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Table of Contents

Question 1

a

```
sample(1:50,10)
```

```
##  [1]  8 29  3  9 36 41 38  5 18 13
```

b

```
sample(1:50,10,replace = TRUE)
```

```
##  [1]  1 41  7 31  9 41 37 16 12 28
```

c

```
(1+50)/2
```

```
## [1] 25.5

mean_sample <- mean(sample(1:50,100000,replace = TRUE))
mean_sample

## [1] 25.57261

#As the results showed above, I believe the are similar
```

d

```
res1 <- sample(c(0,1),100,replace = TRUE, prob = c(2/3,1/3))
res1

##   [1] 1 0 1 0 1 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 1 0 1 0 0 0 0 0 1 1
1 0 0 0 1 0
##  [38] 0 0 0 1 1 0 0 0 0 0 1 0 1 0 1 0 0 0 0 0 0 0 0 0 0 1 1 0 0 0 1
1 0 0 1 1 0
##  [75] 0 0 0 0 0 0 1 1 0 1 0 0 0 1 1 1 0 1 0 0 0 0 0 0 0 1
```

e

```
res2 <- sample(c(0,0,1),100, replace = TRUE)


res2

##   [1] 1 0 0 0 0 1 0 1 0 0 1 1 1 1 0 1 0 0 0 1 1 0 1 0 1 1 0 1 0 0 0
0 0 1 0 1 0
##  [38] 0 0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 0 0 0 1 1 0 0 0 0 1 0 1 0 1
0 0 1 0 0 1
##  [75] 0 1 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 0 1 0 1 0 0 0 0 0
```

Question 2

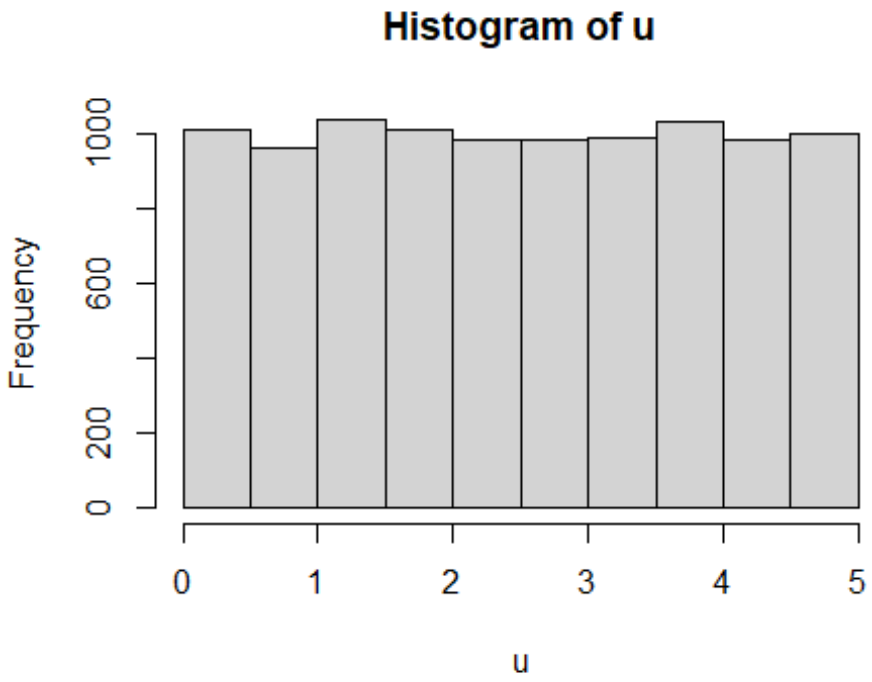
a

```
runif(10,0,5)

##  [1] 3.3595641 0.4689800 3.7873857 3.9470408 1.9268004 3.0116481 3.5
511587
##  [8] 4.6755466 0.9200025 3.0893979
```

b

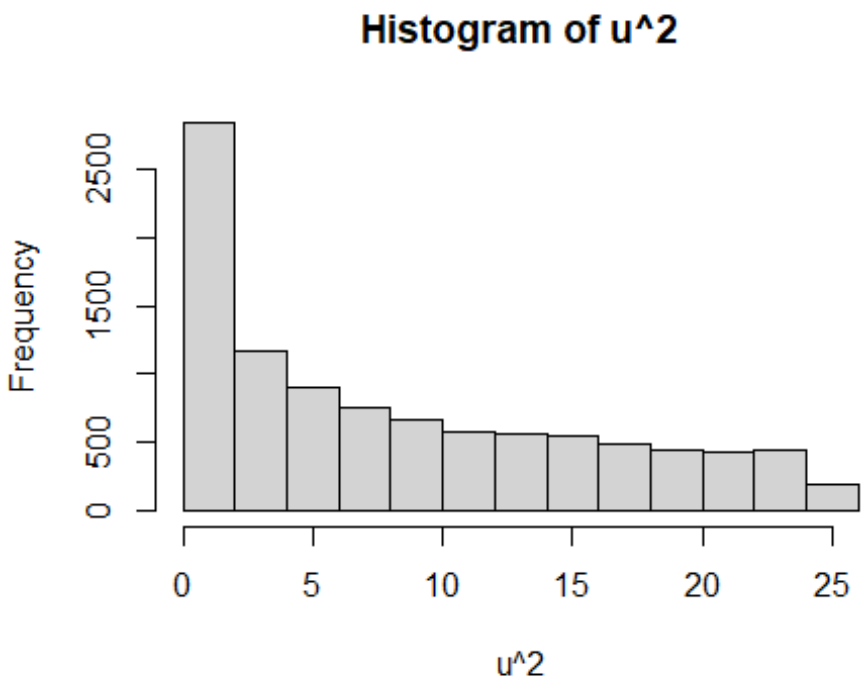
```
u <- runif(10000,0,5)
hist(u)
```



Yes it is uniform

c

```
hist(u^2)
```



No the histogram is not uniform.

Question 3

a

```
(43+68)/68
```

```
## [1] 1.632353
```

b

```
(43+68)/43
```

```
## [1] 2.581395
```

c

I

The probability of both A and B if they are independent is 0.4*0.6 = 0.24.

II

The minimum probability is 0, when A and B have no overlapping.

III

The maximum probability is 0.4, when B is containing every element of A.