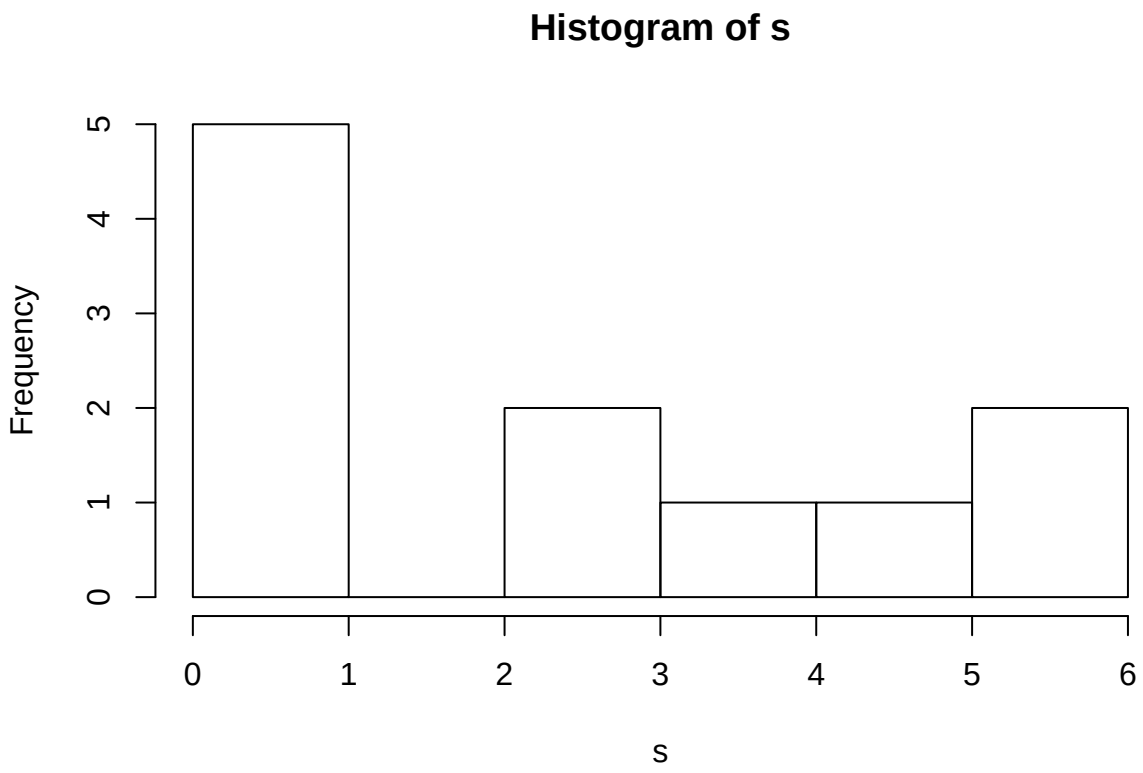
STA304_A1_Q2

(a)

```
s <- c(1, 0, 0, 4, 1, 6, 6, 3, 5, 3, 1)
hist(s)
```



(b)

```
u = mean(s)
sigma_square = var(s)
p = sum(s==1) / length(s)
```

u

```
## [1] 2.727273
```

sigma_squre

```
## [1] 5.218182
```

p

```
## [1] 0.2727273
```

(c)

```
sample = sample(s,5,replace=TRUE)
p_estimator = sum(sample==1) / length(sample)
```

sample

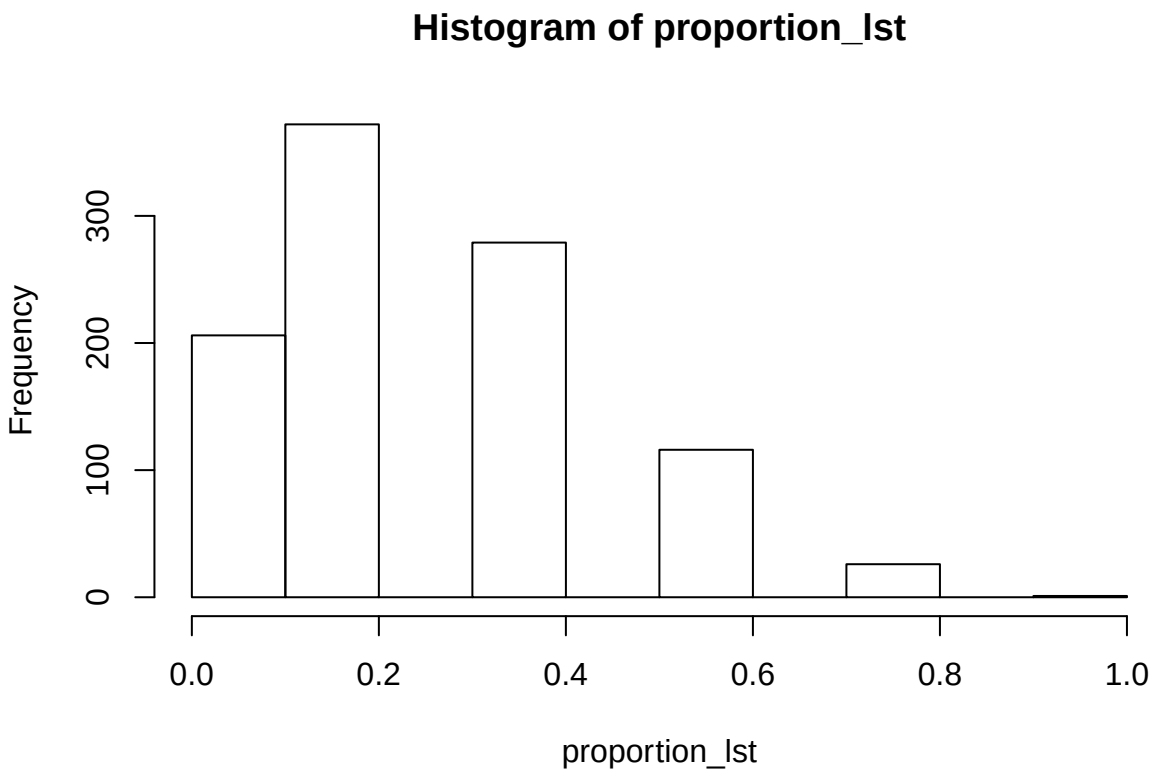
```
## [1] 3 6 0 6 6
```

p estimate

```
## [1] 0
```

(d)

```
proportion_lst = c()
i <- 1
while (i < 1001) {
one_sample = sample(s,5,replace=TRUE)
new_p_estimator = sum(one_sample==1) / length(one_sample)
proportion_lst <- c(proportion_lst, new_p_estimator)
i = i+1
}
hist(proportion_lst)
```



(e)

```
sample = sample(s,5,replace=FALSE)
p_estimator_without_replacement = sum(sample==1) / length(sample)
sample
```

```
## [1] 4 0 6 1 1
```

p(the proporttion of 1's) without replacement

```
p_estimator_without_replacement
```

```
## [1] 0.4
```

(f)

```
proportion_lst = c()
i <- 1
while (i < 1001) {
sample = sample(s,5,replace=FALSE)
new_p_estimator = sum(sample==1) / length(sample)
```

```
proportion_lst <- c(proportion_lst, new_p_estimator)
i = i+1
}
hist(proportion_lst)
```