# Assignment 2 FE-515

Akshay Pradeep Patade

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## Question 1: (50 points)

### 1.1

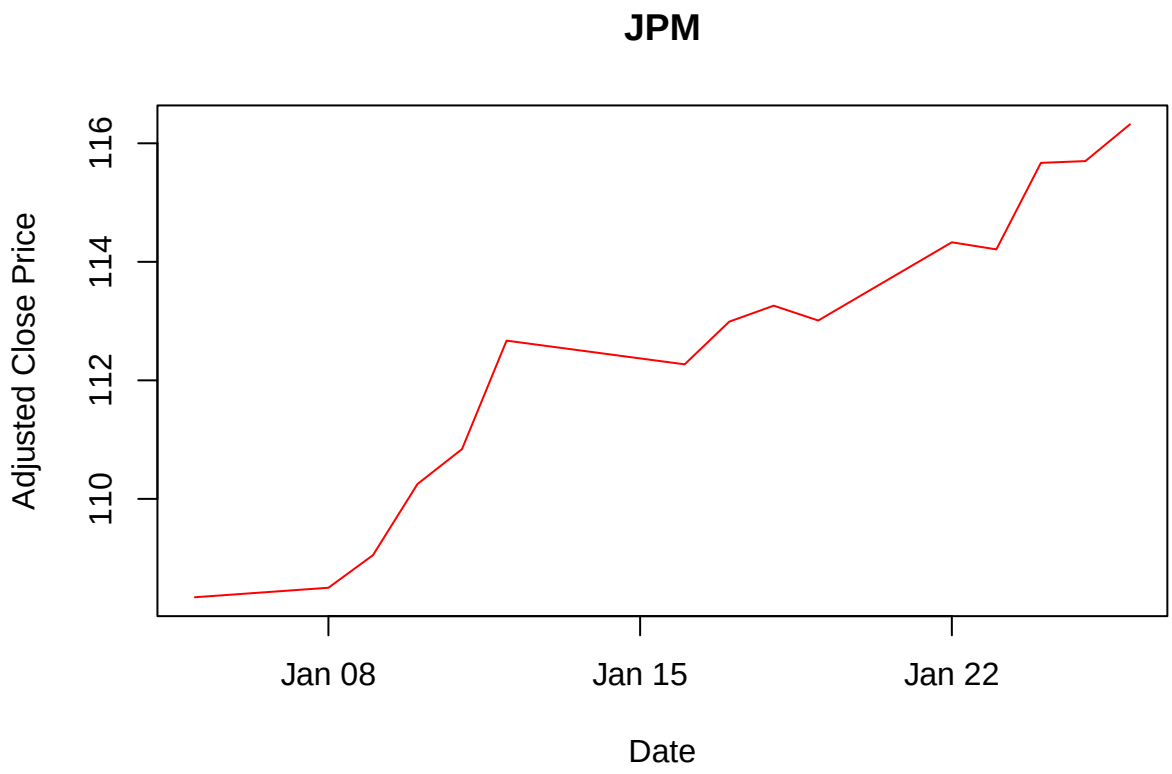
```
df <- read.csv("JPM.csv")
df
```

```
##          Date   Open   High    Low  Close Adj.Close   Volume
## 1  2018-01-05 109.26 109.55 107.78 108.34    108.34 14155000
## 2  2018-01-08 108.15 108.68 107.70 108.50    108.50 12466500
## 3  2018-01-09 108.72 109.63 108.49 109.05    109.05 13292300
## 4  2018-01-10 109.47 110.70 109.39 110.25    110.25 15834500
## 5  2018-01-11 110.67 110.93 110.05 110.84    110.84 13676800
## 6  2018-01-12 111.65 112.85 110.84 112.67    112.67 18884200
## 7  2018-01-16 111.51 113.43 111.07 112.27    112.27 22703300
## 8  2018-01-17 111.89 113.30 111.31 112.99    112.99 14940300
## 9  2018-01-18 112.76 113.72 112.27 113.26    113.26 14572900
## 10 2018-01-19 113.94 114.34 112.80 113.01    113.01 18785500
## 11 2018-01-22 112.66 114.39 112.50 114.33    114.33 12475700
## 12 2018-01-23 113.67 114.64 113.35 114.21    114.21 12320800
## 13 2018-01-24 114.86 116.00 114.66 115.67    115.67 15904500
## 14 2018-01-25 116.04 116.17 115.08 115.70    115.70 13510000
## 15 2018-01-26 115.70 116.32 114.96 116.32    116.32 12008000
```

```
df[,1] <- as.Date(df[,1])
```

