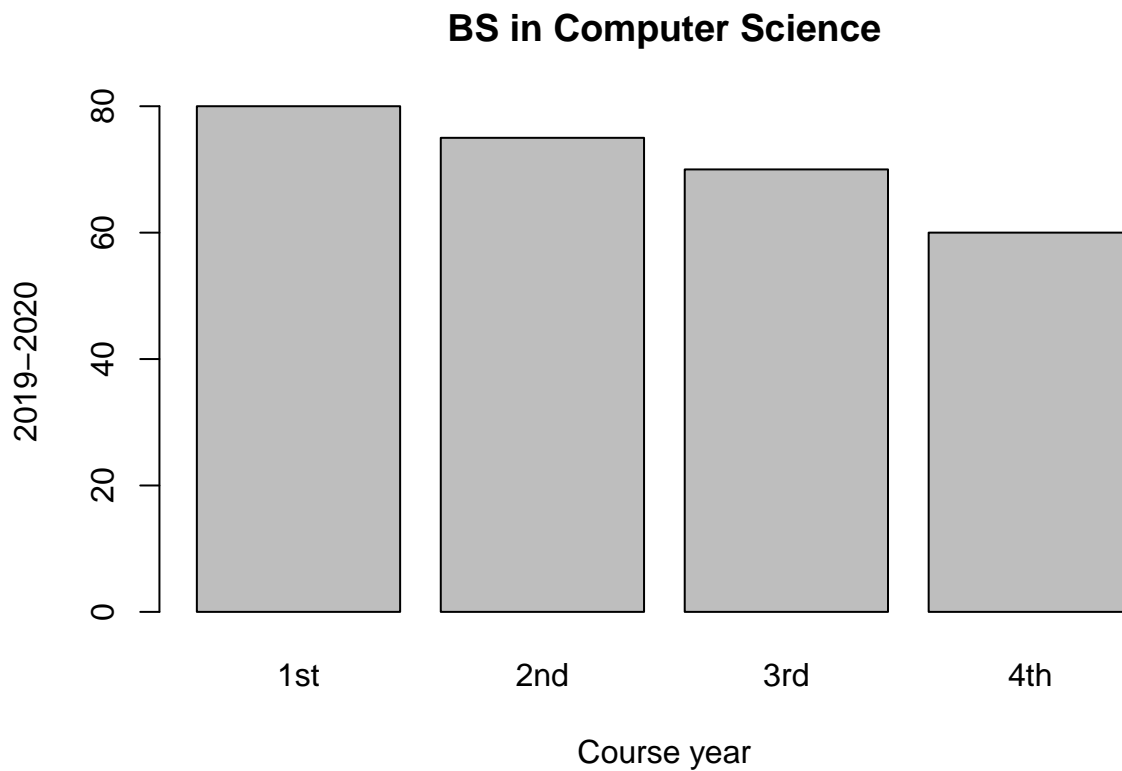# WORKSHEET #5

Ann Erika D. Gabales

2022-11-27

1. The table shows the enrollment of BS in Compter Science, SY 2010-2011.

a. Plot the data using a bar graph. Write the codes and copy the result.

```r
Enrollment <-c(80,75,70,60)
barplot(Enrollment,
        main="BS in Computer Science",
        xlab="Course year",
        ylab="2019-2020",
        names.arg = c("1st", "2nd", "3rd", "4th"))
```


b. Using the same table, label the barchart with
Title = " Enrollment of BS Computer Science
horizontal axis = "Curriculum Year" *and*

1

vertical axis = "number of students"

```
Enrollment <-c(80,75,70,60)
barplot(Enrollment,
        main="Enrollment of BS Computer Science",
        xlab="Curriculum Year",
        ylab="number of students",
        names.arg = c("1st", "2nd", "3rd", "4th"),)
```

