

Rworksheet-5

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

```
BS <- data.frame("Course Year" = c ("1st", "2nd", "3rd", "4th"), "2019-2020" = c(80, 75, 70, 60))
BS
```

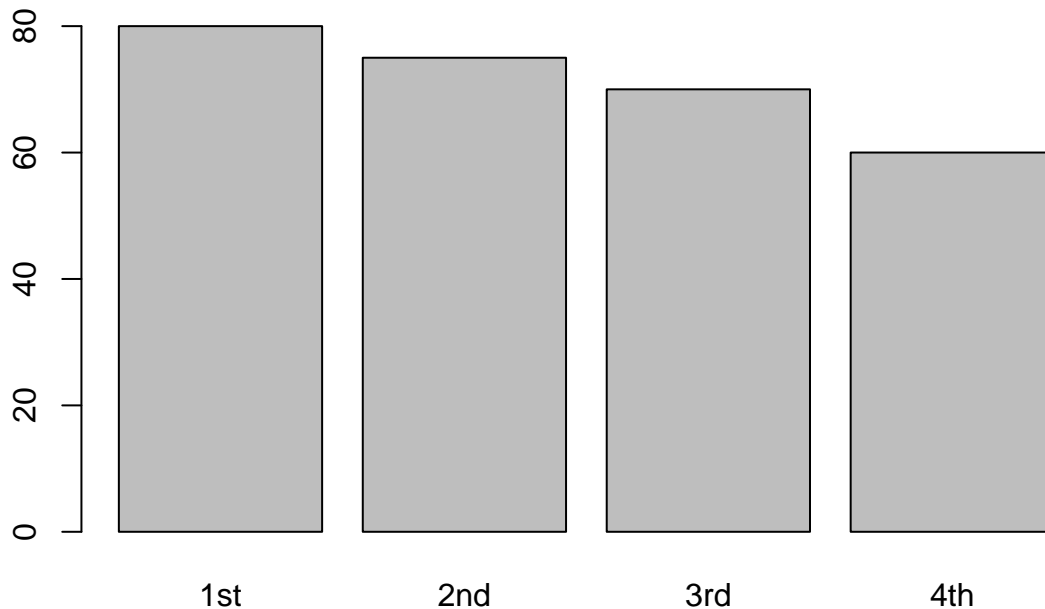
```
##   Course.Year X2019.2020
## 1         1st          80
## 2         2nd          75
## 3         3rd          70
## 4         4th          60
```

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

```
bar <- c("1st" = 80, "2nd" = 75, "3rd" = 70, "4th" = 60)
bar
```

```
## 1st 2nd 3rd 4th
##  80  75  70  60
```

```
barplot(bar)
```

