1. Bernoulli Distribution.

↳ It has only success or failure

P = success, q = 1 − P ⇒ failure.

↳ It is a discrete distribution with only two possible values for the random variable

R.V ← $X = \{0, 1\}$ (1 → success, 0 → failure)

Question-1

step-1 ⇒ R.E ⇒ Tossing a Coin

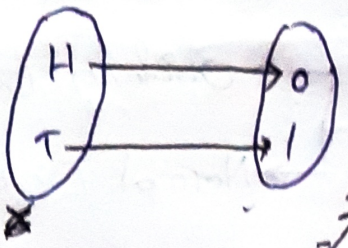
step-2 ⇒ S.S ⇒ {H, T}

step-3:- R.V ⇒ X ⇒ getting a head

Y ⇒ Counting the no. of heads

X: SS → {0, 1}

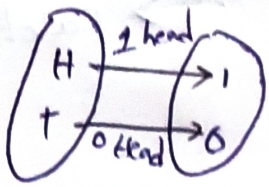
failure (not getting head) ← 0, 1 → success (getting a head)



Bernoulli Discrete Random Variable.

Y: SS → {0, 1}

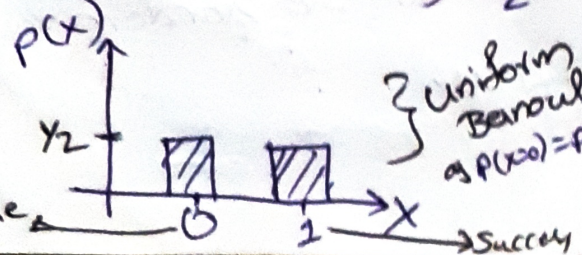
0 heads (failure) ← 0, 1 → 1 head (success)



Step-4:- Probability Distribution (PMF)

$P(X=0) = P(\{T\}) = \frac{1}{2}$

$P(X=1) = P(\{H\}) = \frac{1}{2}$



Question-2

step-1 ⇒ Rolling a dice

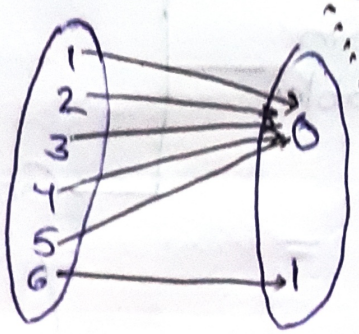
step-2 ⇒ {1, 2, 3, 4, 5, 6}

step-3 ⇒

R.V ⇒ X ⇒ getting a "6"

Y ⇒ getting a prime number.

X: SS → {0, 1} ← Success (getting 6)

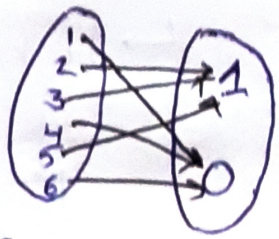


failure (not getting 6)

Bernoulli Discrete Random Variable

Y: SS → {0, 1}

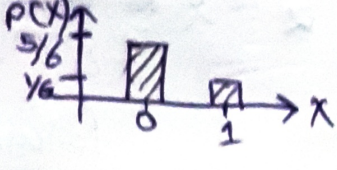
not getting prime number (failure) ← 0, 1 → getting prime number (success)