Enrollment of BS Computer Science
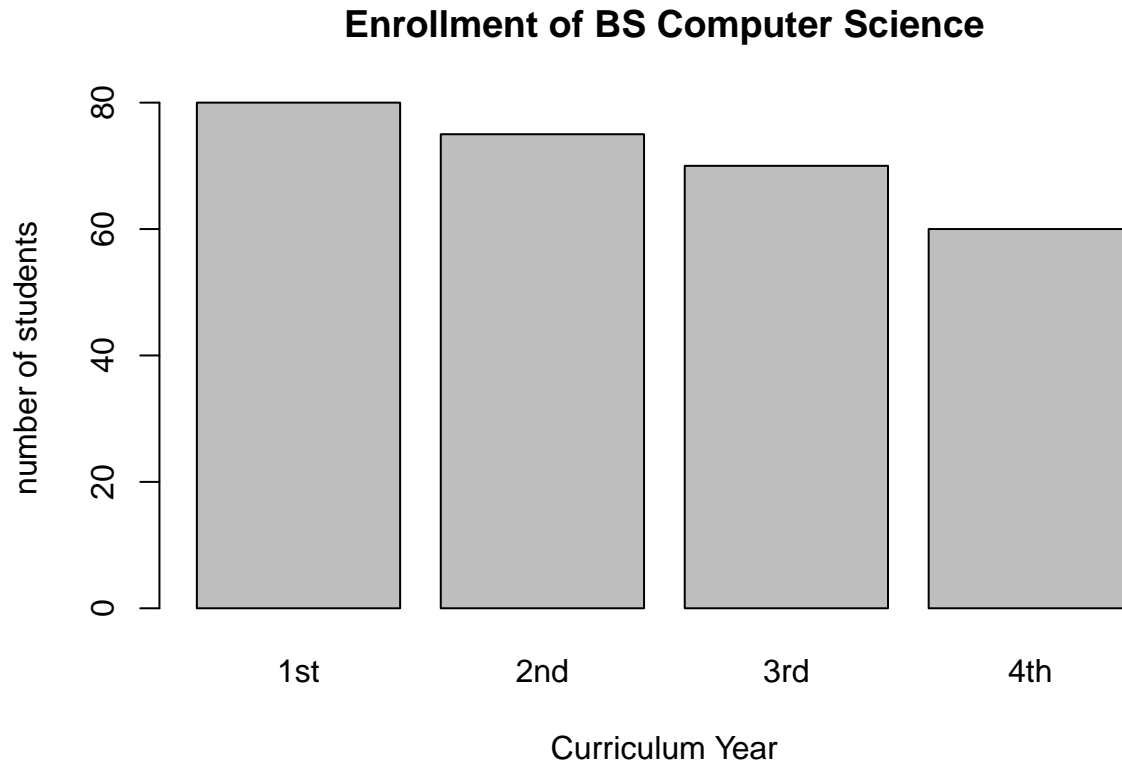
2. The monthly income of De Jesus family was spent on the following: **60% on Food, 10% on electricity, 5% for savings, and**
25% for other miscellaneous expenses.
a. Create a table for the above scenario. Write the codes and its result.

```
library(scales)
```

```
## Warning: package 'scales' was built under R version 4.2.2
```

```
spent <- c(0.6,0.1,0.05,0.25)

data <- matrix(percent(spent), ncol = 1)
rownames(data) <- c("Food", "Electricity","Savings", "other expenses")
colnames(data) <- c("Spent")

final=as.table(data)
final
```

```
##              Spent
## Food          60%
## Electricity   10%
## Savings       5%
## other expenses 25%
```

b. Plot the data using a pie chart. Add labels, colors and legend. Write the codes and its result.

```r
spent <- c(60, 10, 5, 25)

spent_labels <- round(spent/sum(spent) * 100, 1)
spent_labels <- paste(spent_labels, "%", sep = "")

pie(spent,
    main = "Miscellaneous",
    col = rainbow(length(spent)),
    labels = spent_labels,
    cex = 0.8)
legend(1.5, 0.5, c("Food","Electricity","Savings","Other expenses"),
       cex = 0.8, fill = rainbow((length(spent))))
```

Miscellaneous
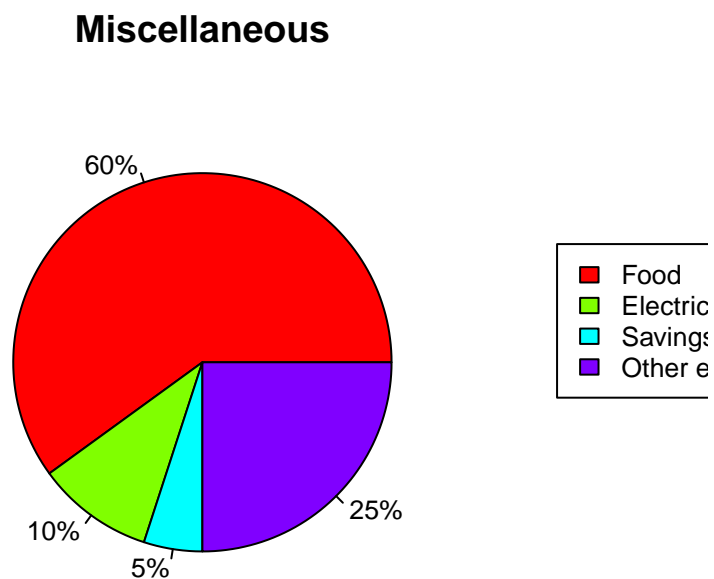
3. Open the mtcars dataset.

```r
data("mtcars")
head(mtcars)
```

3

```
##                    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
```

a. Create a simple histogram specifically for mpg (miles per gallon) variable. Use $ to select the mpg only. Write the codes and its result.

```
hist(mtcars$mpg)
```


