Exit Polls
Opion Polls } Inferential stats

Bag → 3 red ⇒ 150 Rs
2 blue ⇓
4 Red Balls
⇒ 10 Rs ← stud pay

① Find all possible combination

② Find prob of each combination

③ Use prob to estimate profit / loss

Possible outcomes

4 Blue 0 Red	3 Blue 1 Red	2 Red 2 Blue	1 Blue 3 red	0 Blue 4 Red
0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0
	0 0 0 0	0 0 0 0	0 0 0 0	
	0 0 0 0	0 0 0 0	0 0 0 0	
	0 0 0 0	0 0 0 0	0 0 0 0	
		0 0 0 0		
		0 0 0 0		

X → Number of Red balls

0 0 0 0 → X = 3 → Random variable

0 0 0 0 → X = 2

Cust id	Income	Loan	Dependent	Default
				yes
				No
				No

X = 1 ⇒ if defaulted

X = 0 ⇒ if not defaulted

X = 0	X = 1	X = 2	X = 3	X = 4
4 Blue	3 Blue	2 Red	1 Blue	0 Blue
0 Red	1 Red	2 Blue	3 red	4 Red
0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0
	0 0 0 0	0 0 0 0	0 0 0 0	
	0 0 0 0	0 0 0 0	0 0 0 0	
	0 0 0 0	0 0 0 0	0 0 0 0	
		0 0 0 0		
		0 0 0 0		

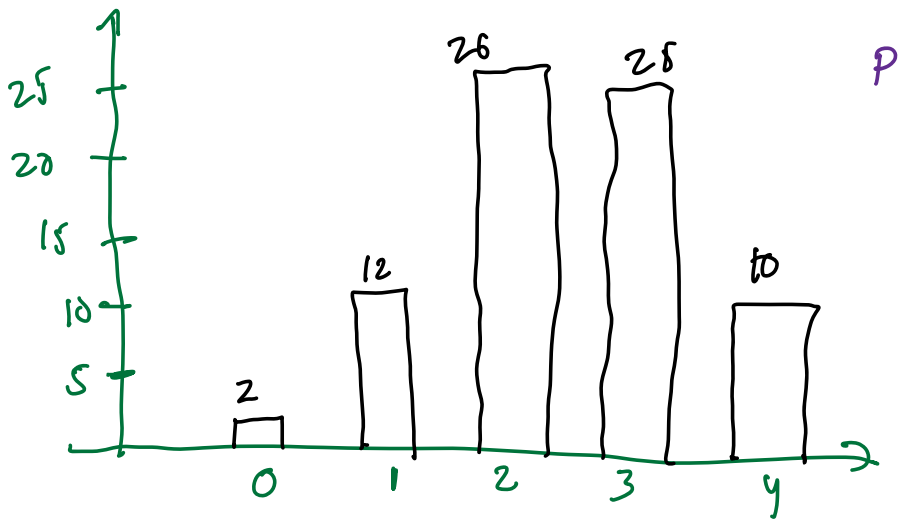
$x=0 \Rightarrow 2$

$x=1 \Rightarrow 12$

$x=2 \Rightarrow 26$

$x=3 \Rightarrow 25$

$x=4 \Rightarrow 10$

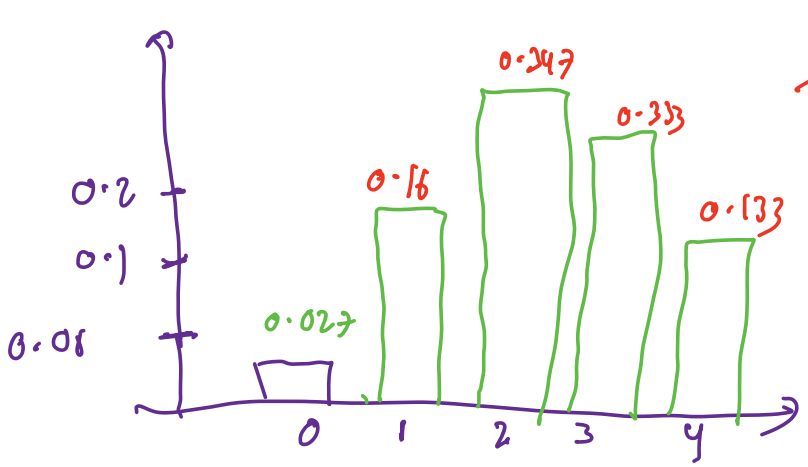


$P(x=2) = \frac{26}{75}$

$P(x=4) = \frac{10}{75}$

x	Prob
0	0.027
1	0.16
2	0.347
3	0.333
4	0.133

$\Rightarrow$ Prob. Distribution



→ Prob distribution chart

$P(x=1) = 0.16$

Total Players = 1000

Number of players with 1 red ball = 160

$P(x=2) = 0.347$

= 347

$X=0 = 27$

$X=1 = 160$

$X=2 = 347$

$X=3 = 333$

$X=4 = 133$

$27*0 + 160*1 + 347*2 + 333*3 + 133*4$

Total # of red balls = 2385

Avg # red balls $\Rightarrow$ 2.385

$\Rightarrow$ $x = x_1, x_2, x_3, x_4, x_5, \cdots, x_n$

$EV = x_1 * P(x=x_1) + x_2 * P(x=x_2) + x_3 * P(x=x_3) + \cdots + x_n * P(x=x_n)$

$= 0 * 0.027 + 1 * 0.16 + 2 * 0.347 + 3 * 0.333 + 4 * 0.133$

$= 2.385$

$X \rightarrow +150, -10$

$P(x = 150) = P(4 \text{ red balls}) = 0.133$

$P(x = -10) = P(0_{OR}1_{OR}2_{OR}3 \text{ red balls})$

$= 0.027 + 0.160 + 0.347 + 0.333$

$= 0.867$

$EV = x_1 * P(x=x_1) + x_2 * P(x=x_2) + x_3 * P(x=x_3) + \cdots + x_n * P(x=x_n)$

$$EV = 150 * 0.133 + (-10) * 0.867$$
$$= 11.28$$

Without Experiments

3 red Balls
2 Blue Balls

$$P(1 \text{ Red ball in } 1 \text{ trial}) = \frac{3}{5} = 0.6$$

$$P(E_1 \text{ AND } E_2) = P(E_1) * P(E_2)$$

P(2 red balls in 2 trials)

P(red in 1st trial) & P(red in 2nd trial)
$= 0.6 * 0.6$
$= 0.36$

OR 2 Blue 3 red Balls

O O O O O

$0.4 * 0.6 * 0.6 * 0.6$

2/5 = B
3/5 = R

$\Rightarrow$ $x=3$

$P(0000) \Rightarrow 0.4 * 0.6 * 0.6 * 0.6$

$\Rightarrow 0.0864$

$P(0000) = 0.6 * 0.4 * 0.6 * 0.6$

$= 0.0864$

$P(0000) = 0.0864$

$P(0000) = 0.0864$

$P(X=3) = 4 * 0.0864$

$= 0.3456$

Break: 10:49 PM

$P(X=0) = 0000 \Rightarrow 0.4 * 0.4 * 0.4 * 0.4$

$\Rightarrow 0.0256 * 1$

$X=0$	$X=1$	$X=2$	$X=3$	$X=4$
4 Blue	3 Blue	2 Red	1 Blue	0 Blue
0 Red	1 Red	2 Blue	3 red	4 Red
0000	0000	0000	0000	0000
	0000	0000	0000	
	0000	0000	0000	
	0000	0000	0000	
		0000		
		0000		