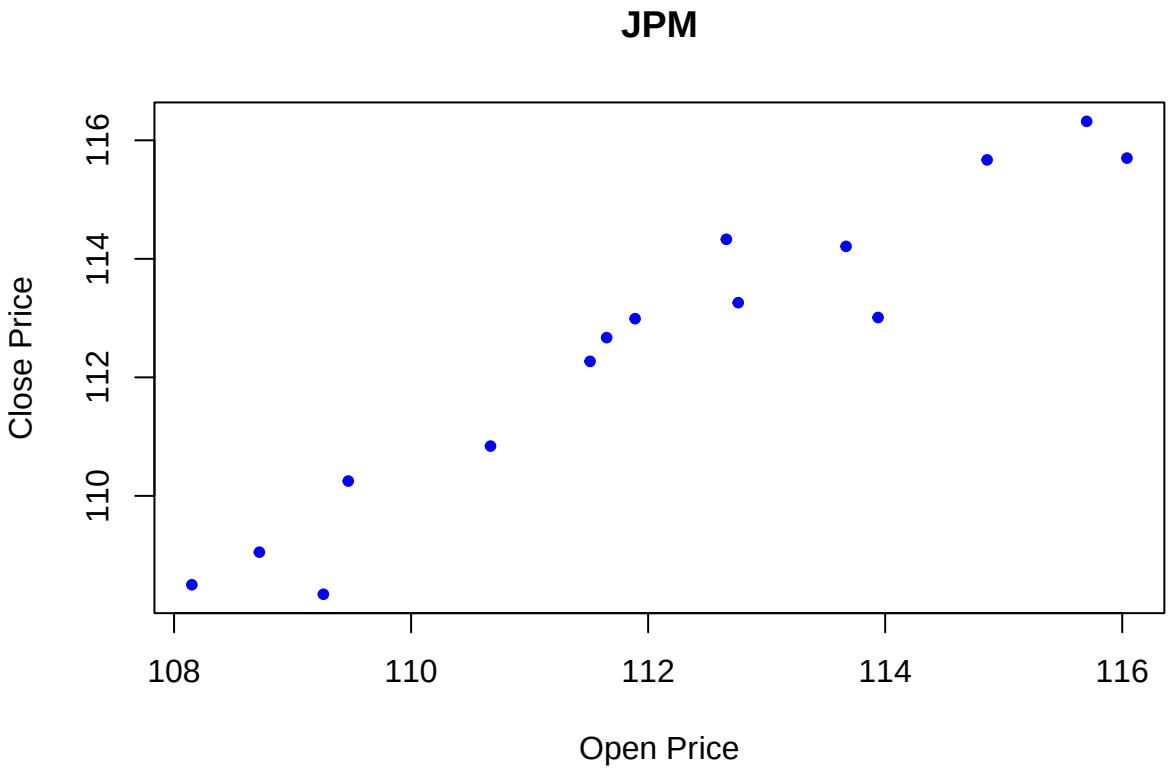
### 1.2

```
plot(df$Date, df$Adj.Close, type="l", col="red",
     xlab="Date", ylab="Adjusted Close Price", main="JPM")
```