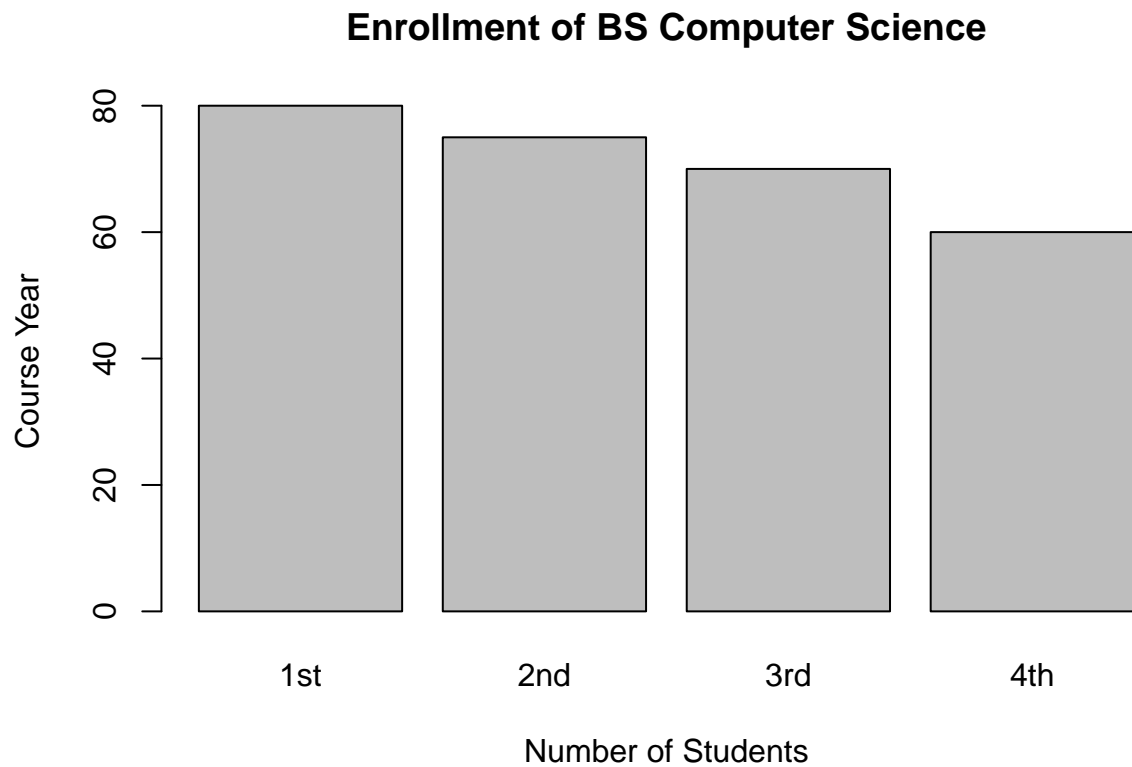


- b. Using the same table, label the barchart with Title = "Enrollment of BS Computer Science" horizontal axis = "Curriculum Year" and vertical axis = "number of students"

```
bar <- c("1st" = 80 , "2nd" = 75, "3rd" = 70, "4th" = 60)
bar
```

```
## 1st 2nd 3rd 4th
## 80 75 70 60
```

```
barplot(bar, main = "Enrollment of BS Computer Science", xlab = "Number of Students", ylab = "Course
```



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.

```
Monthly <- data.frame(facts = c("Food", "Electricity", "Savings", "Miscellaneous_expenses"), A = c(60, 10, 5, 25))
Monthly
```

```
##           facts A
## 1           Food 60
## 2      Electricity 10
## 3           Savings 5
## 4 Miscellaneous_expenses 25
```

```
Tab1 <- table(Monthly)
Tab1
```

```
##           A
## facts      5 10 25 60
## Electricity 0 1 0 0
## Food        0 0 0 1
## Miscellaneous_expenses 0 0 1 0
## Savings     1 0 0 0
```

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

```
A <- c(60, 10, 50, 25)
A
```

```
## [1] 60 10 50 25
```

```
data1 <- round(A/sum(A) * 100, 1)
data1
```

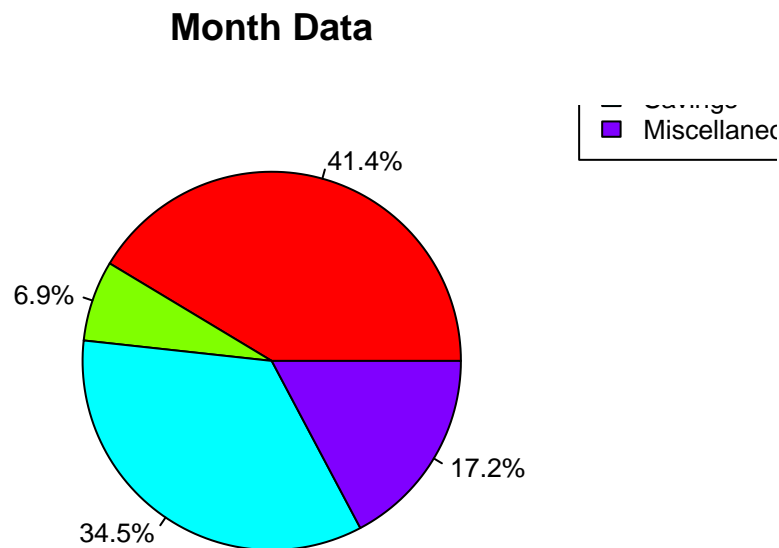
```
## [1] 41.4 6.9 34.5 17.2
```

```
data1 <- paste(data1,"%",sep = "")
data1
```

```
## [1] "41.4%" "6.9%" "34.5%" "17.2%"
```

```
pie1 <- pie(A, main = "Month Data", col = rainbow(4),
            labels = data1, cex = 0.8)
```

```
legend(1.3,1.5, c("Food","Electricity","Savings","Miscellaneous expenses"), cex = 0.8,fill = rainbow(4))
```



