Week4 Assignment

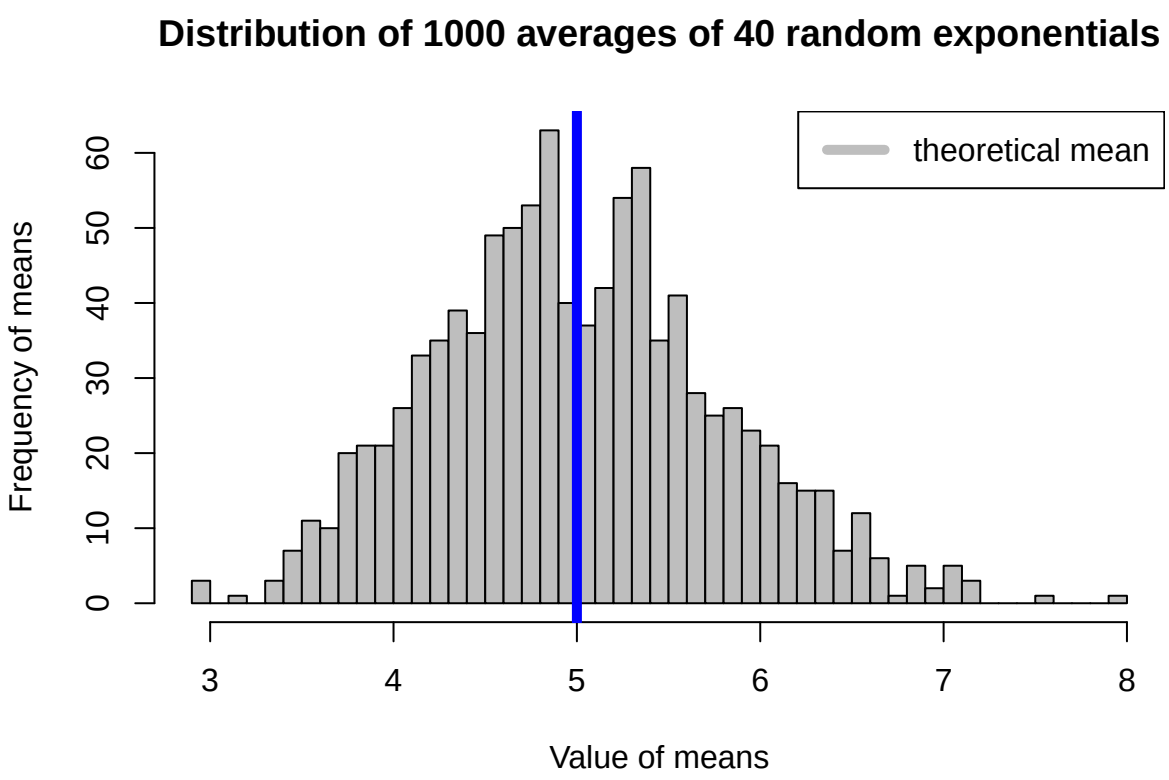
Ash

2022-10-03

Part1

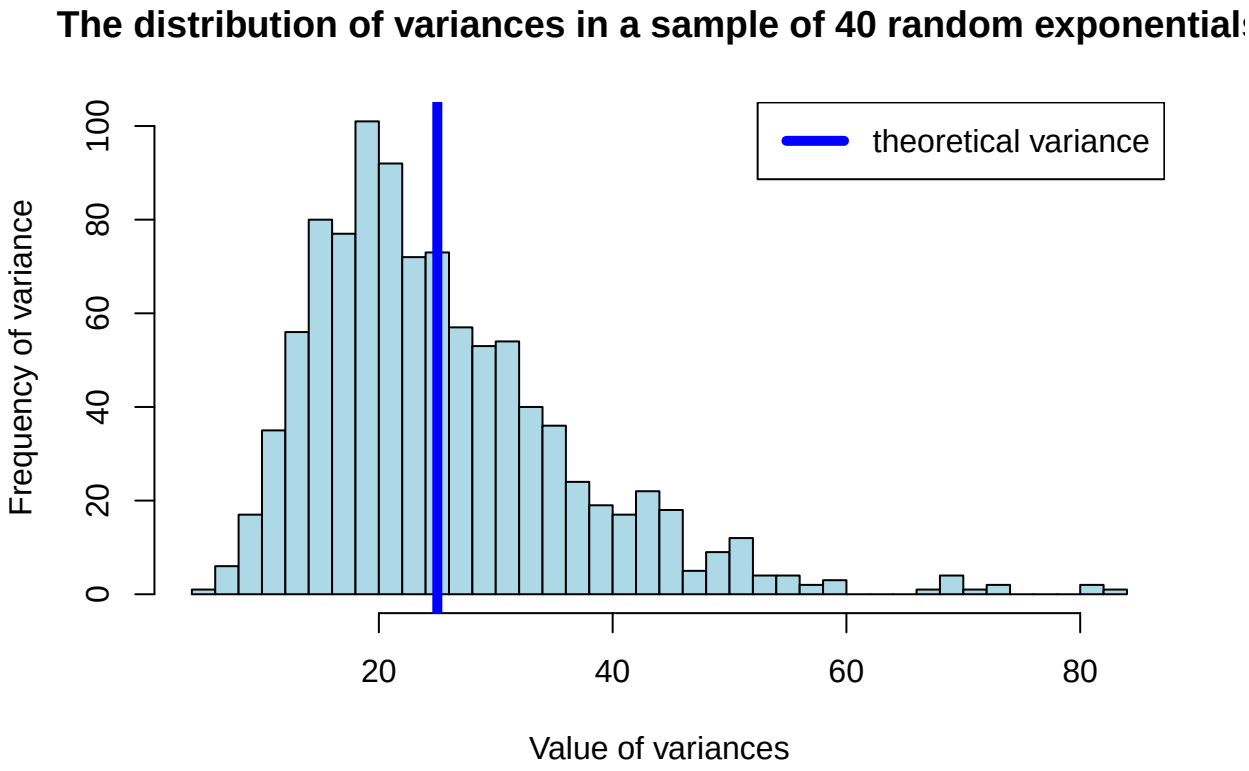
Q!

```
lambda <- 0.2
sim_Data <- matrix(rexp(1000*40, lambda), nrow = 1000, ncol = 40)
distMean <- apply(sim_Data, 1, mean)
hist(distMean, breaks = 50,
     main = "Distribution of 1000 averages of 40 random exponentials",
     xlab = "Value of means",
     ylab = "Frequency of means",
     col = "grey")
abline(v = 1/lambda, lty = 1, lwd = 5, col = "blue")
legend("topright", lty = 1, lwd = 5, col = "grey", legend = "theoretical mean")
```