Histogram of mtcars$mpg
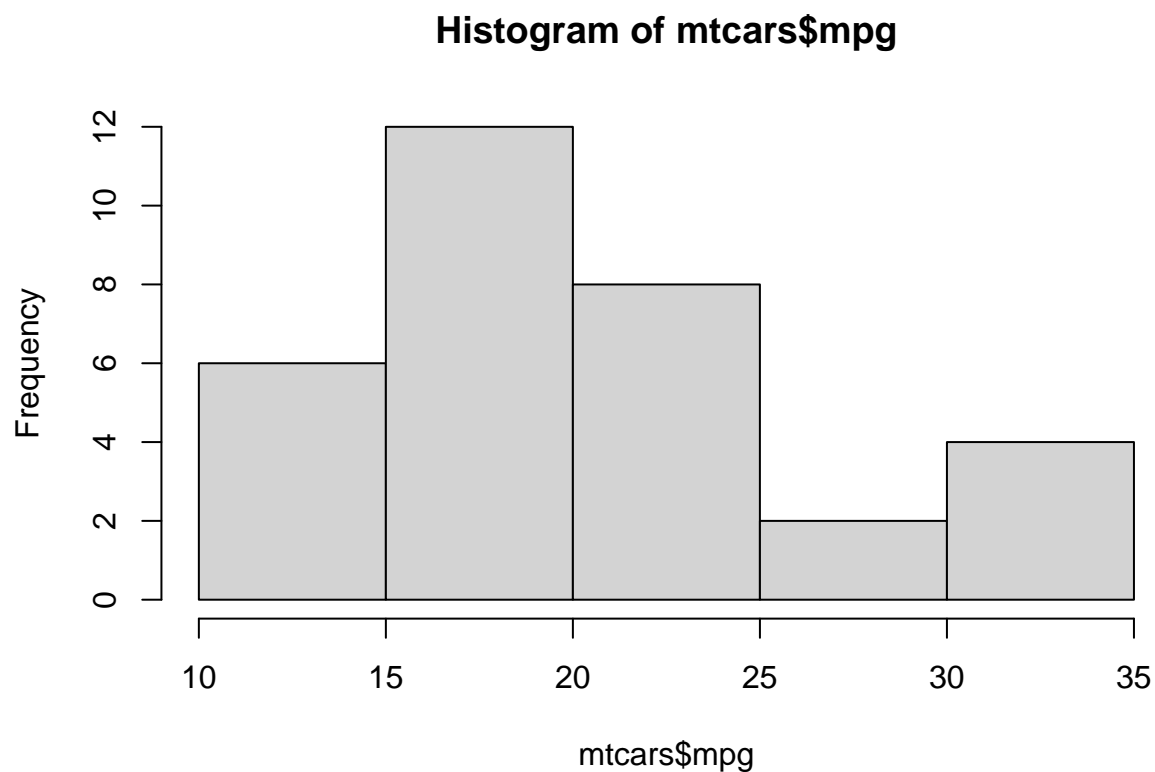
b. Colored histogram with different number of bins.

```
hist(mtcars$mpg, breaks=12, col="red")
```

Histogram of mtcars$mpg
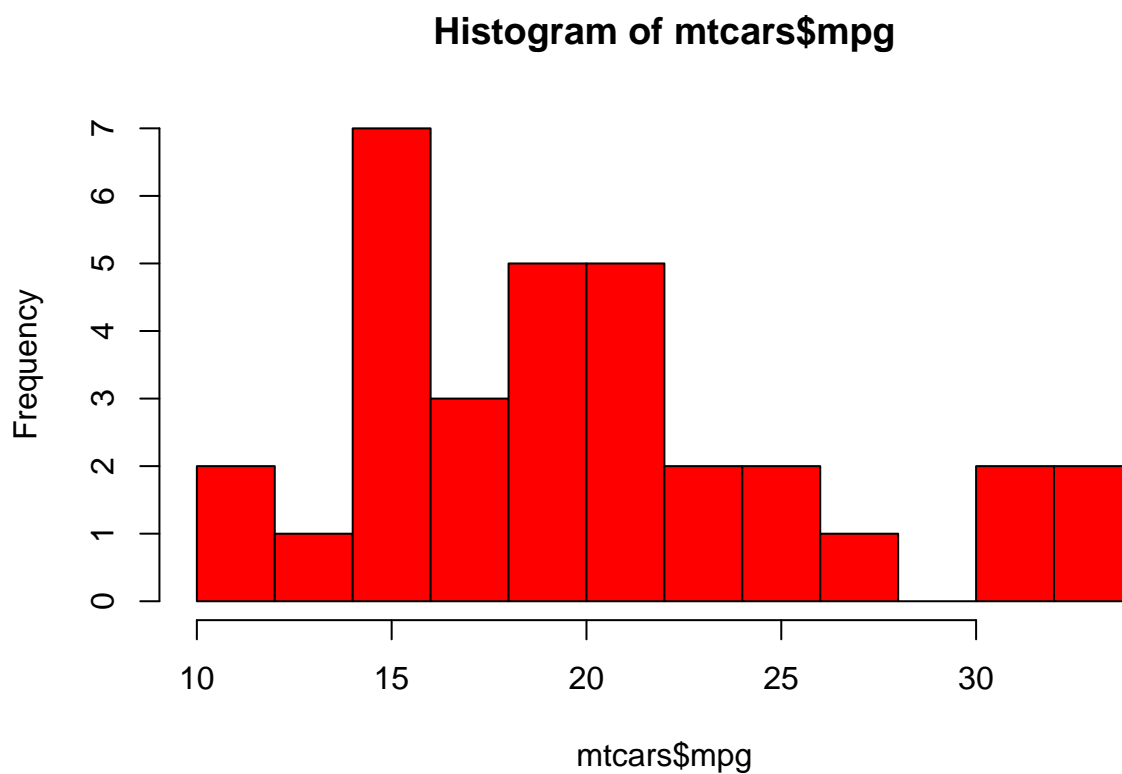
c.Add a Normal Curve. Copy the result.

```
x <- mtcars$mpg
h<-hist(x, breaks=10, col="red", xlab="Miles Per Gallon",
        main="Histogram with Normal Curve")
xfit<-seq(min(x),max(x),length=40)
yfit<-dnorm(xfit,mean=mean(x),sd=sd(x))
yfit <- yfit*diff(h$mids[1:2])*length(x)
lines(xfit, yfit, col="blue", lwd=2)
```