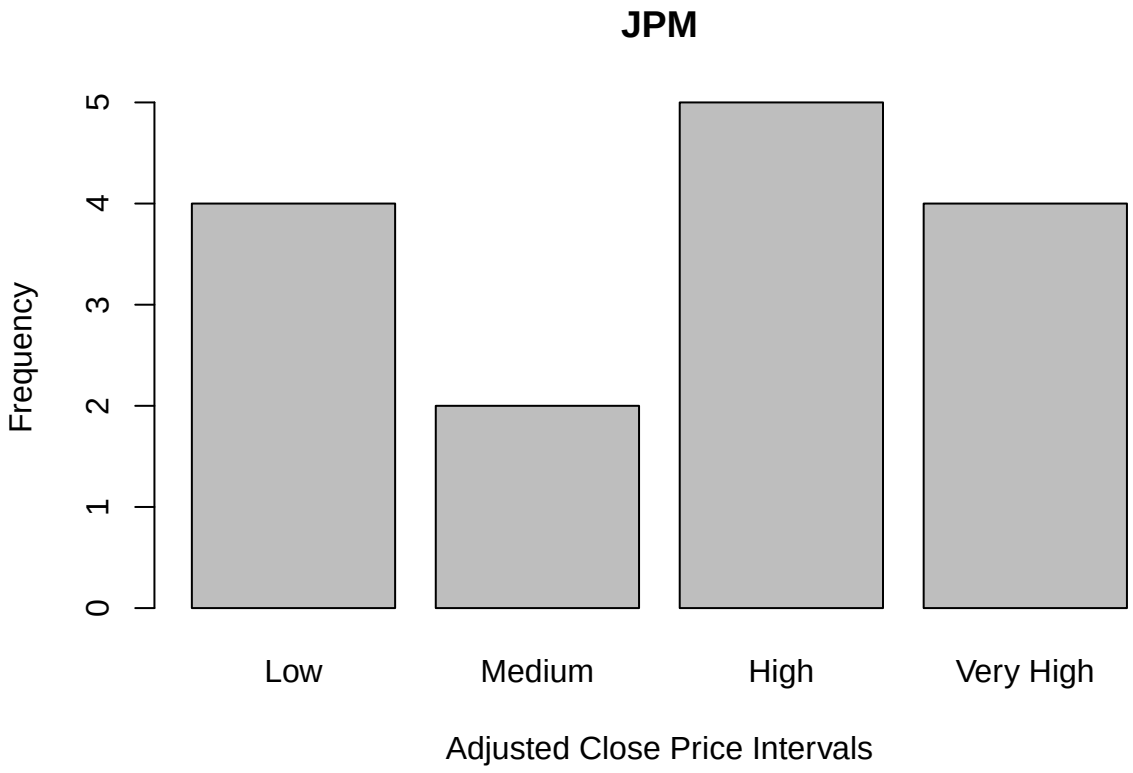

### 1.3

```
plot(df$Open, df$Close, xlab="Open Price", ylab="Close Price", main="JPM",
     col="blue", pch=20)
```



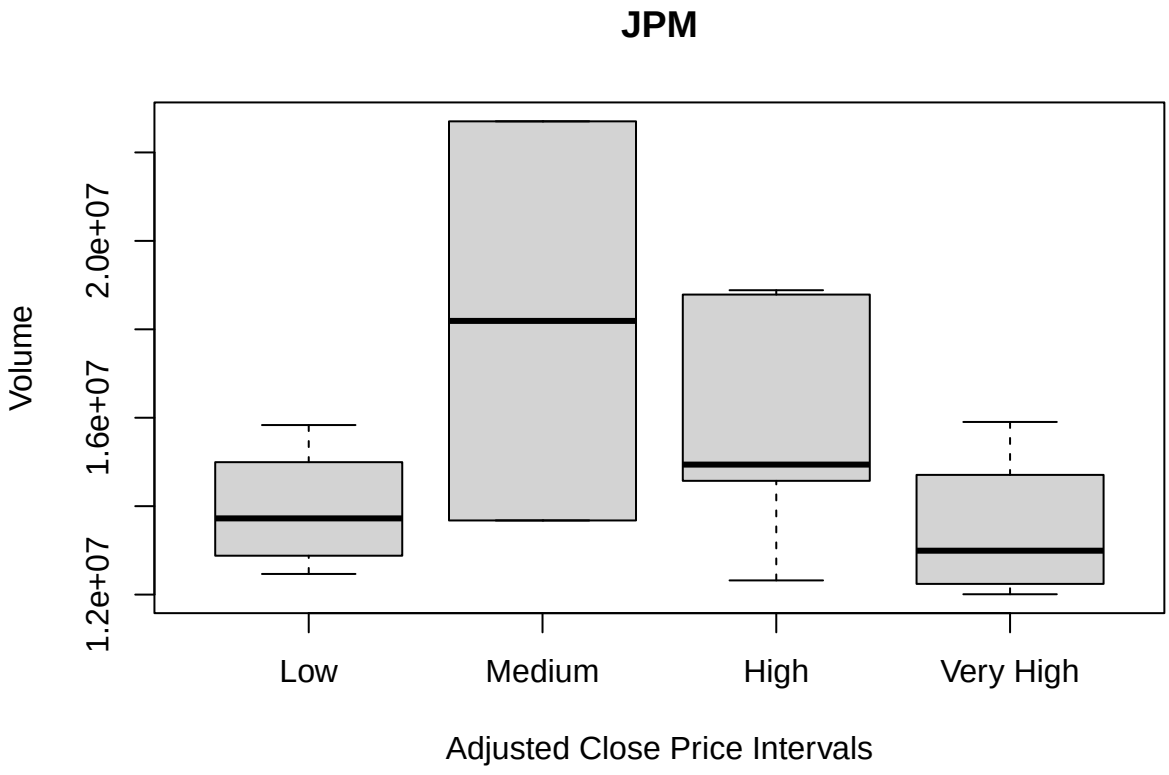

### 1.4

```
cuts <- cut(df$Adj.Close, breaks=4, labels=c("Low", "Medium", "High", "Very High"))

barplot(table(cuts), xlab="Adjusted Close Price Intervals", ylab="Frequency", main="JPM")
```



