

Stat 536 Quiz 1Navelski

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Quiz 1

Part 1

```
nsim=2000
ns=ceiling((nsim/2))
u1=runif(ns,-1,1)
u2=runif(ns,-1,1)
s=u1^2 + u2^2
y=cbind(u1,u2,s)

for (i in 1:1000) {
  while(y[i,3]>=1){
    y[i,1] = runif(1,-1,1)
    y[i,2] = runif(1,-1,1)
    y[i,3] = y[i,1]^2 + y[i,2]^2
    if(y[i,3]< 1 & 0<y[i,3])
      break()
  }
}

x1=sqrt(-2*log(y[,3]))*(y[,1]/sqrt(y[,3]))
x2=sqrt(-2*log(y[,3]))*(y[,2]/sqrt(y[,1]))

## Warning in sqrt(y[, 1]): NaNs produced
```

Part b

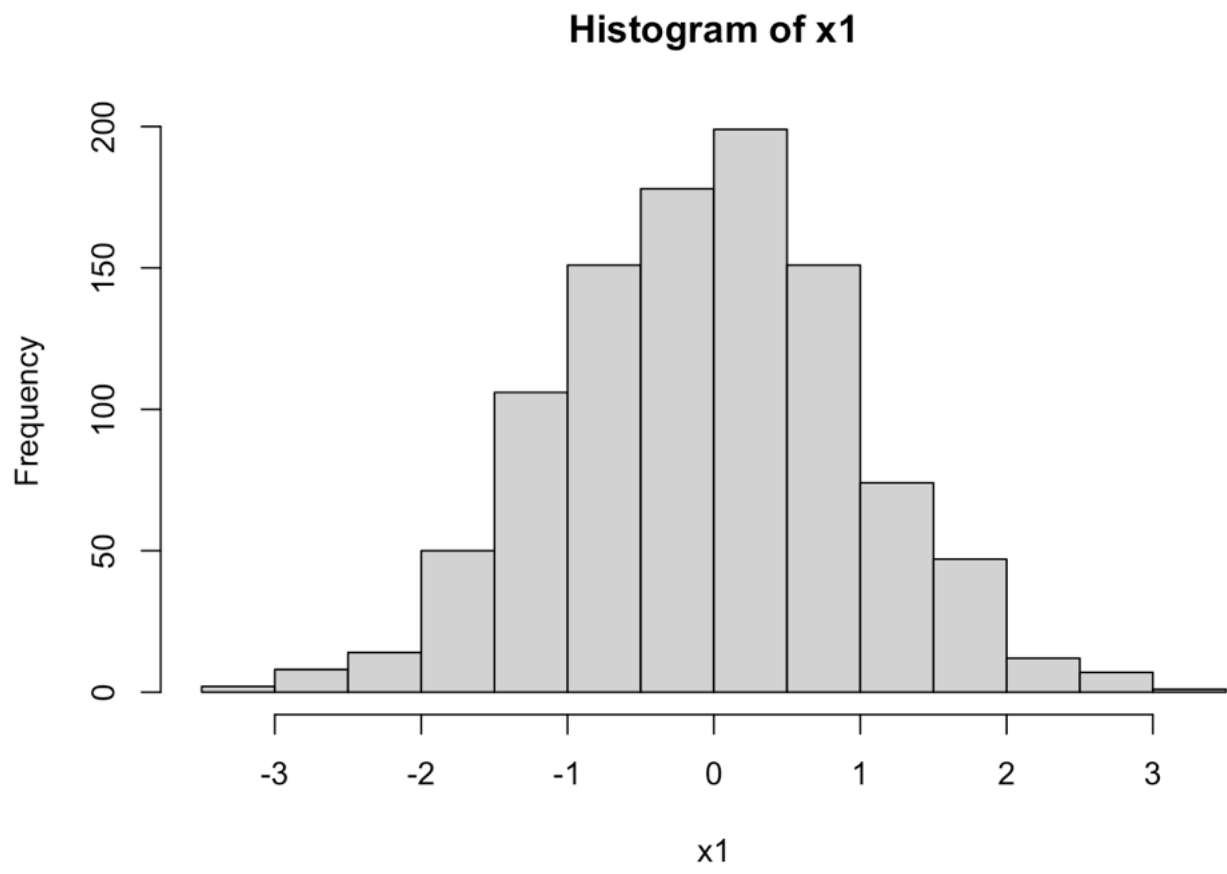
```
sim_norm <- function(ns){
  u1=runif(ns,-1,1)
  u2=runif(ns,-1,1)
  s=u1^2 + u2^2
  y=cbind(u1,u2,s)

  for (i in 1:ns) {
    while(y[i,3]>=1){
      y[i,1] = runif(1,-1,1)