3. Open the mtcars dataset.

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

```
data("mtcars")
datamtcars <- (mtcars$mpg)
datamtcars
```

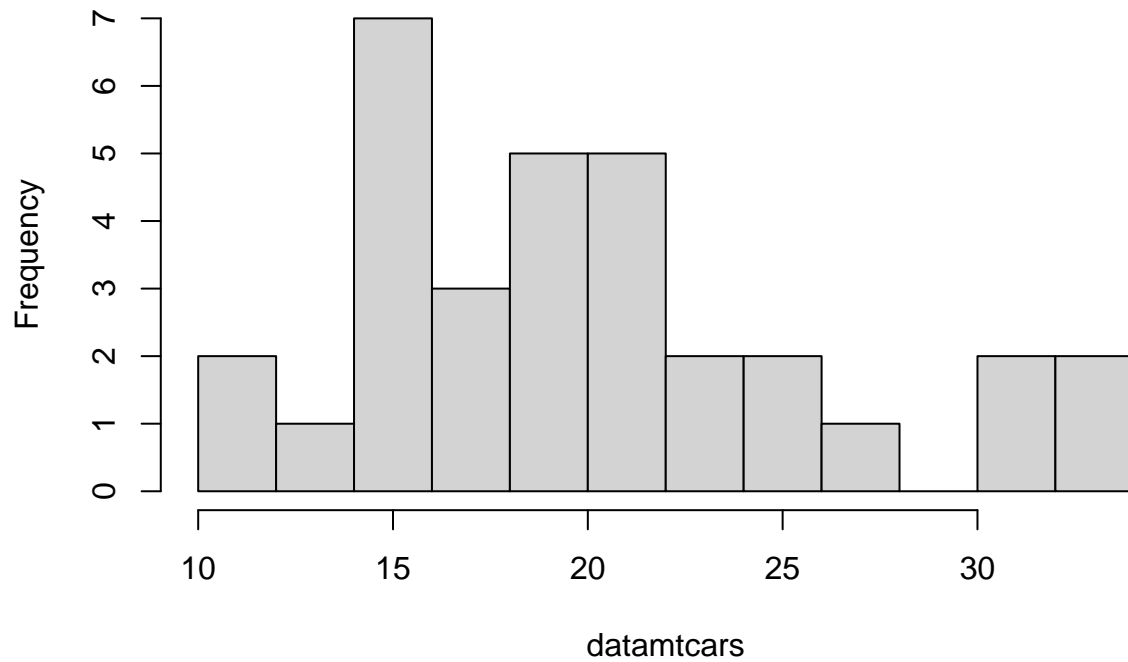
```
## [1] 21.0 21.0 22.8 21.4 18.7 18.1 14.3 24.4 22.8 19.2 17.8 16.4 17.3 15.2 10.4
```

```
## [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
```

```
hist(datamtcars, breaks = 12)
```

