

Binomial Random Variable Simulation

The purpose of this exercise is to write the **R** function `binomsim.r` that simulates a binomial random variable. The binomial random variable counts the number of successes in n independent trials, each of which results in either a success or failure with probability p . The inputs to the function will be n and p , and the output will be the number of successes.

You can write this function without using either an “if” statement or a “for” loop, but for this particular assignment, please use both kinds of statements. You will also need to use **R**’s built-in `runif` function.

Secondly, you will need to do some error checking on this assignment. The number of trials must be an integer strictly greater than zero. Also, the probability of success must be strictly between zero and one. To produce an error message, return “NA” and print a message.

Here are several examples.

```
> binom_sim(10000,0)
Error, p must be a strictly between 0 and 1.
[1] NA
> binom_sim(10000,1)
Error, p must be a strictly between 0 and 1.
[1] NA
> binom_sim(10000,2)
Error, p must be a strictly between 0 and 1.
[1] NA
> binom_sim(10000,-1/2)
Error, p must be a strictly between 0 and 1.
[1] NA
> binom_sim(0,1/2)
Error, n must be a positive integer.
[1] NA
> binom_sim(4.6,1/2)
Error, n must be a positive integer.
[1] NA
> binom_sim(-6,1/2)
Error, n must be a positive integer.
[1] NA
> set.seed(1)
> binom_sim(1,0.999)
[1] 1
> binom_sim(5,1/2)
[1] 2
```

```
> binom_sim(10,1/6)
[1] 1
> binom_sim(1000000,1/1000)
[1] 949
```