Practice

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#Contants

```
#In built constant
pi
```

```
## [1] 3.141593
```

#Vectors

```
#Used like lists in python
#'c' means concatenation
v <- c(1, 5, 4, 1, 1, 2)
print(v)
```

```
## [1] 1 5 4 1 1 2
```

```
#To add a number across the vector
v1 <- v + 1000
print(v1)
```

```
## [1] 1001 1005 1004 1001 1001 1002
```

```
#To square all the numbers in the vector
v2 <- v^2
print(v2)
```

```
## [1]  1 25 16  1  1  4
```

```
#To inverse all the numbers in the vector
v3 <- 1/v
print(v3)
```

```
## [1] 1.00 0.20 0.25 1.00 1.00 0.50
```

#Ranges

```r
#R version of range() in python
1:9
```

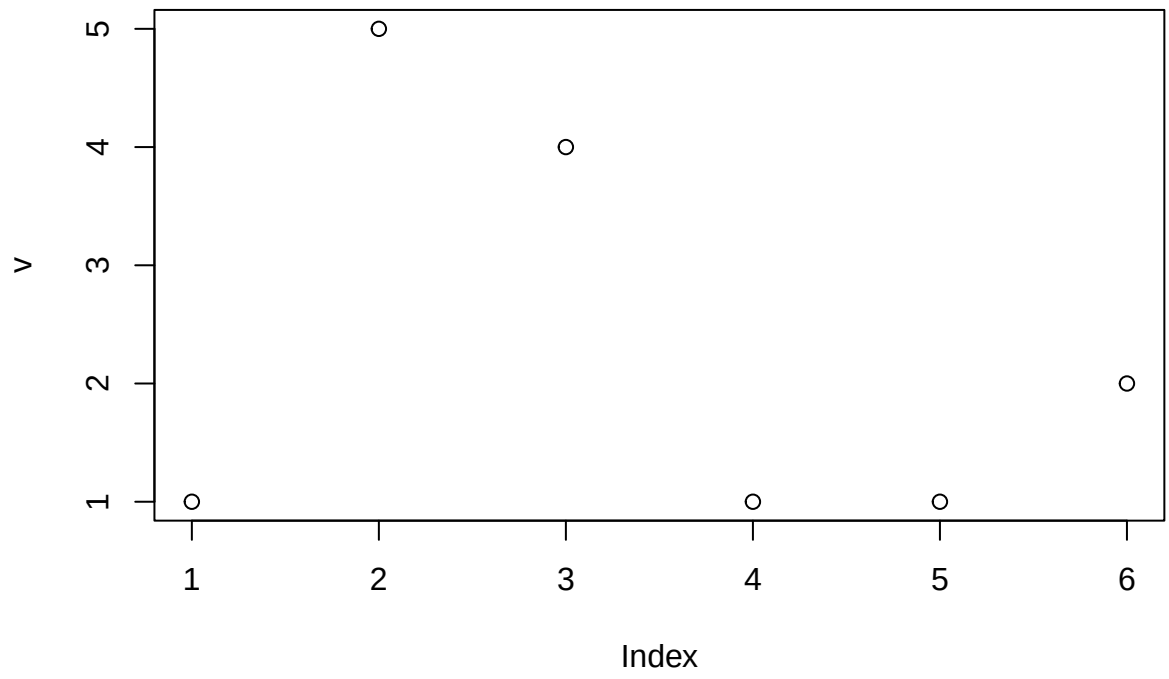
```
## [1] 1 2 3 4 5 6 7 8 9
```

```r
100:120
```