Histogram with Normal Curve
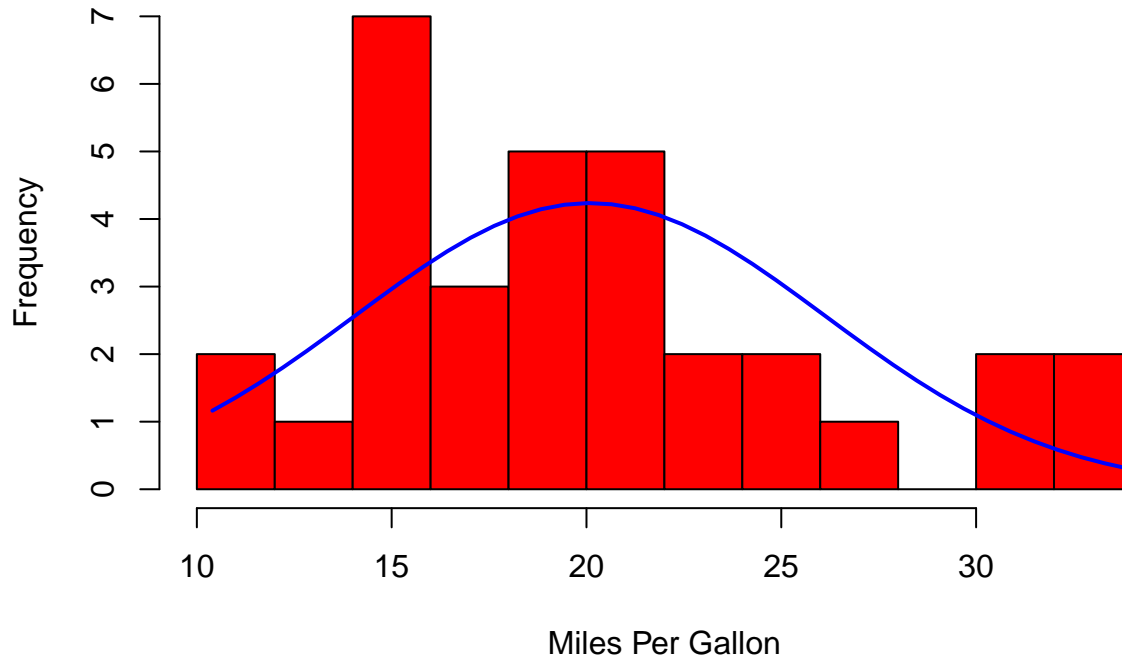
4. Open the iris dataset. Create a subset for each species.

```
data("iris")
force(iris)
```

```
##    Sepal.Length Sepal.Width Petal.Length Petal.Width  Species
## 1           5.1         3.5          1.4         0.2   setosa
## 2           4.9         3.0          1.4         0.2   setosa
## 3           4.7         3.2          1.3         0.2   setosa
## 4           4.6         3.1          1.5         0.2   setosa
## 5           5.0         3.6          1.4         0.2   setosa
## 6           5.4         3.9          1.7         0.4   setosa
## 7           4.6         3.4          1.4         0.3   setosa
## 8           5.0         3.4          1.5         0.2   setosa
## 9           4.4         2.9          1.4         0.2   setosa
## 10          4.9         3.1          1.5         0.1   setosa
## 11          5.4         3.7          1.5         0.2   setosa
## 12          4.8         3.4          1.6         0.2   setosa
## 13          4.8         3.0          1.4         0.1   setosa
## 14          4.3         3.0          1.1         0.1   setosa
## 15          5.8         4.0          1.2         0.2   setosa
## 16          5.7         4.4          1.5         0.4   setosa
## 17          5.4         3.9          1.3         0.4   setosa
## 18          5.1         3.5          1.4         0.3   setosa
## 19          5.7         3.8          1.7         0.3   setosa
## 20          5.1         3.8          1.5         0.3   setosa
## 21          5.4         3.4          1.7         0.2   setosa
```

```
## 22           5.1         3.7         1.5         0.4       setosa
## 23           4.6         3.6         1.0         0.2       setosa
## 24           5.1         3.3         1.7         0.5       setosa
## 25           4.8         3.4         1.9         0.2       setosa
## 26           5.0         3.0         1.6         0.2       setosa
## 27           5.0         3.4         1.6         0.4       setosa
## 28           5.2         3.5         1.5         0.2       setosa
## 29           5.2         3.4         1.4         0.2       setosa
## 30           4.7         3.2         1.6         0.2       setosa
## 31           4.8         3.1         1.6         0.2       setosa
## 32           5.4         3.4         1.5         0.4       setosa
## 33           5.2         4.1         1.5         0.1       setosa
## 34           5.5         4.2         1.4         0.2       setosa
## 35           4.9         3.1         1.5         0.2       setosa
## 36           5.0         3.2         1.2         0.2       setosa
## 37           5.5         3.5         1.3         0.2       setosa
## 38           4.9         3.6         1.4         0.1       setosa
## 39           4.4         3.0         1.3         0.2       setosa
## 40           5.1         3.4         1.5         0.2       setosa
## 41           5.0         3.5         1.3         0.3       setosa
## 42           4.5         2.3         1.3         0.3       setosa
## 43           4.4         3.2         1.3         0.2       setosa
## 44           5.0         3.5         1.6         0.6       setosa
## 45           5.1         3.8         1.9         0.4       setosa
## 46           4.8         3.0         1.4         0.3       setosa
## 47           5.1         3.8         1.6         0.2       setosa
## 48           4.6         3.2         1.4         0.2       setosa
## 49           5.3         3.7         1.5         0.2       setosa
## 50           5.0         3.3         1.4         0.2       setosa
## 51           7.0         3.2         4.7         1.4 versicolor
## 52           6.4         3.2         4.5         1.5 versicolor
## 53           6.9         3.1         4.9         1.5 versicolor
## 54           5.5         2.3         4.0         1.3 versicolor
## 55           6.5         2.8         4.6         1.5 versicolor
## 56           5.7         2.8         4.5         1.3 versicolor
## 57           6.3         3.3         4.7         1.6 versicolor
## 58           4.9         2.4         3.3         1.0 versicolor
## 59           6.6         2.9         4.6         1.3 versicolor
## 60           5.2         2.7         3.9         1.4 versicolor
## 61           5.0         2.0         3.5         1.0 versicolor
## 62           5.9         3.0         4.2         1.5 versicolor
## 63           6.0         2.2         4.0         1.0 versicolor
## 64           6.1         2.9         4.7         1.4 versicolor
## 65           5.6         2.9         3.6         1.3 versicolor
## 66           6.7         3.1         4.4         1.4 versicolor
## 67           5.6         3.0         4.5         1.5 versicolor
## 68           5.8         2.7         4.1         1.0 versicolor
## 69           6.2         2.2         4.5         1.5 versicolor
## 70           5.6         2.5         3.9         1.1 versicolor
## 71           5.9         3.2         4.8         1.8 versicolor
## 72           6.1         2.8         4.0         1.3 versicolor
## 73           6.3         2.5         4.9         1.5 versicolor
## 74           6.1         2.8         4.7         1.2 versicolor
## 75           6.4         2.9         4.3         1.3 versicolor
```

```
