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## Descrete Random Variables

We have a few common exampes of discrete random variables. Each distribution also has a corresponding implementation in ‘R’. 1. The Bernoulli distribution <https://en.wikipedia.org/wiki/Bernoulli_distribution>.

# Random Bernoulli - only one trial (flipping a coin, ourcomes 1 or 0)  
  
rbinom(n=1, size=1, prob= 0.5)

## [1] 1

# Weighted coin   
rbinom(n=1, size=1, prob=0.75)

## [1] 1

1. Binomial Distribution:

# Flip 10 coins and record the results  
rbinom(n=10, size=1, prob=0.5)

## [1] 1 1 1 1 0 1 1 1 0 1

# Flip 10 fair coind and record number of succeses  
rbinom(n=1, size=10, prob=0.5)

## [1] 7

1. Poisson Destribusion. People kicks with by a horseanad killed. <https://en.wikipedia.org/wiki/Poisson_distribution>

# How many horse kicks in each group of 10 soldiers? We expect (lambda) 2 kicks. So 2 is a mean/expected.  
rpois(n=10, lambda=2)

## [1] 2 1 3 2 2 3 3 1 6 2

# No whte horses are angry. Now 4 kicks is a mean.  
rpois(n=10, lambda=4)

## [1] 3 1 1 6 4 3 5 1 5 5

## Moments of these Distrebutions.

The comment Momemts are the first and second Moment, from which we calculte the mean and variance respectively.

### Binomial

# Random draw of 5 faiar coins  
xBinom <- rbinom(n=5, size=1, prob=0.5)  
xBinom

## [1] 0 0 1 0 1

# Mean  
mean(xBinom)

## [1] 0.4

# variance  
var(xBinom)

## [1] 0.3

# Random draw of 100 faiar coins  
xBinom2 <- rbinom(n=100, size=1, prob=0.5)  
xBinom2

## [1] 1 1 1 0 0 1 1 1 0 0 1 1 1 1 0 1 1 1 1 0 1 0 0 0 1 0 1 0 1 1 1 0 0 1 0  
## [36] 1 1 0 1 0 0 1 1 1 1 0 1 0 1 0 1 0 1 1 1 0 1 1 1 1 1 1 0 1 0 0 0 1 1 0  
## [71] 0 0 0 0 0 1 1 1 1 1 1 1 0 0 1 0 1 1 1 0 0 1 1 0 0 1 0 1 0 0

# Mean  
mean(xBinom2)

## [1] 0.58

# variance  
var(xBinom2)

## [1] 0.2460606

## Continuous Random Variables