ASSIGNMENT

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Different ways to generate random numbers in R

Uniform numbers

To generate random numbers from a uniform distribution you can use the runif() function. Alternatively, you can use sample() to take a random sample using with or without replacements.

```
n =10
# generate n random numbers between the default values of 0 and 1
runif(n)
```

```
##  [1] 0.64988561 0.01255174 0.98520212 0.90284879 0.67576997 0.97977839
##  [7] 0.86632346 0.35556710 0.41200458 0.05930927
```

```
# generate n random numbers between 0 and 25
runif(n, min = 0, max = 25)
```

```
##  [1]  6.6426065 24.9613141 12.1531580  2.0581307 19.4172250  7.5033651
##  [7]  2.7208076  0.7928451 11.9247673  9.4763910
```

```
# generate n random numbers between 0 and 25 (with replacement)
sample(0:25, n, replace = TRUE)
```

```
##  [1] 19 21 21  4 25  5  3 17 16 17
```

```
# generate n random numbers between 0 and 25 (without replacement)
sample(0:25, n, replace = FALSE)
```

```
##  [1] 23 20 12 17 22  0 13  5 15 16
```

Normal Distribution Numbers

The normal (or Gaussian) distribution is the most common and well know distribution.

```
# generate n random numbers from a normal distribution with given mean & st. dev.
rnorm(n, mean = 0, sd = 1)
```

```
##  [1]  0.3454238  1.5261867  1.3931361  1.4262701  0.9543976 -1.3356338
##  [7]  0.2514271 -0.1747495 -0.4459902 -0.6900016
```

Binomial Distribution Numbers

This is conventionally interpreted as the number of successes in size = x trials and with prob = p probability of success:

```
# generate a vector of length n displaying the number of successes from a trial
# size = 100 with a probabilty of success = 0.5
rbinom(n, size = 100, prob = 0.5)
```

```
##  [1] 50 51 45 46 53 54 46 58 57 45
```

Poisson Distribution Numbers

The Poisson distribution is a discrete probability distribution that expresses the probability of a given number of events occuring in a fixed interval of time and/or space if these events occur with a known average rate and independently of the time since the last event.

```
# generate a vector of length n displaying the random number of events occuring
# when lambda (mean rate) equals 4.
rpois(n, lambda = 4)
```

```
##  [1] 2 4 3 2 4 8 4 2 5 6
```

Exponential Distribution Numbers

The Exponential probability distribution describes the time between events in a Poisson process.

```
# generate a vector of length n with rate = 1
rexp(n, rate = 1)
```

```
##  [1] 4.38397581 0.02549907 1.32469010 1.21040061 0.95527458 0.07030326
##  [7] 0.69474871 2.14477115 0.02844013 1.97915654
```

Gamma Distribution Numbers

The Gamma probability distribution is related to the Beta distribution and arises naturally in processes for which the waiting times between Poisson distributed events are relevant.

```
# generate a vector of length n with shape parameter = 1
rgamma(n, shape = 1)
```

```
##  [1] 0.3198199 0.2421886 1.1730124 1.3959846 0.7971262 1.6908353 2.2123747
##  [8] 0.1229425 0.8245443 0.7580635
```