## 76            6.6            3.0            4.4            1.4 versicolor
## 77            6.8            2.8            4.8            1.4 versicolor
## 78            6.7            3.0            5.0            1.7 versicolor
## 79            6.0            2.9            4.5            1.5 versicolor
## 80            5.7            2.6            3.5            1.0 versicolor
## 81            5.5            2.4            3.8            1.1 versicolor
## 82            5.5            2.4            3.7            1.0 versicolor
## 83            5.8            2.7            3.9            1.2 versicolor
## 84            6.0            2.7            5.1            1.6 versicolor
## 85            5.4            3.0            4.5            1.5 versicolor
## 86            6.0            3.4            4.5            1.6 versicolor
## 87            6.7            3.1            4.7            1.5 versicolor
## 88            6.3            2.3            4.4            1.3 versicolor
## 89            5.6            3.0            4.1            1.3 versicolor
## 90            5.5            2.5            4.0            1.3 versicolor
## 91            5.5            2.6            4.4            1.2 versicolor
## 92            6.1            3.0            4.6            1.4 versicolor
## 93            5.8            2.6            4.0            1.2 versicolor
## 94            5.0            2.3            3.3            1.0 versicolor
## 95            5.6            2.7            4.2            1.3 versicolor
## 96            5.7            3.0            4.2            1.2 versicolor
## 97            5.7            2.9            4.2            1.3 versicolor
## 98            6.2            2.9            4.3            1.3 versicolor
## 99            5.1            2.5            3.0            1.1 versicolor
## 100           5.7            2.8            4.1            1.3 versicolor
## 101           6.3            3.3            6.0            2.5  virginica
## 102           5.8            2.7            5.1            1.9  virginica
## 103           7.1            3.0            5.9            2.1  virginica
## 104           6.3            2.9            5.6            1.8  virginica
## 105           6.5            3.0            5.8            2.2  virginica
## 106           7.6            3.0            6.6            2.1  virginica
## 107           4.9            2.5            4.5            1.7  virginica
## 108           7.3            2.9            6.3            1.8  virginica
## 109           6.7            2.5            5.8            1.8  virginica
## 110           7.2            3.6            6.1            2.5  virginica
## 111           6.5            3.2            5.1            2.0  virginica
## 112           6.4            2.7            5.3            1.9  virginica
## 113           6.8            3.0            5.5            2.1  virginica
## 114           5.7            2.5            5.0            2.0  virginica
## 115           5.8            2.8            5.1            2.4  virginica
## 116           6.4            3.2            5.3            2.3  virginica
## 117           6.5            3.0            5.5            1.8  virginica
## 118           7.7            3.8            6.7            2.2  virginica
## 119           7.7            2.6            6.9            2.3  virginica
## 120           6.0            2.2            5.0            1.5  virginica
## 121           6.9            3.2            5.7            2.3  virginica
## 122           5.6            2.8            4.9            2.0  virginica
## 123           7.7            2.8            6.7            2.0  virginica
## 124           6.3            2.7            4.9            1.8  virginica
## 125           6.7            3.3            5.7            2.1  virginica
## 126           7.2            3.2            6.0            1.8  virginica
## 127           6.2            2.8            4.8            1.8  virginica
## 128           6.1            3.0            4.9            1.8  virginica
## 129           6.4            2.8            5.6            2.1  virginica
```

```
## 130            7.2            3.0            5.8            1.6  virginica
## 131            7.4            2.8            6.1            1.9  virginica
## 132            7.9            3.8            6.4            2.0  virginica
## 133            6.4            2.8            5.6            2.2  virginica
## 134            6.3            2.8            5.1            1.5  virginica
## 135            6.1            2.6            5.6            1.4  virginica
## 136            7.7            3.0            6.1            2.3  virginica
## 137            6.3            3.4            5.6            2.4  virginica
## 138            6.4            3.1            5.5            1.8  virginica
## 139            6.0            3.0            4.8            1.8  virginica
## 140            6.9            3.1            5.4            2.1  virginica
## 141            6.7            3.1            5.6            2.4  virginica
## 142            6.9            3.1            5.1            2.3  virginica
## 143            5.8            2.7            5.1            1.9  virginica
## 144            6.8            3.2            5.9            2.3  virginica
## 145            6.7            3.3            5.7            2.5  virginica
## 146            6.7            3.0            5.2            2.3  virginica
## 147            6.3            2.5            5.0            1.9  virginica
## 148            6.5            3.0            5.2            2.0  virginica
## 149            6.2            3.4            5.4            2.3  virginica
## 150            5.9            3.0            5.1            1.8  virginica
```