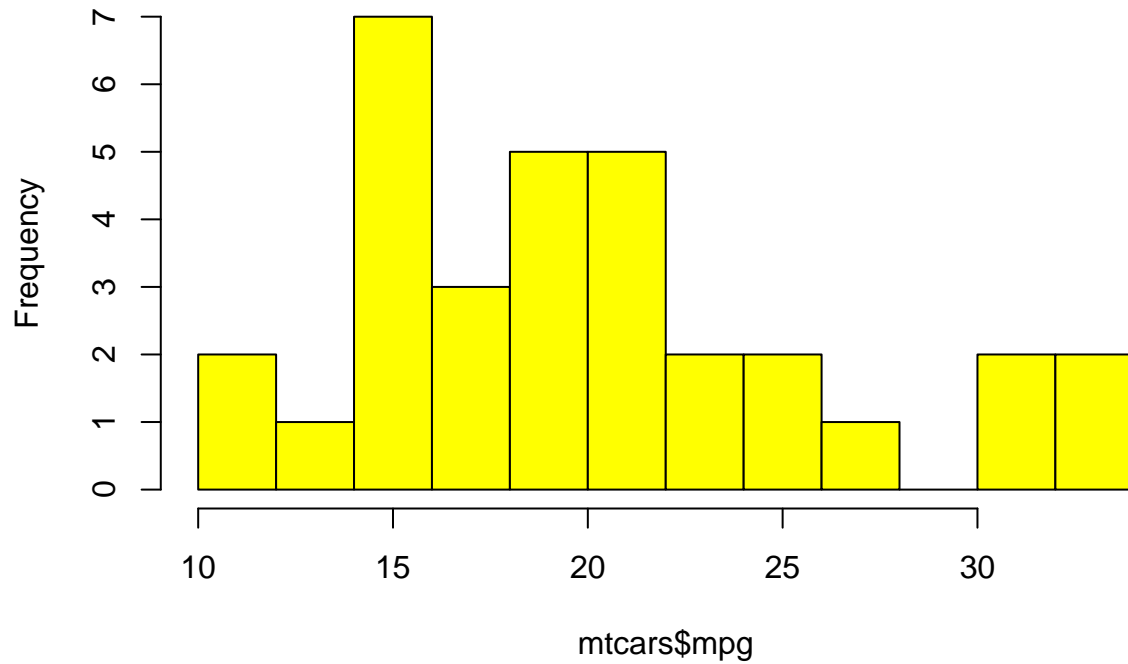
Histogram of datamtcars



b. Colored histogram with different number of bins. #Note: breaks= controls the number of bins.

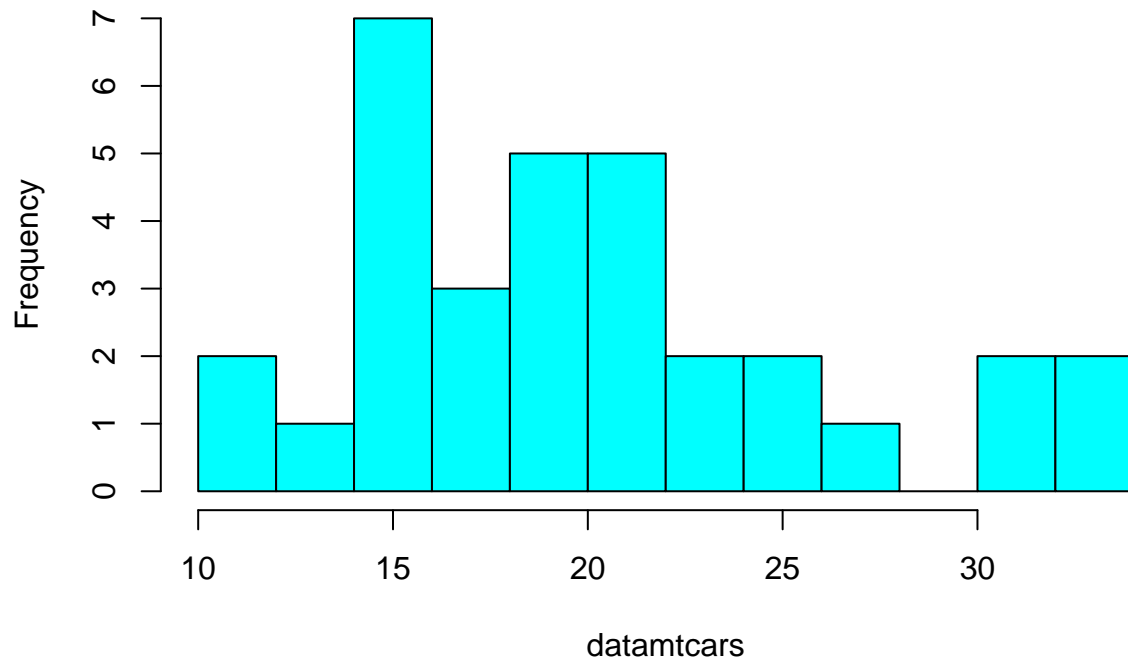
```
hist(mtcars$mpg, breaks=12, col="yellow")
```

