AI1103 : Assignment 1

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Download all python codes from

https://github.com/shashank−anirudh−rachapalle/Probability−and−random−variables/Assignment1/Assignment1.py

and latex codes from

https://github.com/shashank−anirudh−rachapalle/Probability−and−random−variables/Assignment1/Assignment1.tex

Problem statement(3.8)

Six balls are drawn successively from an urn containing 7 red and 9 black balls.Tell whether or not the trails of drawing balls are Bernoulli trails when after each draw the ball drawn is

1) replaced
2) not replaced in the urn

Solution(3.8)

For the trails of drawing balls to be Bernoulli
• No. of trails should be finite. (n=6)
•Probability of an outcome should be same at every trail.

1) When balls are replaced
   At the beginning of each trail there are 7 red balls and 9 black balls

$$Pr(X = 1) = 7/16 \tag{3.8.1}$$
$$Pr(X = 0) = 9/16 \tag{3.8.2}$$

   the probabilities according to 3.8.1 and 3.8.2 are same for every trail..∴ when balls are replaced,trails are Bernoulli.
2) When balls are not replaced

$$Pr(X = 1) = 7/16 \tag{3.8.3}$$

   in the first trail and for the second trail,

$$Pr(X = 1) = 7/15 \tag{3.8.4}$$

if black ball is taken out in the first trail.

$$Pr(X = 1) = 6/15 \tag{3.8.5}$$

if red ball is taken out in the first trail.

Considering 3.8.3 ,3.8.4 ,3.8.5 Pr(X=1) is different.Since probability of taking out red ball is different according to the trail and outcomes in the preceding trails,When balls are not replaced the trails are not Bernoulli.