a. *Write the codes and its result.*

```
set_iris <- subset(iris, Species == "setosa")
set_iris
```

```
##    Sepal.Length Sepal.Width Petal.Length Petal.Width Species
## 1           5.1         3.5          1.4         0.2  setosa
## 2           4.9         3.0          1.4         0.2  setosa
## 3           4.7         3.2          1.3         0.2  setosa
## 4           4.6         3.1          1.5         0.2  setosa
## 5           5.0         3.6          1.4         0.2  setosa
## 6           5.4         3.9          1.7         0.4  setosa
## 7           4.6         3.4          1.4         0.3  setosa
## 8           5.0         3.4          1.5         0.2  setosa
## 9           4.4         2.9          1.4         0.2  setosa
## 10          4.9         3.1          1.5         0.1  setosa
## 11          5.4         3.7          1.5         0.2  setosa
## 12          4.8         3.4          1.6         0.2  setosa
## 13          4.8         3.0          1.4         0.1  setosa
## 14          4.3         3.0          1.1         0.1  setosa
## 15          5.8         4.0          1.2         0.2  setosa
## 16          5.7         4.4          1.5         0.4  setosa
## 17          5.4         3.9          1.3         0.4  setosa
## 18          5.1         3.5          1.4         0.3  setosa
## 19          5.7         3.8          1.7         0.3  setosa
## 20          5.1         3.8          1.5         0.3  setosa
## 21          5.4         3.4          1.7         0.2  setosa
## 22          5.1         3.7          1.5         0.4  setosa
## 23          4.6         3.6          1.0         0.2  setosa
## 24          5.1         3.3          1.7         0.5  setosa
## 25          4.8         3.4          1.9         0.2  setosa
```

```
## 26          5.0          3.0          1.6          0.2  setosa
## 27          5.0          3.4          1.6          0.4  setosa
## 28          5.2          3.5          1.5          0.2  setosa
## 29          5.2          3.4          1.4          0.2  setosa
## 30          4.7          3.2          1.6          0.2  setosa
## 31          4.8          3.1          1.6          0.2  setosa
## 32          5.4          3.4          1.5          0.4  setosa
## 33          5.2          4.1          1.5          0.1  setosa
## 34          5.5          4.2          1.4          0.2  setosa
## 35          4.9          3.1          1.5          0.2  setosa
## 36          5.0          3.2          1.2          0.2  setosa
## 37          5.5          3.5          1.3          0.2  setosa
## 38          4.9          3.6          1.4          0.1  setosa
## 39          4.4          3.0          1.3          0.2  setosa
## 40          5.1          3.4          1.5          0.2  setosa
## 41          5.0          3.5          1.3          0.3  setosa
## 42          4.5          2.3          1.3          0.3  setosa
## 43          4.4          3.2          1.3          0.2  setosa
## 44          5.0          3.5          1.6          0.6  setosa
## 45          5.1          3.8          1.9          0.4  setosa
## 46          4.8          3.0          1.4          0.3  setosa
## 47          5.1          3.8          1.6          0.2  setosa
## 48          4.6          3.2          1.4          0.2  setosa
## 49          5.3          3.7          1.5          0.2  setosa
## 50          5.0          3.3          1.4          0.2  setosa
```

```
ver_iris <- subset(iris, Species == "versicolor")
ver_iris
```

```
##     Sepal.Length Sepal.Width Petal.Length Petal.Width    Species
## 51          7.0          3.2          4.7          1.4 versicolor
## 52          6.4          3.2          4.5          1.5 versicolor
## 53          6.9          3.1          4.9          1.5 versicolor
## 54          5.5          2.3          4.0          1.3 versicolor
## 55          6.5          2.8          4.6          1.5 versicolor
## 56          5.7          2.8          4.5          1.3 versicolor
## 57          6.3          3.3          4.7          1.6 versicolor
## 58          4.9          2.4          3.3          1.0 versicolor
## 59          6.6          2.9          4.6          1.3 versicolor
## 60          5.2          2.7          3.9          1.4 versicolor
## 61          5.0          2.0          3.5          1.0 versicolor
## 62          5.9          3.0          4.2          1.5 versicolor
## 63          6.0          2.2          4.0          1.0 versicolor
## 64          6.1          2.9          4.7          1.4 versicolor
## 65          5.6          2.9          3.6          1.3 versicolor
## 66          6.7          3.1          4.4          1.4 versicolor
## 67          5.6          3.0          4.5          1.5 versicolor
## 68          5.8          2.7          4.1          1.0 versicolor
## 69          6.2          2.2          4.5          1.5 versicolor
## 70          5.6          2.5          3.9          1.1 versicolor
## 71          5.9          3.2          4.8          1.8 versicolor
## 72          6.1          2.8          4.0          1.3 versicolor
## 73          6.3          2.5          4.9          1.5 versicolor
## 74          6.1          2.8          4.7          1.2 versicolor
```

```