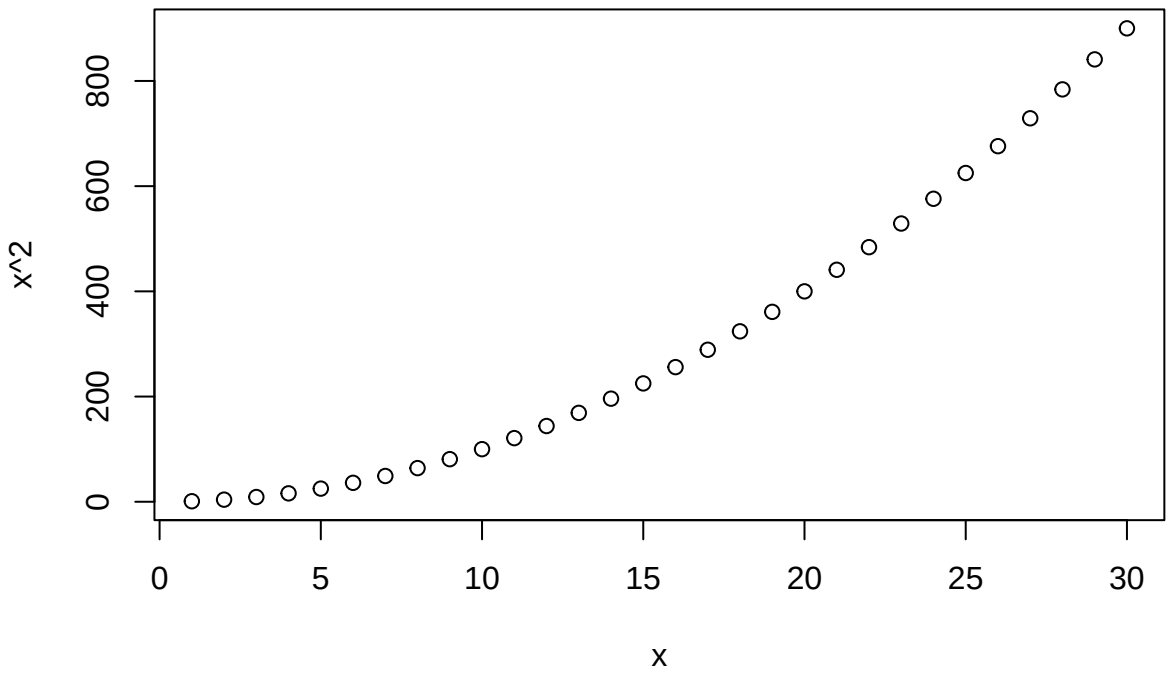
```
##  [1] 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118
## [20] 119 120
```

