red. Probability of getting a black ball in first draw $= \frac{10}{18} = \frac{5}{9}$ As the ball is replaced after first throw, Hence, Probability of getting a red ball in second draw $= \frac{8}{18} = \frac{4}{9}$ Now, Probability of getting first ball is black and second is red $= \frac{5}{9} \times \frac{4}{9} = \frac{20}{81}$

3) One of them is black and other is red. Probability of getting a black ball in first draw $= \frac{10}{18} = \frac{5}{9}$ As the ball is replaced after first throw,Hence, Probability of getting a red ball in second draw $= \frac{8}{18} = \frac{4}{9}$ Now, Probability of getting first ball is black and second is red $= \frac{5}{9} \times \frac{4}{9} = \frac{20}{81}$ Probability of getting a red ball in first draw $= 8/18 = 4/9$ As the ball is replaced after first throw, Hence, Probability of getting a black ball in second draw $= \frac{10}{18} = \frac{5}{9}$ Now, Probability of getting first ball is red and second is black $= \frac{5}{9} \times \frac{4}{9} = \frac{20}{81}$ Therefore, Probability of getting one of them is black and other is red: = Probability of getting first ball is black and second is red + Probability of getting first ball is red and second is black $= \frac{5}{9} \times \frac{4}{9} = \frac{20}{81}$

3 Code

The python code is as follows :

```
ball = int(input("Enter the number of balls"))
red = int(input("Enter the number of red balls :"))
black = int(input("Enter the number of black balls
    :"))

while ball != (red+black) :
    red = int(input("Enter the number of red balls
        :"))
    black = int(input("Enter the number of black
        balls:"))

answer1,answer2,answer3,count = 0,0,0,0
for k in range(1,ball+1,1):
    for j in range(1,ball+1,1):
        if k<=red and j<=red :
            answer1+=1
        if k>red and j<=red :
            answer2+=1
        if k<=red and j>red :
            answer3+=1

for k in range(1,ball+1,1):
    for j in range(1,ball+1,1):
        count+=1

print(f"First bit answer ={answer1/count}, Second
    bit answer ={answer2/count}, third bit answer
    ={(answer2+answer3)/count}")
```