## 75            6.4           2.9            4.3                  1.3 versicolor
## 76            6.6           3.0            4.4                  1.4 versicolor
## 77            6.8           2.8            4.8                  1.4 versicolor
## 78            6.7           3.0            5.0                  1.7 versicolor
## 79            6.0           2.9            4.5                  1.5 versicolor
## 80            5.7           2.6            3.5                  1.0 versicolor
## 81            5.5           2.4            3.8                  1.1 versicolor
## 82            5.5           2.4            3.7                  1.0 versicolor
## 83            5.8           2.7            3.9                  1.2 versicolor
## 84            6.0           2.7            5.1                  1.6 versicolor
## 85            5.4           3.0            4.5                  1.5 versicolor
## 86            6.0           3.4            4.5                  1.6 versicolor
## 87            6.7           3.1            4.7                  1.5 versicolor
## 88            6.3           2.3            4.4                  1.3 versicolor
## 89            5.6           3.0            4.1                  1.3 versicolor
## 90            5.5           2.5            4.0                  1.3 versicolor
## 91            5.5           2.6            4.4                  1.2 versicolor
## 92            6.1           3.0            4.6                  1.4 versicolor
## 93            5.8           2.6            4.0                  1.2 versicolor
## 94            5.0           2.3            3.3                  1.0 versicolor
## 95            5.6           2.7            4.2                  1.3 versicolor
## 96            5.7           3.0            4.2                  1.2 versicolor
## 97            5.7           2.9            4.2                  1.3 versicolor
## 98            6.2           2.9            4.3                  1.3 versicolor
## 99            5.1           2.5            3.0                  1.1 versicolor
## 100           5.7           2.8            4.1                  1.3 versicolor
```

```r
vir_iris <- subset(iris, Species == "virginica")
vir_iris
```

```
##      Sepal.Length Sepal.Width Petal.Length Petal.Width   Species
## 101           6.3           3.3           6.0           2.5 virginica
## 102           5.8           2.7           5.1           1.9 virginica
## 103           7.1           3.0           5.9           2.1 virginica
## 104           6.3           2.9           5.6           1.8 virginica
## 105           6.5           3.0           5.8           2.2 virginica
## 106           7.6           3.0           6.6           2.1 virginica
## 107           4.9           2.5           4.5           1.7 virginica
## 108           7.3           2.9           6.3           1.8 virginica
## 109           6.7           2.5           5.8           1.8 virginica
## 110           7.2           3.6           6.1           2.5 virginica
## 111           6.5           3.2           5.1           2.0 virginica
## 112           6.4           2.7           5.3           1.9 virginica
## 113           6.8           3.0           5.5           2.1 virginica
## 114           5.7           2.5           5.0           2.0 virginica
## 115           5.8           2.8           5.1           2.4 virginica
## 116           6.4           3.2           5.3           2.3 virginica
## 117           6.5           3.0           5.5           1.8 virginica
## 118           7.7           3.8           6.7           2.2 virginica
## 119           7.7           2.6           6.9           2.3 virginica
## 120           6.0           2.2           5.0           1.5 virginica
## 121           6.9           3.2           5.7           2.3 virginica
## 122           5.6           2.8           4.9           2.0 virginica
## 123           7.7           2.8           6.7           2.0 virginica
```

```
## 124            6.3          2.7          4.9          1.8 virginica
## 125            6.7          3.3          5.7          2.1 virginica
## 126            7.2          3.2          6.0          1.8 virginica
## 127            6.2          2.8          4.8          1.8 virginica
## 128            6.1          3.0          4.9          1.8 virginica
## 129            6.4          2.8          5.6          2.1 virginica
## 130            7.2          3.0          5.8          1.6 virginica
## 131            7.4          2.8          6.1          1.9 virginica
## 132            7.9          3.8          6.4          2.0 virginica
## 133            6.4          2.8          5.6          2.2 virginica
## 134            6.3          2.8          5.1          1.5 virginica
## 135            6.1          2.6          5.6          1.4 virginica
## 136            7.7          3.0          6.1          2.3 virginica
## 137            6.3          3.4          5.6          2.4 virginica
## 138            6.4          3.1          5.5          1.8 virginica
## 139            6.0          3.0          4.8          1.8 virginica
## 140            6.9          3.1          5.4          2.1 virginica
## 141            6.7          3.1          5.6          2.4 virginica
## 142            6.9          3.1          5.1          2.3 virginica
## 143            5.8          2.7          5.1          1.9 virginica
## 144            6.8          3.2          5.9          2.3 virginica
## 145            6.7          3.3          5.7          2.5 virginica
## 146            6.7          3.0          5.2          2.3 virginica
## 147            6.3          2.5          5.0          1.9 virginica
## 148            6.5          3.0          5.2          2.0 virginica
## 149            6.2          3.4          5.4          2.3 virginica
## 150            5.9          3.0          5.1          1.8 virginica
```