#Plots

```r
plot(v)
```




```r
x <- 1:30
plot(x, x^2)
```



#Data Analysis

```
mtcars #Prints whole data set
```

```
##                    mpg cyl  disp  hp drat    wt  qsec vs am gear carb
## Mazda RX4         21.0   6 160.0 110 3.90 2.620 16.46  0  1    4    4
## Mazda RX4 Wag     21.0   6 160.0 110 3.90 2.875 17.02  0  1    4    4
## Datsun 710        22.8   4 108.0  93 3.85 2.320 18.61  1  1    4    1
## Hornet 4 Drive    21.4   6 258.0 110 3.08 3.215 19.44  1  0    3    1
## Hornet Sportabout 18.7   8 360.0 175 3.15 3.440 17.02  0  0    3    2
## Valiant           18.1   6 225.0 105 2.76 3.460 20.22  1  0    3    1
## Duster 360        14.3   8 360.0 245 3.21 3.570 15.84  0  0    3    4
## Merc 240D         24.4   4 146.7  62 3.69 3.190 20.00  1  0    4    2
## Merc 230          22.8   4 140.8  95 3.92 3.150 22.90  1  0    4    2
## Merc 280          19.2   6 167.6 123 3.92 3.440 18.30  1  0    4    4
## Merc 280C         17.8   6 167.6 123 3.92 3.440 18.90  1  0    4    4
## Merc 450SE        16.4   8 275.8 180 3.07 4.070 17.40  0  0    3    3
## Merc 450SL        17.3   8 275.8 180 3.07 3.730 17.60  0  0    3    3
## Merc 450SLC       15.2   8 275.8 180 3.07 3.780 18.00  0  0    3    3
## Cadillac Fleetwood  10.4   8 472.0 205 2.93 5.250 17.98  0  0    3    4
## Lincoln Continental 10.4   8 460.0 215 3.00 5.424 17.82  0  0    3    4
## Chrysler Imperial   14.7   8 440.0 230 3.23 5.345 17.42  0  0    3    4
## Fiat 128          32.4   4  78.7  66 4.08 2.200 19.47  1  1    4    1
## Honda Civic       30.4   4  75.7  52 4.93 1.615 18.52  1  1    4    2
## Toyota Corolla    33.9   4  71.1  65 4.22 1.835 19.90  1  1    4    1
## Toyota Corona     21.5   4 120.1  97 3.70 2.465 20.01  1  0    3    1
```

```
## Dodge Challenger    15.5   8 318.0 150 2.76 3.520 16.87  0  0    3    2
## AMC Javelin         15.2   8 304.0 150 3.15 3.435 17.30  0  0    3    2
## Camaro Z28          13.3   8 350.0 245 3.73 3.840 15.41  0  0    3    4
## Pontiac Firebird    19.2   8 400.0 175 3.08 3.845 17.05  0  0    3    2
## Fiat X1-9           27.3   4  79.0  66 4.08 1.935 18.90  1  1    4    1
## Porsche 914-2       26.0   4 120.3  91 4.43 2.140 16.70  0  1    5    2
## Lotus Europa        30.4   4  95.1 113 3.77 1.513 16.90  1  1    5    2
## Ford Pantera L      15.8   8 351.0 264 4.22 3.170 14.50  0  1    5    4
## Ferrari Dino        19.7   6 145.0 175 3.62 2.770 15.50  0  1    5    6
## Maserati Bora       15.0   8 301.0 335 3.54 3.570 14.60  0  1    5    8
## Volvo 142E          21.4   4 121.0 109 4.11 2.780 18.60  1  1    4    2
```

```
head(mtcars) #Prints first 6 rows
```

```
##                   mpg cyl disp  hp drat    wt  qsec vs am gear carb
## Mazda RX4         21.0   6  160 110 3.90 2.620 16.46  0  1    4    4
## Mazda RX4 Wag     21.0   6  160 110 3.90 2.875 17.02  0  1    4    4
## Datsun 710        22.8   4  108  93 3.85 2.320 18.61  1  1    4    1
## Hornet 4 Drive    21.4   6  258 110 3.08 3.215 19.44  1  0    3    1
## Hornet Sportabout 18.7   8  360 175 3.15 3.440 17.02  0  0    3    2
## Valiant           18.1   6  225 105 2.76 3.460 20.22  1  0    3    1
```

```
tail(mtcars) #Prints last 6 rows
```

```
##                 mpg cyl  disp  hp drat    wt qsec vs am gear carb
## Porsche 914-2  26.0   4 120.3  91 4.43 2.140 16.7  0  1    5    2
## Lotus Europa   30.4   4  95.1 113 3.77 1.513 16.9  1  1    5    2
## Ford Pantera L 15.8   8 351.0 264 4.22 3.170 14.5  0  1    5    4
## Ferrari Dino   19.7   6 145.0 175 3.62 2.770 15.5  0  1    5    6
## Maserati Bora  15.0   8 301.0 335 3.54 3.570 14.6  0  1    5    8
## Volvo 142E     21.4   4 121.0 109 4.11 2.780 18.6  1  1    4    2
```

```
#Use '$' to get a column from a dataset
mtcars$mpg
```

```
##  [1] 21.0 21.0 22.8 21.4 18.7 18.1 14.3 24.4 22.8 19.2 17.8 16.4 17.3 15.2 10.4
## [16] 10.4 14.7 32.4 30.4 33.9 21.5 15.5 15.2 13.3 19.2 27.3 26.0 30.4 15.8 19.7
## [31] 15.0 21.4
```