      y[i,2] = runif(1,-1,1)
      y[i,3] = y[i,1]^2 + y[i,2]^2
      if(y[i,3]< 1 & 0<y[i,3])
        break()
    }
  }

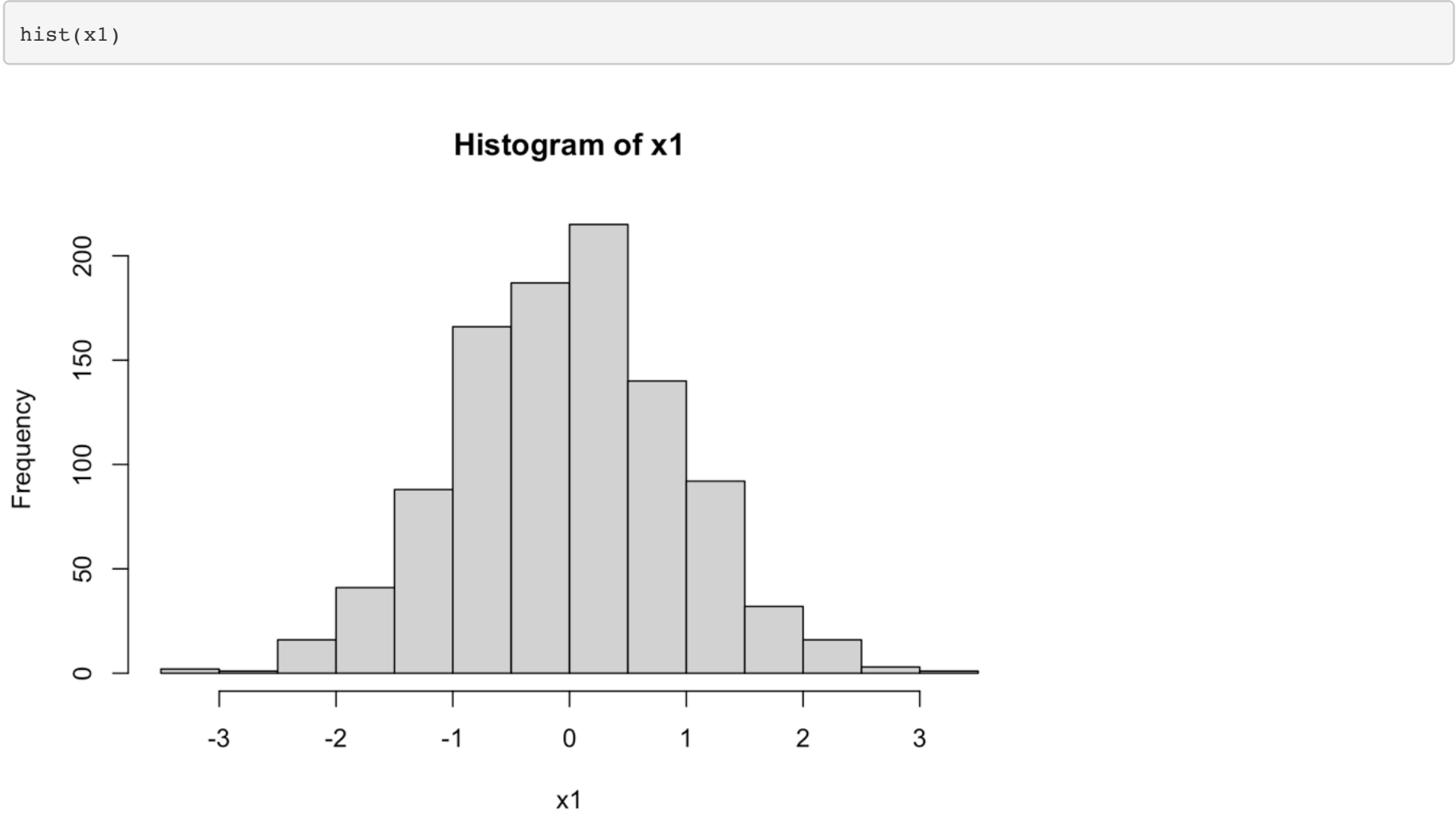
  x1=sqrt(-2*log(y[,3]))*(y[,1]/sqrt(y[,3]))
  x2=sqrt(-2*log(y[,3]))*(y[,2]/sqrt(y[,1]))
  return(hist(x1))
}

sim_norm(1000)

## Warning in sqrt(y[, 1]): NaNs produced
```



Part c



Part d

Part e

```
### Any Univariate Normal Distribution
# once we have a N(0,1) we can simulate any univariate
# or multivariate normal distribution we can define any univariate
# normal distribution as x~N(0,1) ---> z=mu+si*x ~ N(mu,si^2)

# norm_simz=function(ns,mu=0,var=1){
#   x1=sim_norm(ns)
#   z=mu+(sqrt(var))*x
#   return(z)
# }
#
# z=norm_simz(1000,mu=3,var=2)
# hist(z)
```