b. Get the mean for every characteristics of each species using colMeans(). Write the codes and its result.

```
setosa <- colMeans(set_iris[sapply(set_iris,is.numeric)])
setosa
```

```
## Sepal.Length  Sepal.Width Petal.Length  Petal.Width
##        5.006        3.428        1.462        0.246
```

```
versicolor <- colMeans(ver_iris[sapply(ver_iris,is.numeric)])
versicolor
```

```
## Sepal.Length  Sepal.Width Petal.Length  Petal.Width
##        5.936        2.770        4.260        1.326
```

```
virginica <- colMeans(vir_iris[sapply(vir_iris,is.numeric)])
virginica
```

```
## Sepal.Length  Sepal.Width Petal.Length  Petal.Width
##        6.588        2.974        5.552        2.026
```

c. Combine all species by using rbind()

```
species <- rbind(setosa, versicolor, virginica)
species
```

```
##            Sepal.Length Sepal.Width Petal.Length Petal.Width
## setosa            5.006       3.428        1.462       0.246
## versicolor        5.936       2.770        4.260       1.326
## virginica         6.588       2.974        5.552       2.026
```

d. From the data in 4-c: Create the barplot().Write the codes and its result

```
barplot(species, beside = TRUE,
        main = "Iris Data",
        xlab = "Characteristics",
        ylab = "Mean Scores",
        col = c("red","green","blue"))
```