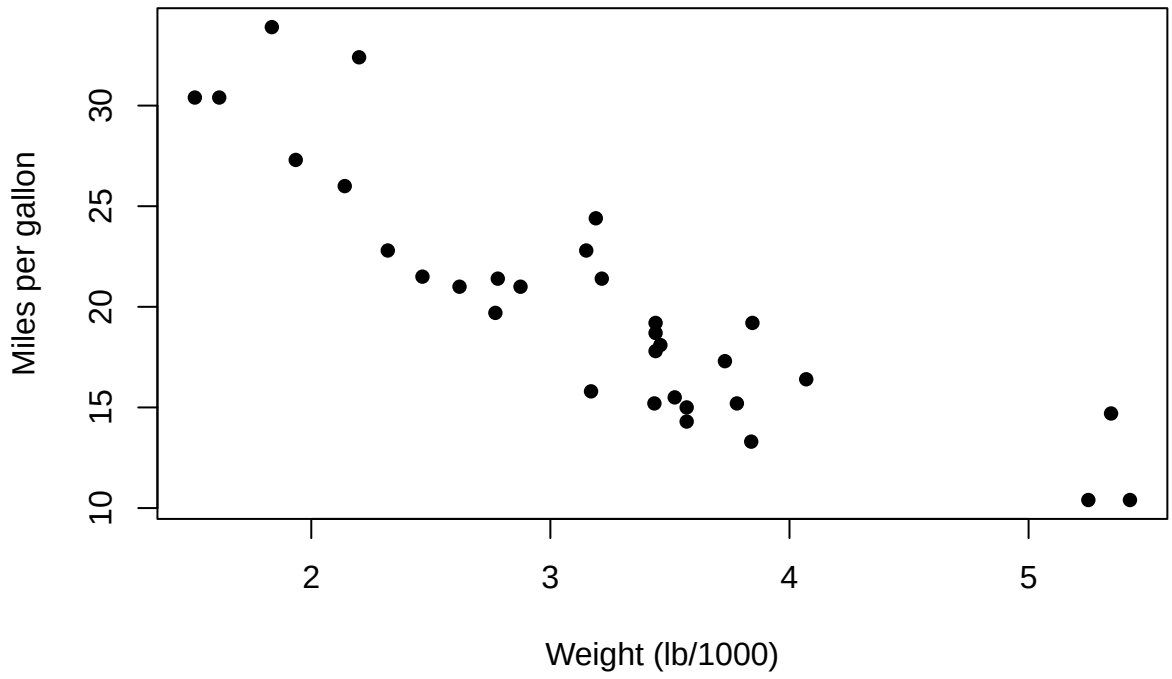
```
#You can also use '[]' to get columns
mtcars[,"mpg"] #by column name
```

```
##  [1] 21.0 21.0 22.8 21.4 18.7 18.1 14.3 24.4 22.8 19.2 17.8 16.4 17.3 15.2 10.4
## [16] 10.4 14.7 32.4 30.4 33.9 21.5 15.5 15.2 13.3 19.2 27.3 26.0 30.4 15.8 19.7
## [31] 15.0 21.4
```

```
mtcars[,1] #by column number
```

```
##  [1] 21.0 21.0 22.8 21.4 18.7 18.1 14.3 24.4 22.8 19.2 17.8 16.4 17.3 15.2 10.4
## [16] 10.4 14.7 32.4 30.4 33.9 21.5 15.5 15.2 13.3 19.2 27.3 26.0 30.4 15.8 19.7
## [31] 15.0 21.4
```

```r
plot(mtcars$wt, mtcars$mpg, xlab = "Weight (lb/1000)", ylab="Miles per gallon", pch=16)
```



#Frequency Tables

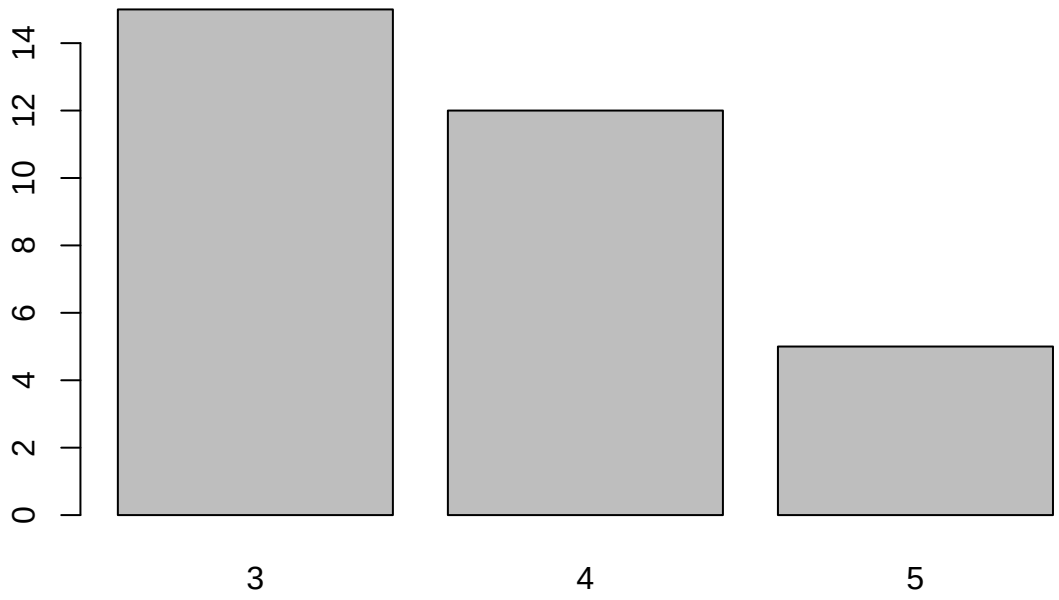
```r
table(mtcars$am) #Shows how many manual & automatic cars there are
```

```
##
##  0  1
## 19 13
```

