Assignment 1

PD, JO, and MvD, group 06

17 febuary 2023

Exercise 1

Here is the part for exercise 1 **a)**

```
# what is code without comments
print("exercise 1.a code here!")
```

```
## [1] "exercise 1.a code here!"
```

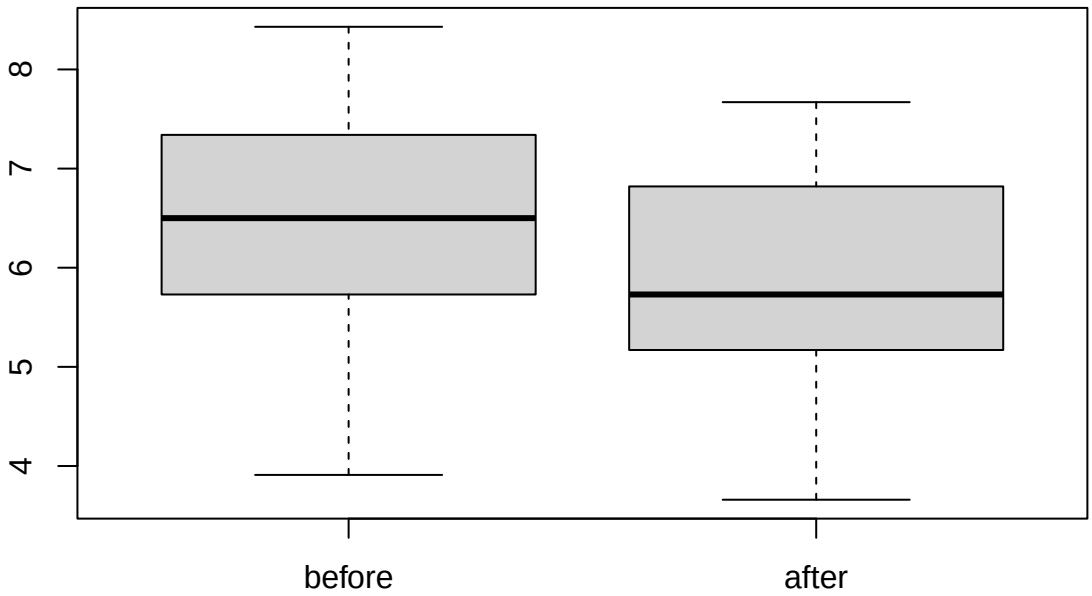
Exercise 2

Here is the part for exercise 2 **a)**

```
# what is code without comments
print("exercise 2.a code here!")
```

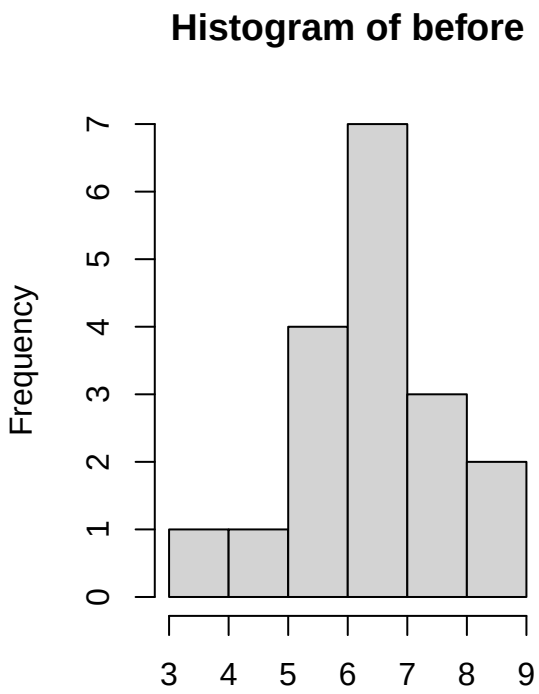
```
## [1] "exercise 2.a code here!"
```

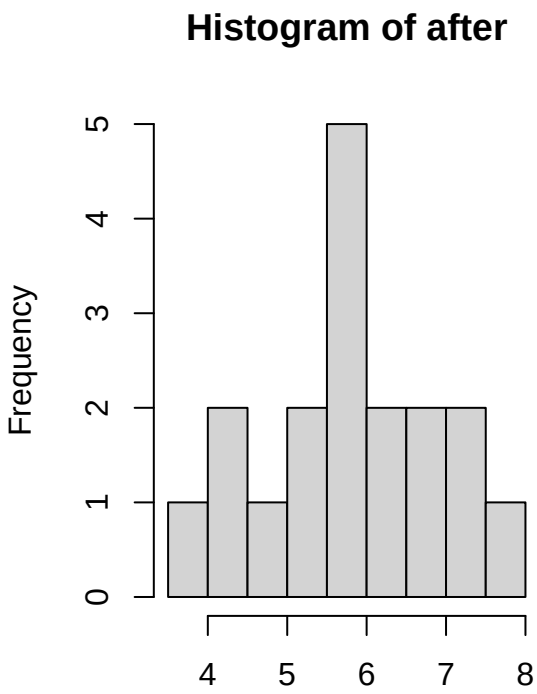
```
fat = scan("../datasets/cholesterol.txt", what = list(before = 0, after = 0))

#a
boxplot(fat)
```