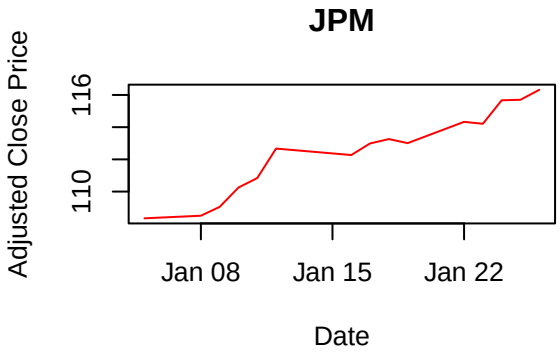

### 1.5

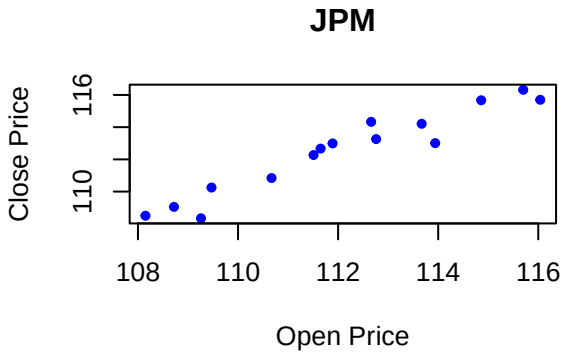
```
boxplot(df$Volume ~ cuts, xlab="Adjusted Close Price Intervals", ylab="Volume", main="JPM")
```

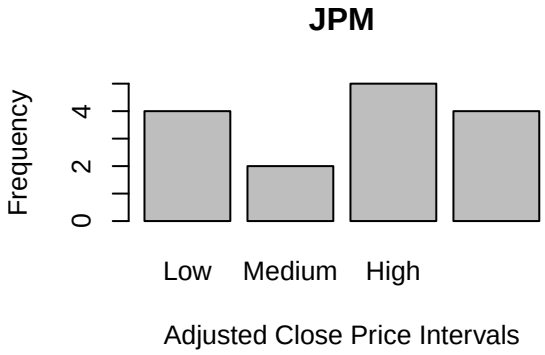


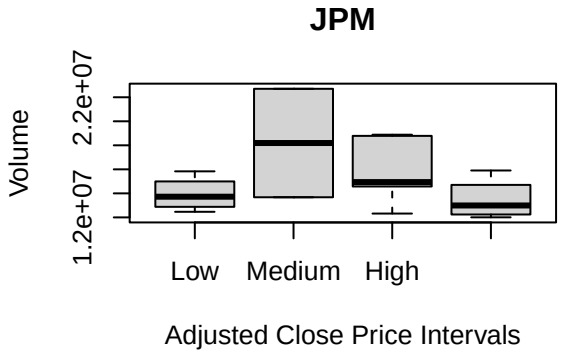

### 1.6

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

plot(df$Date, df$Adj.Close, type="l", col="red",
     xlab="Date", ylab="Adjusted Close Price", main="JPM")

plot(df$Open, df$Close, xlab="Open Price", ylab="Close Price", main="JPM",
     col="blue", pch=20)

cuts <- cut(df$Adj.Close, breaks=4, labels=c("Low", "Medium", "High", "Very High"))

barplot(table(cuts), xlab="Adjusted Close Price Intervals", ylab="Frequency", main="JPM")


boxplot(df$Volume ~ cuts, xlab="Adjusted Close Price Intervals", ylab="Volume", main="JPM")
```




**2**

```
N <- 1000000


x <- runif(N)
y <- runif(N)
z <- runif(N)


count <- sum(x^2 + y^2 + z^2 <= 1 & x >= 0 & y >= 0 & z >= 0)


vol <- 8 * count / N
volume <- vol * (4*pi/3)

print(volume)
```

```
## [1] 17.55592
```