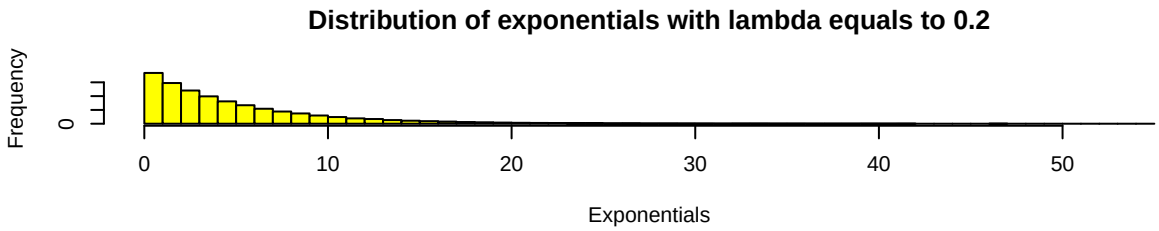
Q2

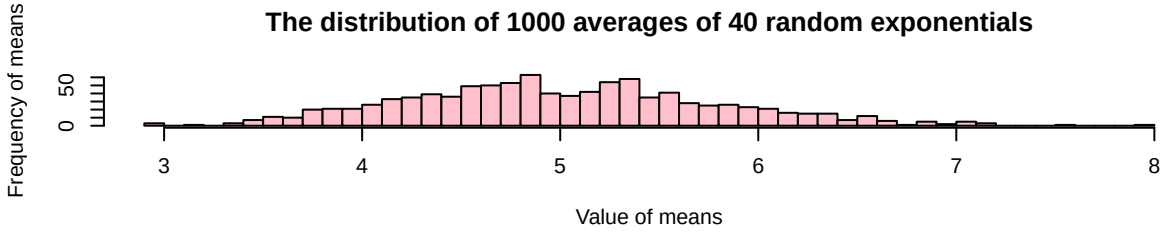
```
distVar <- apply(sim_Data, 1, var)
hist(distVar, breaks = 50, main = "The distribution of variances in a sample of 40 random exponentials"
abline(v = (1/lambda)^2, lty = 1, lwd = 5, col = "blue")
legend("topright", lty = 1, lwd = 5, col = "blue", legend = "theoretical variance")
```

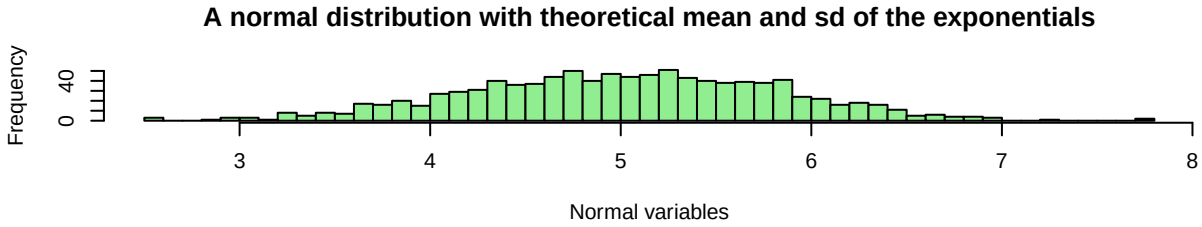


Q3

```
par(mfrow = c(3, 1))
hist(sim_Data, breaks = 50, main = "Distribution of exponentials with lambda equals to 0.2", xlab = "Exp
hist(distMean, breaks = 50, main = "The distribution of 1000 averages of 40 random exponentials", xlab =
simNorm <- rnorm(1000, mean = mean(distMean), sd = sd(distMean))
hist(simNorm, breaks = 50, main = "A normal distribution with theoretical mean and sd of the exponentia
```


Distribution of exponentials with lambda equals to 0.2
Frequency
0
0
10
20
30
40
50
Exponentials


The distribution of 1000 averages of 40 random exponentials
Frequency of means
0
50
3
4
5
6
7
8
Value of means


A normal distribution with theoretical mean and sd of the exponentials
Frequency
0
40
3
4
5
6
7
8
Normal variables