Histogram of mtcars\$mpg



```
hist(datamtcars, breaks=12, col="cyan")
```

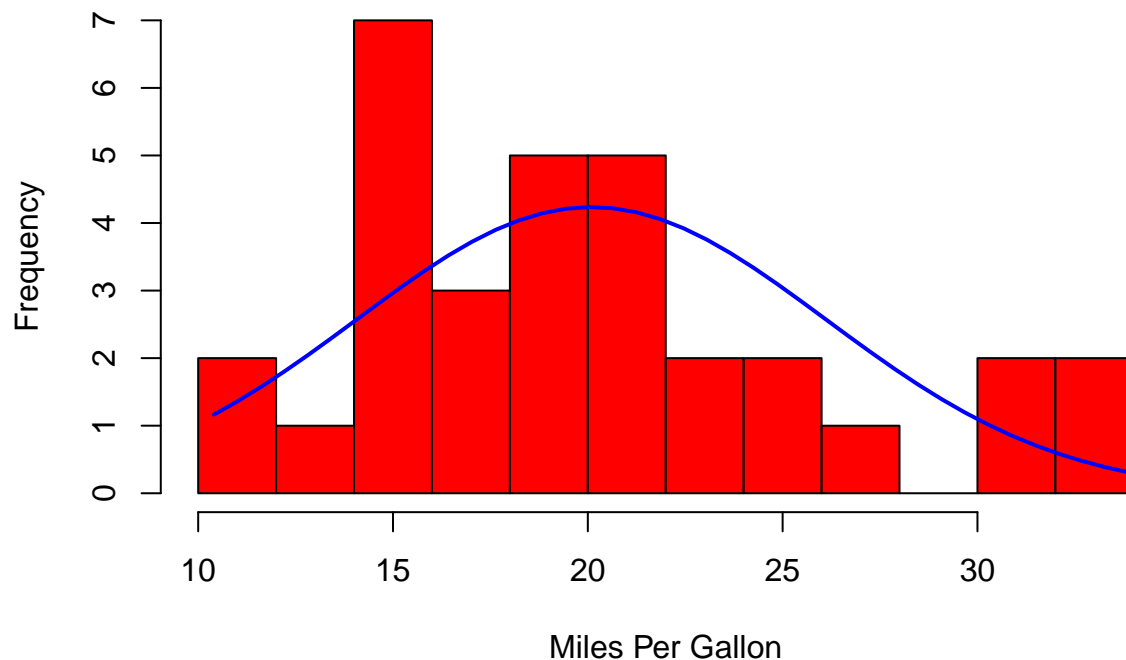
Histogram of datamtcars



c. Add a Normal Curve

```
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

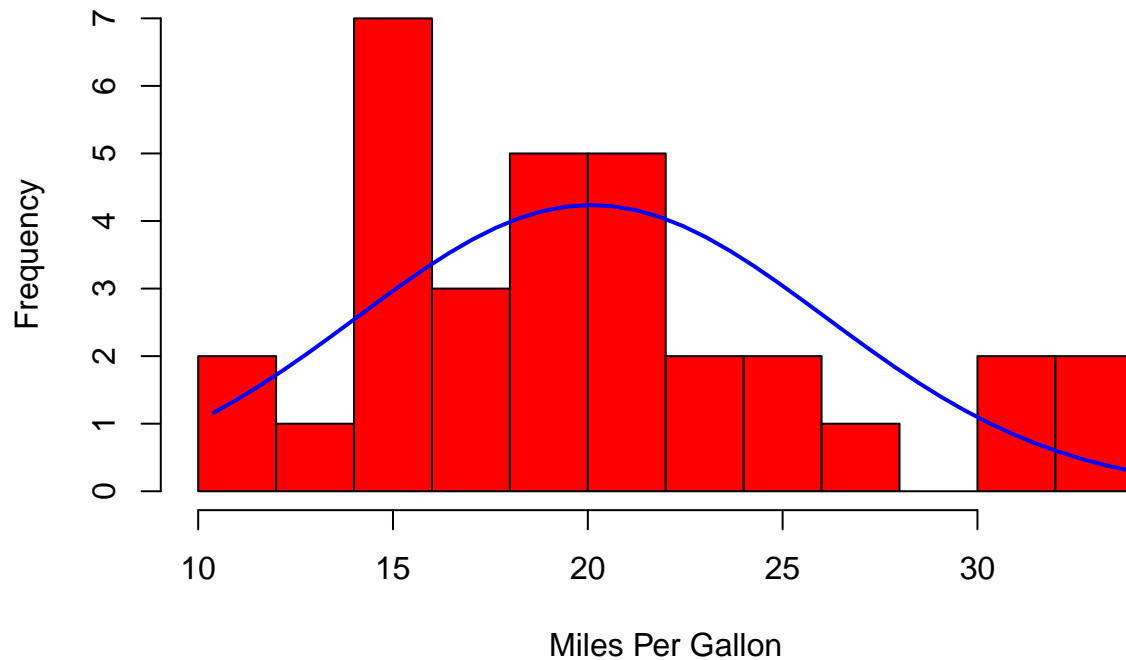


```
curv <- datamtcars  
curv
```

```
## [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
```

```
hist1 <- hist(curv, breaks=10, col="red", xlab="Miles Per Gallon",  
              main="Histogram with Normal Curve")  
xfit <- seq(min(curv), max(curv), length=40)  
yfit <- dnorm(xfit, mean=mean(curv), sd=sd(curv))  
yfit <- yfit * diff(hist1$mids[1:2]) * length(curv)  
lines(xfit, yfit, col="blue", lwd=2)
```

Histogram with Normal Curve



```
hist1
```

```
## $breaks
## [1] 10 12 14 16 18 20 22 24 26 28 30 32 34
##
## $counts
## [1] 2 1 7 3 5 5 2 2 1 0 2 2
##
## $density
## [1] 0.031250 0.015625 0.109375 0.046875 0.078125 0.078125 0.031250 0.031250
## [9] 0.015625 0.000000 0.031250 0.031250
##
## $mids
## [1] 11 13 15 17 19 21 23 25 27 29 31 33
##
## $xname
## [1] "curv"
##
## $equidist
## [1] TRUE
##
## attr(,"class")
## [1] "histogram"
```

4. Open the iris dataset. Create a subset for each species
 - a. Write the codes and its result.

```
data("iris")
data_iris <- data.frame(iris)
data_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
```

```
seto <- subset(data_iris, Species == 'setosa' )
seto
```

```
##      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
```

```
versi <- subset(data_iris, Species == 'versicolor' )
versi
```

```
##      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

```