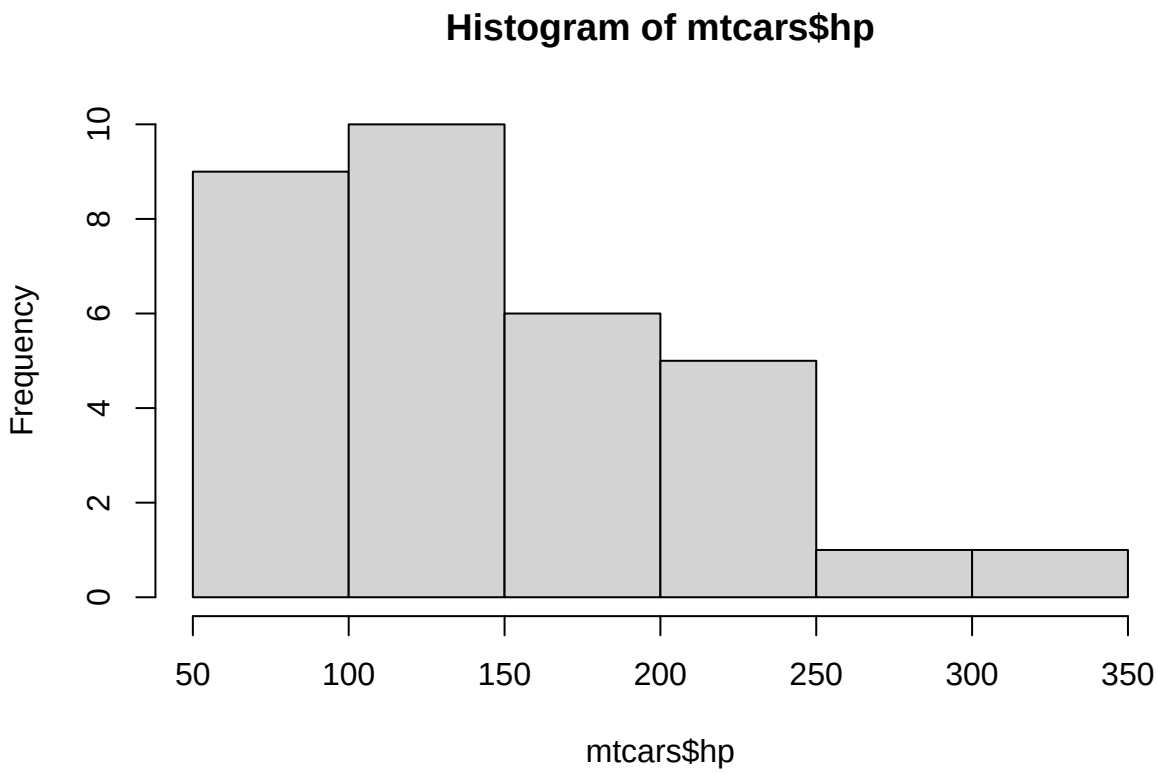
```r
#Show the freq of cars with 3,4,5 gears
gears <- table(mtcars$gear)
gears
```

```
##
##  3  4  5
## 15 12  5
```

