How to use R to generate random numbers?

Using R, we can generate a uniform random number between 0 and 1 by employing the "runif(x)" function. The argument x of "runif(x)" is the number of random values to be generated. For example, to generate one random value, we have :

```
> runif(1)
[1] 0.715994
>
```

When we re-run the runif(1), we get another random number:

```
> runif(1)
[1] 0.3034463
>
```

If we put in an argument (3), we generate three random values:

```
> runif(3)
[1] 0.4825771   0.6344367   0.5344024
>
```

For a given distribution, the name of the random number generator is "r" prefixed to the distribution abbreviated name. The following example generates one random value from the standard normal distribution:

```
> rnorm(1)
[1] -0.06049331
```

Examples of other distributions are as follows:

```
>
> runif(1,min=-2,max=2)   # One uniform variate between -2 and +2
[1] -0.1507374
>
> rnorm(1,mean=100,sd=18) # One normal variate, mean 100 and SD 18
[1] 98.51075
>
> rbinom(1,size=10,prob=0.5)   # One binomial variate
[1] 6
>
> rpois(1,lambda=10)   #One Poisson variate
[1] 12
```

```
>
> rexp(1,rate=0.2)   #One exponential variate
[1] 6.947776
>
> rgamma(1,shape=2,rate=0.1)   # One gamma variate
[1] 14.41291
>
```

As with runif, the first argument is the number of random values to be generated and subsequent arguments are the parameters of the distribution, such as mean and sd for the Normal distribution or size and prob for the binomial. For example:

```
> rnorm(3,mean=100,sd=12)
[1] 116.85284 106.52243  95.35872
>
```

We can also expand our discussion from simple scalars for distributional parameters to vectors, in which case R will cycle through the vector while generating random numbers. The following example generates three normal random values drawn from distributions with means of −20, 0, and +20, respectively (all distributions have a standard deviation of 1.5):

```
> rnorm(3,mean=c(-20,0,+20),sd=1.5)
[1] -19.6126046   0.5472723  18.5003453
>
```

If we want to generate 30 values drawn from a normal variate whose mean is itself randomly distributed of $\mu = 0$ with standard deviation of $\sigma = 0.4$, we have the following outcome:

```
> means<-rnorm(30,mean=0,sd=0.4)
> rnorm(30,mean=means,sd=1)
 [1] -0.27067926  0.28422927  1.27892974  1.87283033 -0.35845366 -1.03173132
 [7]  0.12157686  0.83118586 -0.40119890  0.20016456  0.41561843  0.82101102
[13]  0.62968184  0.07780013  0.51769740  1.62225414 -2.13872387 -2.69811156
[19] -0.49065856  0.20335703  0.79455007 -0.40414592 -0.56584319 -0.97637501
[25]  0.24188852  0.73174163  1.63668146 -1.15373651  1.67964666  0.40591451
>
```