virg <- subset(data_iris, Species == 'virginica' )
virg
```

##	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.

Example: setosa <- colMeans(setosa[sapply(setosaDF,is.numeric)])

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

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

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

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

```
virginica <- colMeans(virg[sapply(virg,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() The table should be look like this:

```
combine_species <- rbind(c(setosa, versicolor,virginica))
combine_species
```

```
##      Sepal.Length Sepal.Width Petal.Length Petal.Width Sepal.Length Sepal.Width
## [1,]          5.006          3.428          1.462          0.246          5.936          2.77
##      Petal.Length Petal.Width Sepal.Length Sepal.Width Petal.Length Petal.Width
## [1,]          4.26          1.326          6.588          2.974          5.552          2.026
```

```
combine_data<- data.frame(combine_species)
combine_data
```

```
##      Sepal.Length Sepal.Width Petal.Length Petal.Width Sepal.Length.1
## 1          5.006          3.428          1.462          0.246          5.936
##      Sepal.Width.1 Petal.Length.1 Petal.Width.1 Sepal.Length.2 Sepal.Width.2
## 1          2.77          4.26          1.326          6.588          2.974
##      Petal.Length.2 Petal.Width.2
## 1          5.552          2.026
```

d From the data in 4-c: Create the barplot(). Write the codes and its result. The barplot should be like this.

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