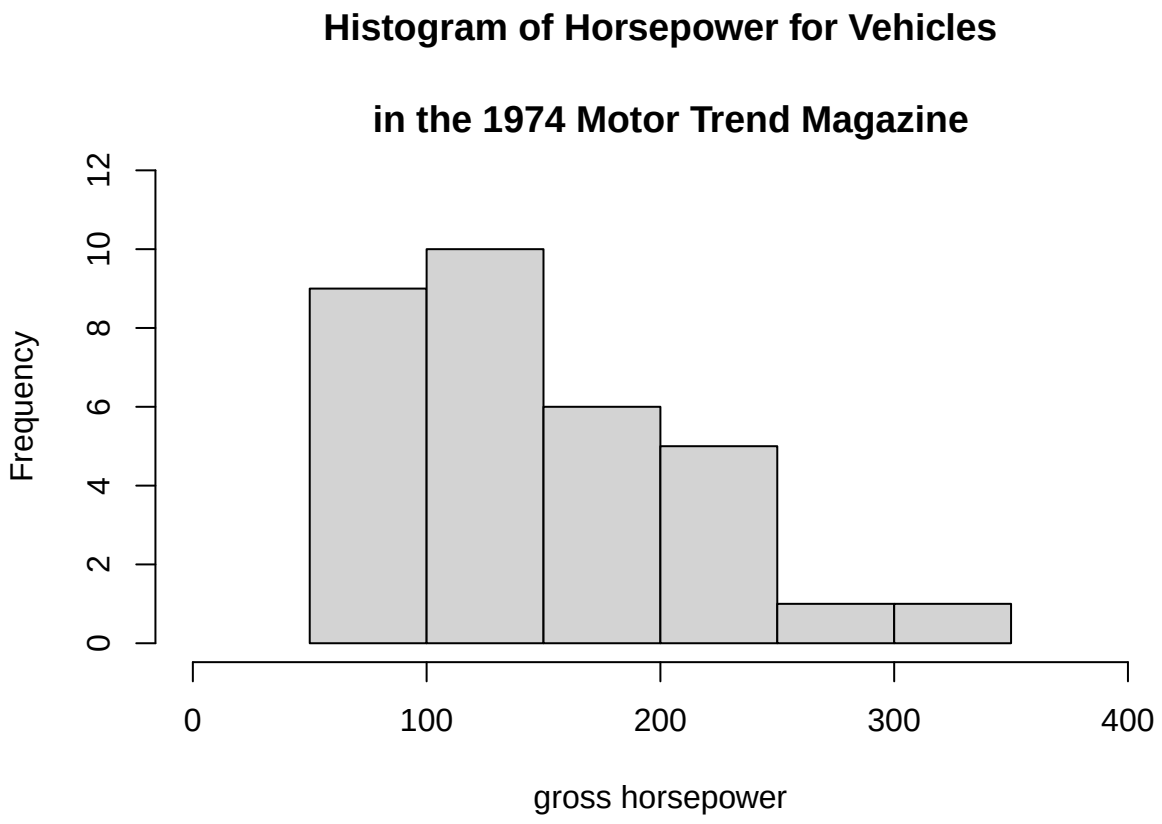
```r
barplot(gears)
```



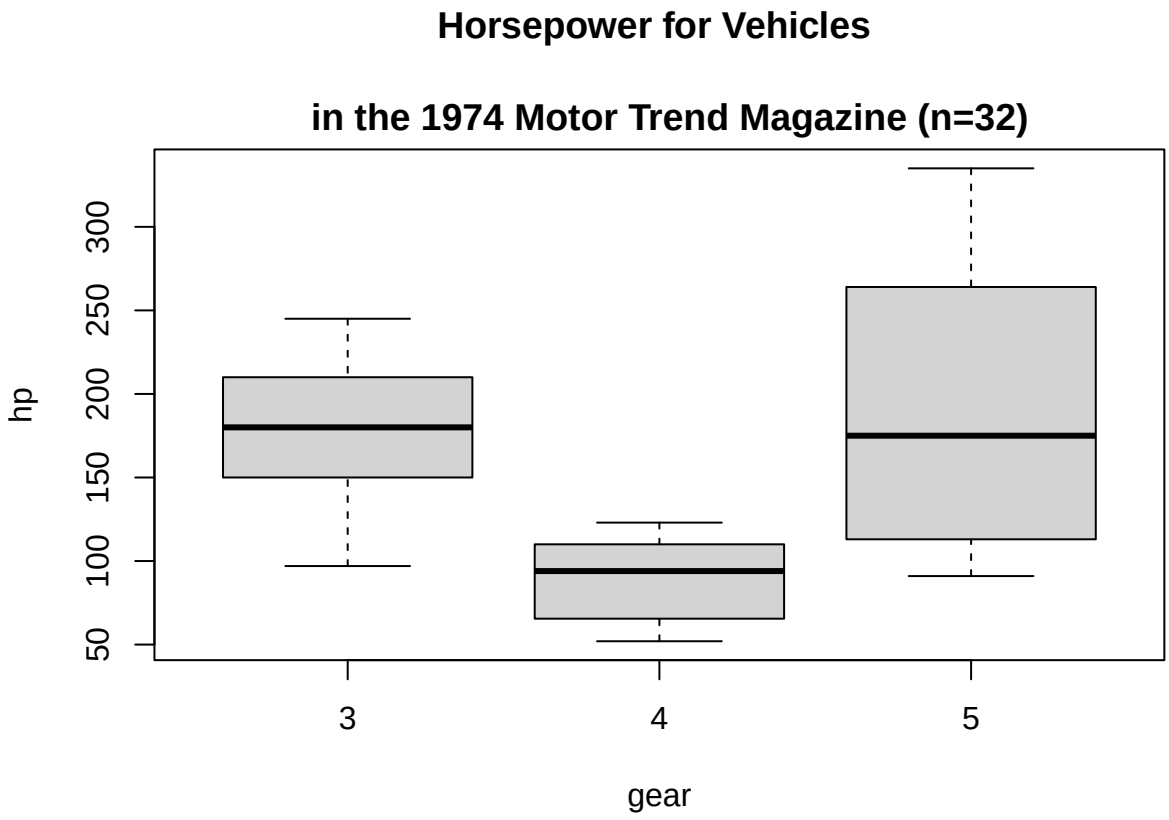

```
hist(mtcars$hp)
```




```
hist(
  mtcars$hp, xlab="gross horsepower",
  main = "Histogram of Horsepower for Vehicles\n
  in the 1974 Motor Trend Magazine",
  ylim = c(0, 12), xlim = c(0, 400)
  )
```




```
boxplot(
  hp~gear,
  data=mtcars,
  main="Horsepower for Vehicles \n
  in the 1974 Motor Trend Magazine (n=32)"
  )
```