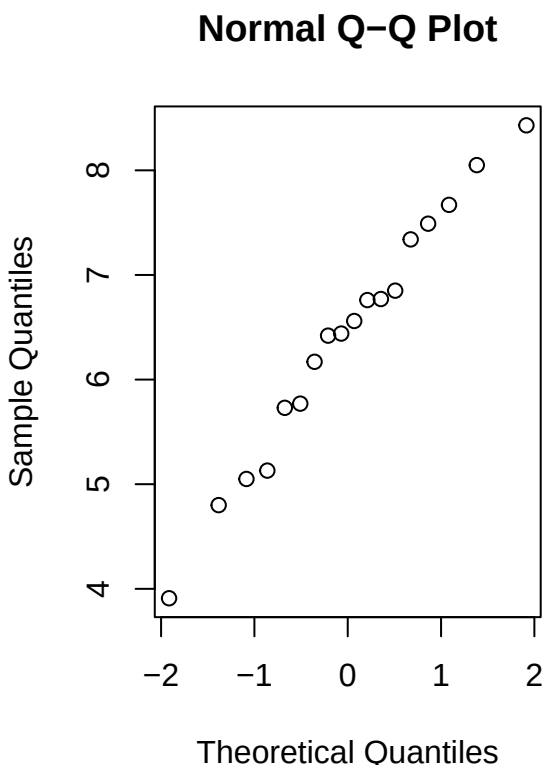

```
attach(fat)

par(mfrow = c(1,2))
```

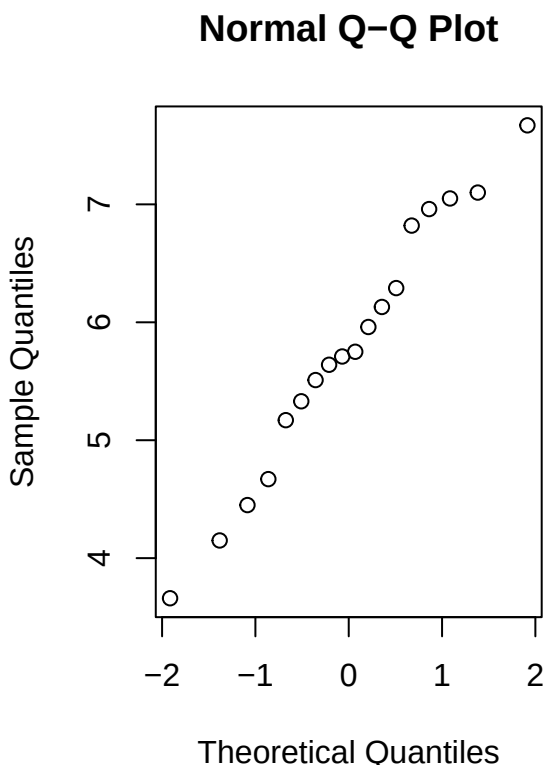
```
hist(before)
hist(after)
```






```
par(mfrow = c(1,2))
qqnorm(before)
qqnorm(after)
```



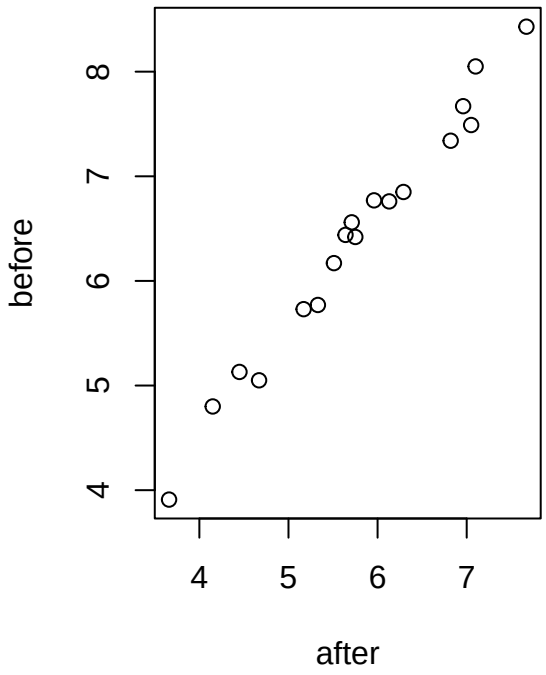



```
plot(before~after)

cor.test(before, after)
```

```
##
##  Pearson's product-moment correlation
##
## data:  before and after
## t = 29.428, df = 16, p-value = 2.321e-15
## alternative hypothesis: true correlation is not equal to 0
## 95 percent confidence interval:
##  0.9751289 0.9966788
## sample estimates:
##       cor
## 0.9908885
```

```
cor.test(before, after, method="spearman")
```

```
##
##  Spearman's rank correlation rho
##
## data:  before and after
## S = 12, p-value = 9.753e-06
## alternative hypothesis: true rho is not equal to 0
## sample estimates:
##       rho
## 0.9876161
```



b)