Step-4:- PMF

$P(X=0) = P(\{1,2,3,4,5\}) = 5/6$

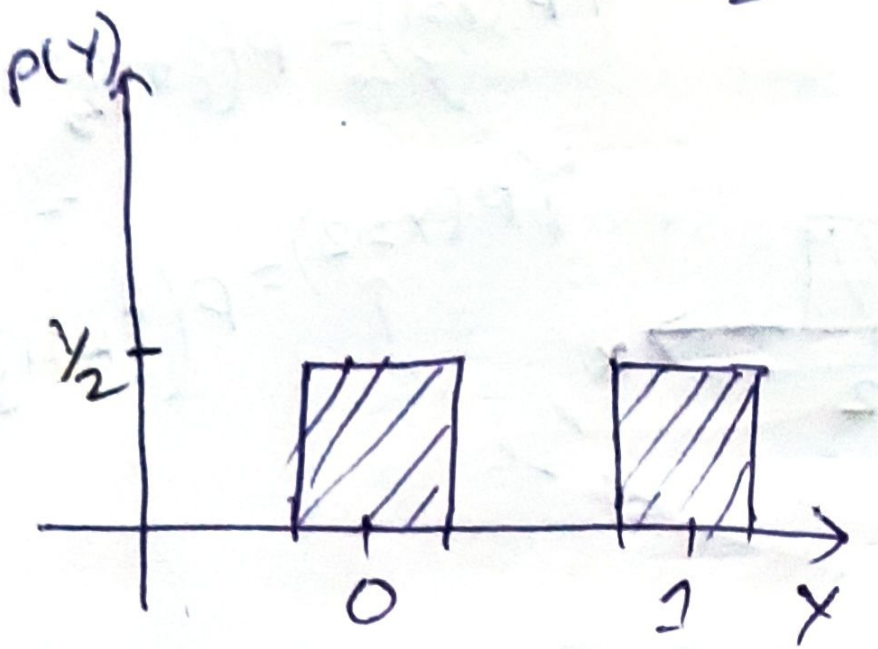
$P(X=1) = P(\{6\}) = 1/6$



non uniform Bernoulli

$P(Y=0) = P(\{T\}) = 1/2$ ⇒ failure

$P(Y=1) = P(\{H\}) = 1/2$ ⇒ success

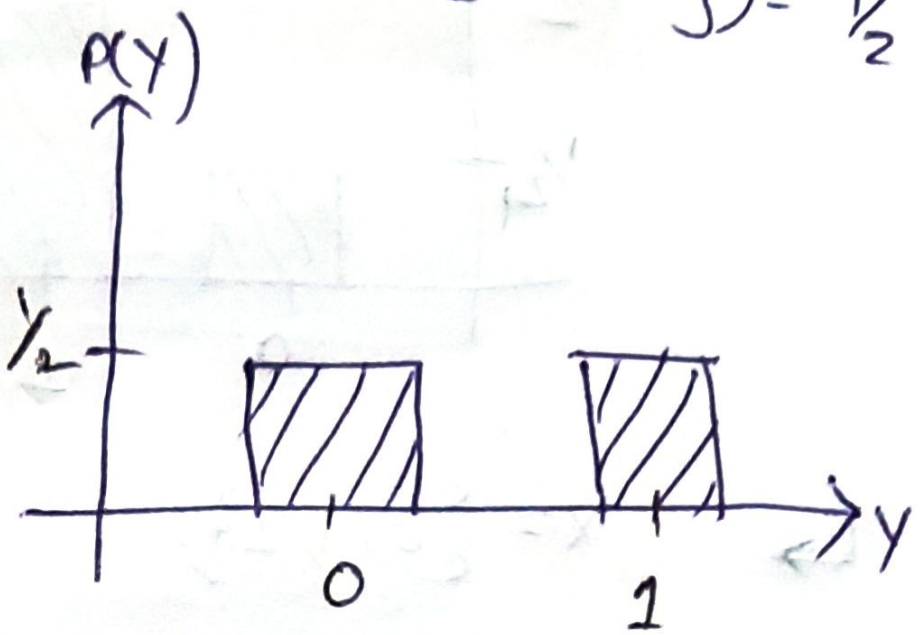


Uniform Bernoulli

(as $P = a$ i.e $P(x=0) = P(x=1)$)

$P(Y=0) = P(\{1,4,6\}) = 1/2$

$P(Y=1) = P(\{2,3,5\}) = 1/2$



Uniform Bernoulli

Note:- for bernoulli P(success) = 1 - P(failure)