Quiz #3: Solutions

Milica Cudina

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Simulations

Problem 1. (2 points)

Draw 100 simulated values from Bernoulli(p=0.2). What is the proportion of "successes" in your simulated batch?
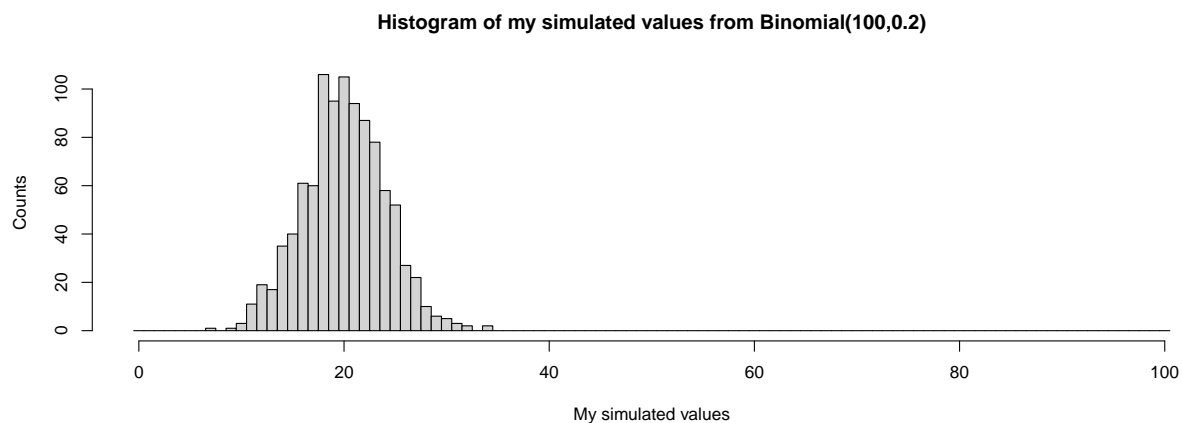
Solution:

```
x=rbinom(100,1,0.2)
sum(x)/100
## [1] 0.24
```

Problem 2. (5 points)

Draw 1000 simulated values from Binomial(n=100, p=0.2). Plot the histogram of your simulated values.

Solution:

```
x=rbinom(1000,100,0.2)
hist(x, breaks=seq(-0.5,100.5,1),
     main="Histogram of my simulated values from Binomial(100,0.2)",
     xlab="My simulated values",
     ylab="Counts")
```


Histogram of my simulated values from Binomial(100,0.2)

Problem 3. (8 points)

Consider the following two-step experiment. First you draw a simulated value from a Bernoulli(p=1/3). If the drawn value from the Bernoulli equals 0, then you draw a simulated value from Binomial(n=50,p=0.5). On the other hand, if the drawn value from the Bernoulli equals 1, then you draw a simulated value from Binomial(100,0.5).

You should repeat the above two-step experiment 1000 times and draw the histogram of the simulated values.

Solution:

```
nsim=1000
sims<-c()
for(i in 1:nsim){
  coin<-rbinom(n=1,size=1,prob=1/3)
  if(coin==0){
    new.sim<-rbinom(1,50,0.5)
  } else {
    new.sim<-rbinom(1,100,0.5)
  }
  sims<-c(sims,new.sim)
}
hist(sims,breaks=seq(-0.5,100,1))
```


Histogram of sims