#Further Work

```
#There are 31 trees in the dataset
trees
```

```
##    Girth Height Volume
## 1    8.3     70   10.3
## 2    8.6     65   10.3
## 3    8.8     63   10.2
## 4   10.5     72   16.4
## 5   10.7     81   18.8
## 6   10.8     83   19.7
## 7   11.0     66   15.6
## 8   11.0     75   18.2
## 9   11.1     80   22.6
## 10  11.2     75   19.9
## 11  11.3     79   24.2
## 12  11.4     76   21.0
## 13  11.4     76   21.4
## 14  11.7     69   21.3
## 15  12.0     75   19.1
## 16  12.9     74   22.2
## 17  12.9     85   33.8
## 18  13.3     86   27.4
## 19  13.7     71   25.7
## 20  13.8     64   24.9
```

```
## 21  14.0     78   34.5
## 22  14.2     80   31.7
## 23  14.5     74   36.3
## 24  16.0     72   38.3
## 25  16.3     77   42.6
## 26  17.3     81   55.4
## 27  17.5     82   55.7
## 28  17.9     80   58.3
## 29  18.0     80   51.5
## 30  18.0     80   51.0
## 31  20.6     87   77.0
```

```
summary(trees)
```

```
##      Girth           Height       Volume
##  Min.   : 8.30   Min.   :63   Min.   :10.20
##  1st Qu.:11.05   1st Qu.:72   1st Qu.:19.40
##  Median :12.90   Median :76   Median :24.20
##  Mean   :13.25   Mean   :76   Mean   :30.17
##  3rd Qu.:15.25   3rd Qu.:80   3rd Qu.:37.30
##  Max.   :20.60   Max.   :87   Max.   :77.00
```

```
maxGirth <- max(trees$Girth)
minGirth <- min(trees$Girth)
cat("Girth ranges from", minGirth, "to", maxGirth)
```

```
## Girth ranges from 8.3 to 20.6
```

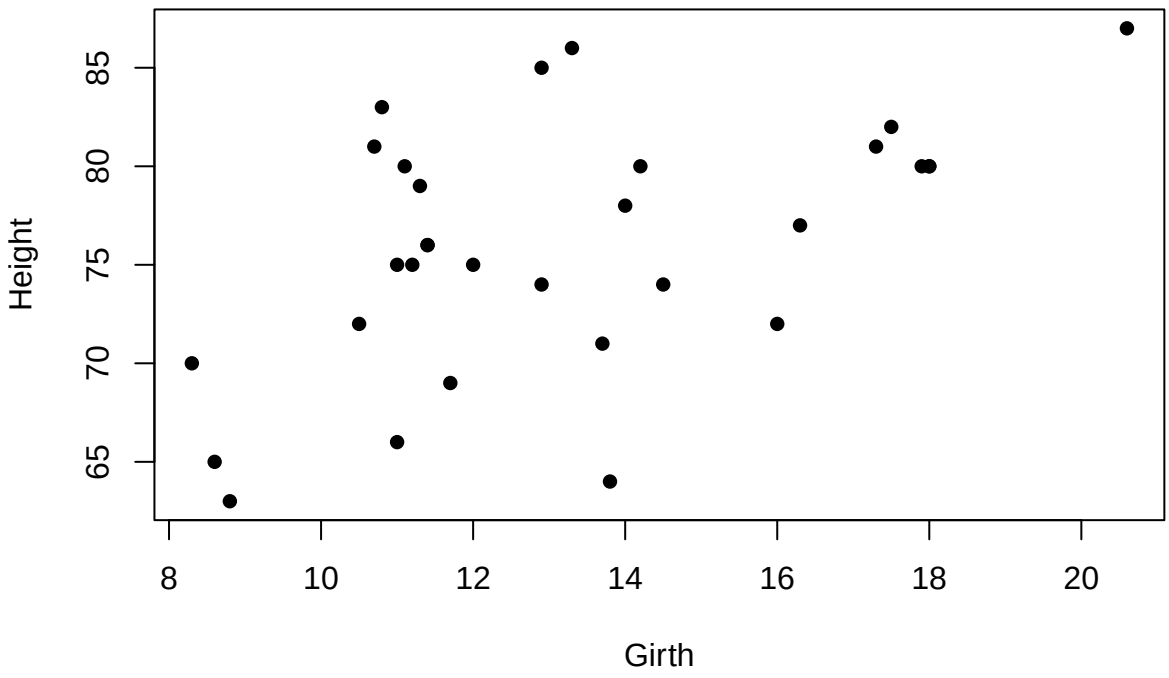
```
maxHeight <- max(trees$Height)
minHeight <- min(trees$Height)
cat("Height ranges from", minHeight, "to", maxHeight)
```

```
## Height ranges from 63 to 87
```