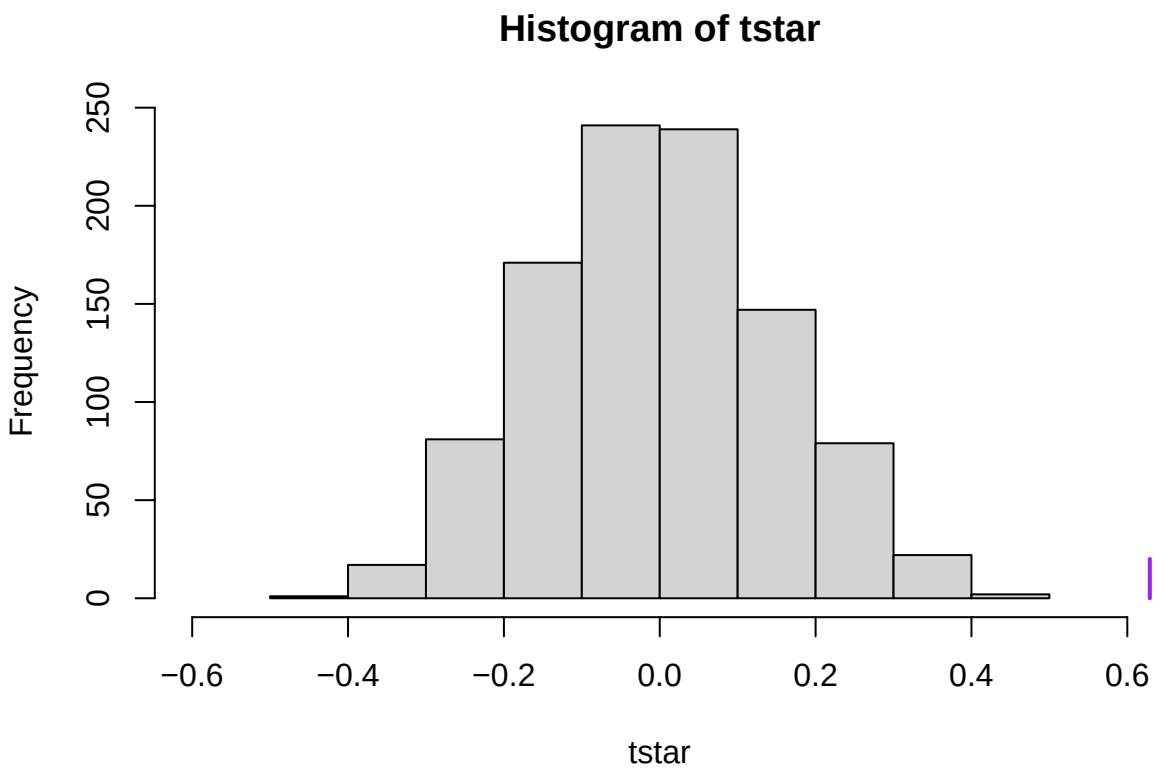
```
t.test(before, after, paired = TRUE) # are the samples paired? yes
```

```
##
##  Paired t-test
##
## data:  before and after
## t = 14.946, df = 17, p-value = 3.279e-11
## alternative hypothesis: true mean difference is not equal to 0
## 95 percent confidence interval:
##  0.5401131 0.7176646
## sample estimates:
## mean difference
##       0.6288889
```

```
permStat = function(x, y) { mean(x-y) }

B = 1000; tstar=numeric(B);
i =0
for(i in i:B) {
  cbind = cbind(before, after)
  fatStar = t(apply(cbind,1,sample))
  tstar[i] = permStat(fatStar[,1], fatStar[,2])
  }

t = permStat(before, after)
print(t)
```

```
## [1] 0.6288889
```

```
hist(tstar, xlim = c(-0.6,0.6))
lines(rep(t,2), c(0,20), col = "purple", lwd=2)
```




```
p1=sum(tstar<t)/B
pr=sum(tstar>t)/B
p=2*min(p1,pr); p
```

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

```
#conclusion indeed significant difference
```

c)

```
# bootstrap test to find out if fat$after is uniformly distributed. and construct a 95% confidence inte
```

Exercise 3

Here is the part for exercise 3 **a)**

```
# what is code without comments
print("exercise 3.a code here!")
```

```
## [1] "exercise 3.a code here!"
```

Exercise 4

Here is the part for exercise 4 **a)**

```
# what is code without comments
print("exercise 4.a code here!")
```

```
## [1] "exercise 4.a code here!"
```