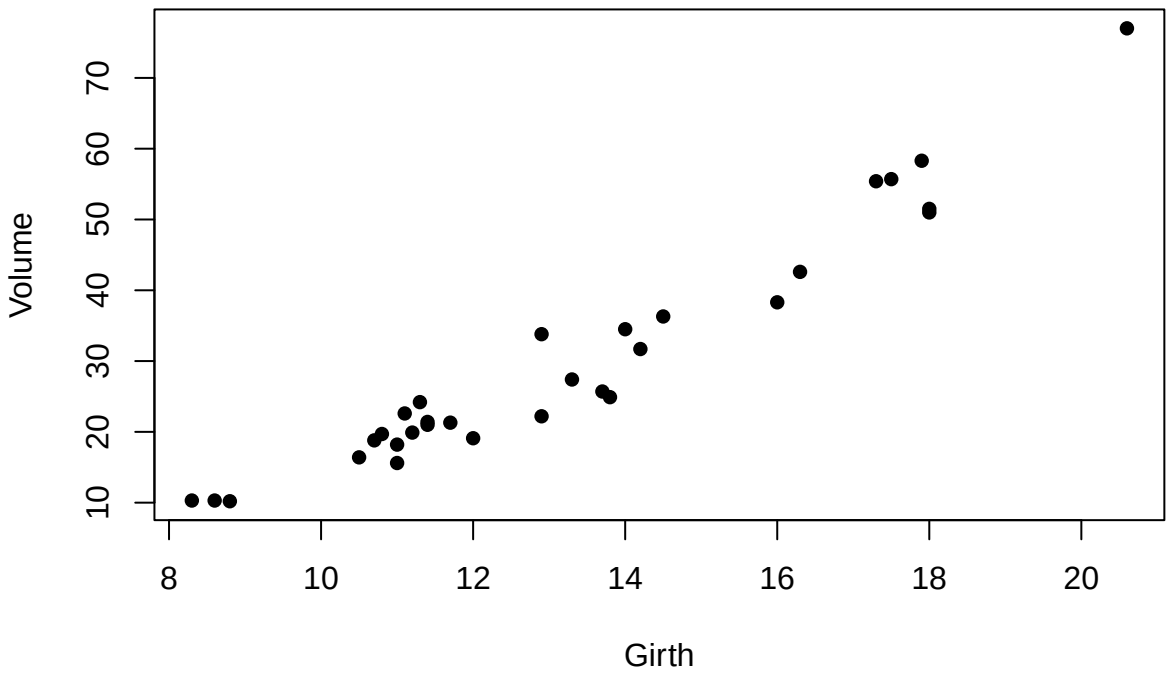
```
maxVolume <- max(trees$Volume)
minVolume <- min(trees$Volume)
cat("Volume ranges from", minVolume, "to", maxVolume)
```

```
## Volume ranges from 10.2 to 77
```

```
plot(trees$Girth, trees$Height, xlab = "Girth", ylab="Height", pch=16)
```




```
plot(trees$Girth, trees$Volume, xlab = "Girth", ylab="Volume", pch=16)
```


Volume
10
20
30
40
50
60
70
8
10
12
14
16
18
20
Girth