

# Rworksheet#5

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2022-11-23

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

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

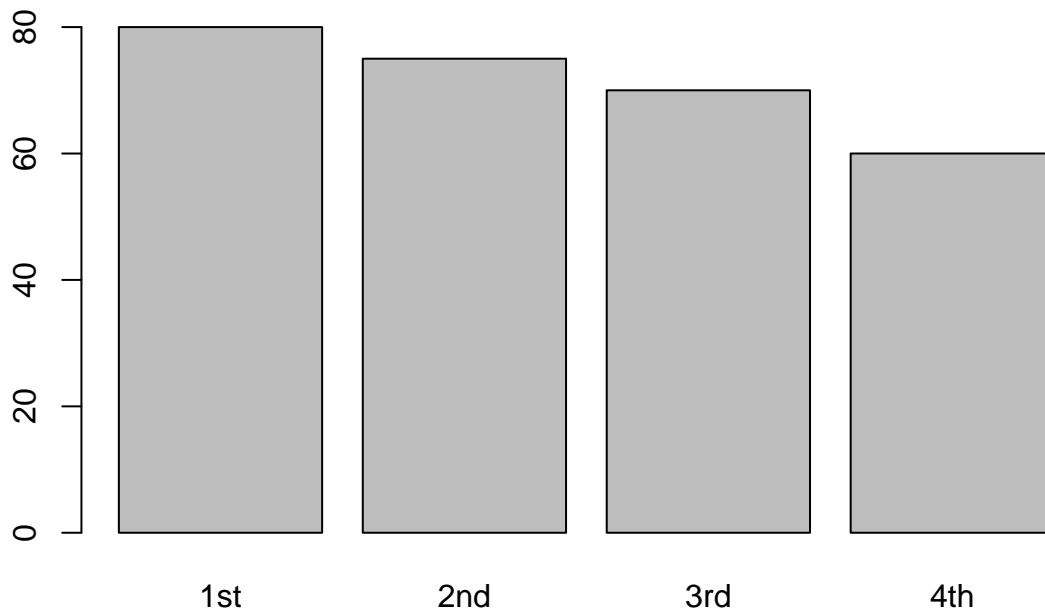
```
##   Course.Year X.2019.2020
## 1         1st          80
## 2         2nd          75
## 3         3rd          70
## 4         4th          60
```

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

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

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

```
barplot(bar_data)
```

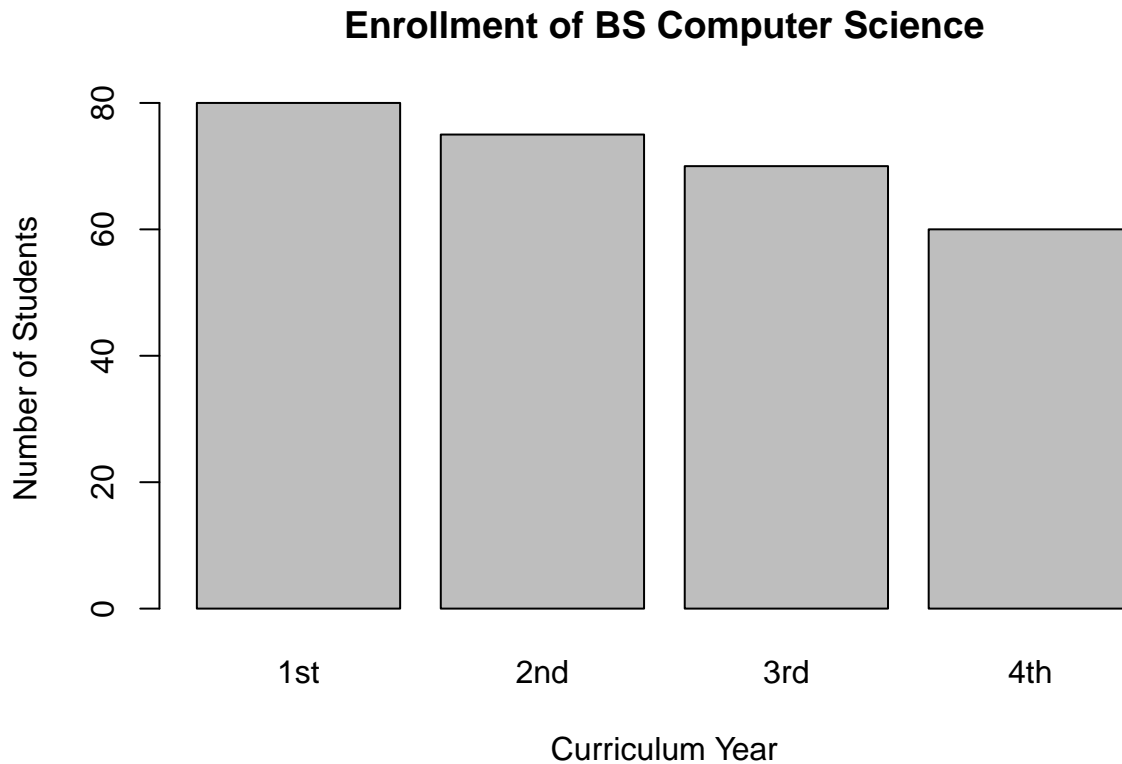


b. Using the same table, label the barchart with Title = "Enrollment of BS Computer Science" horizontal axis = "Curriculum Year" and vertical axis = "number of students"

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

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

```
barplot(bar_tab,
        main = "Enrollment of BS Computer Science",
        xlab = "Curriculum Year",
        ylab = "Number of Students")
```



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.

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

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

```
tab_data <- table(month_data)
tab_data
```

```
##           spent
## 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.

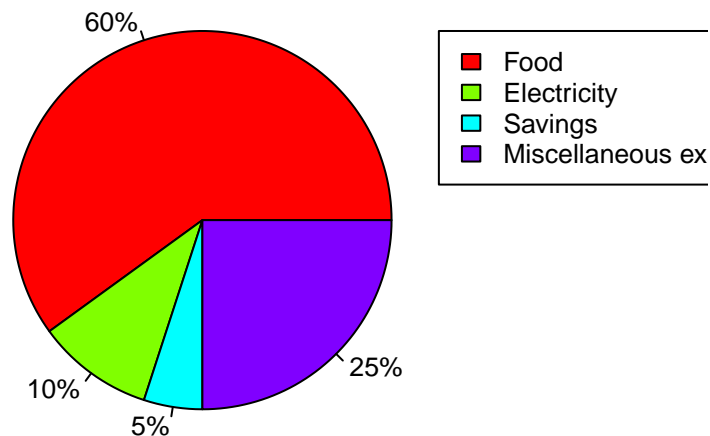
```
spent = c(60, 10, 5, 25)
data_per <- round(spent/sum(spent) * 100, 1)
data_per <- paste(data_per,"%",sep = "")

data_pie <- pie(spent,
  main = "Month Data",
  col = rainbow(4),
  labels = data_per, cex = 0.8)
data_pie
```

```
## NULL
```

```
legend(1.0,0.8, c("Food","Electricity","Savings","Miscellaneous expenses"),
  cex = 0.8,fill = rainbow(4))
```

## Month Data



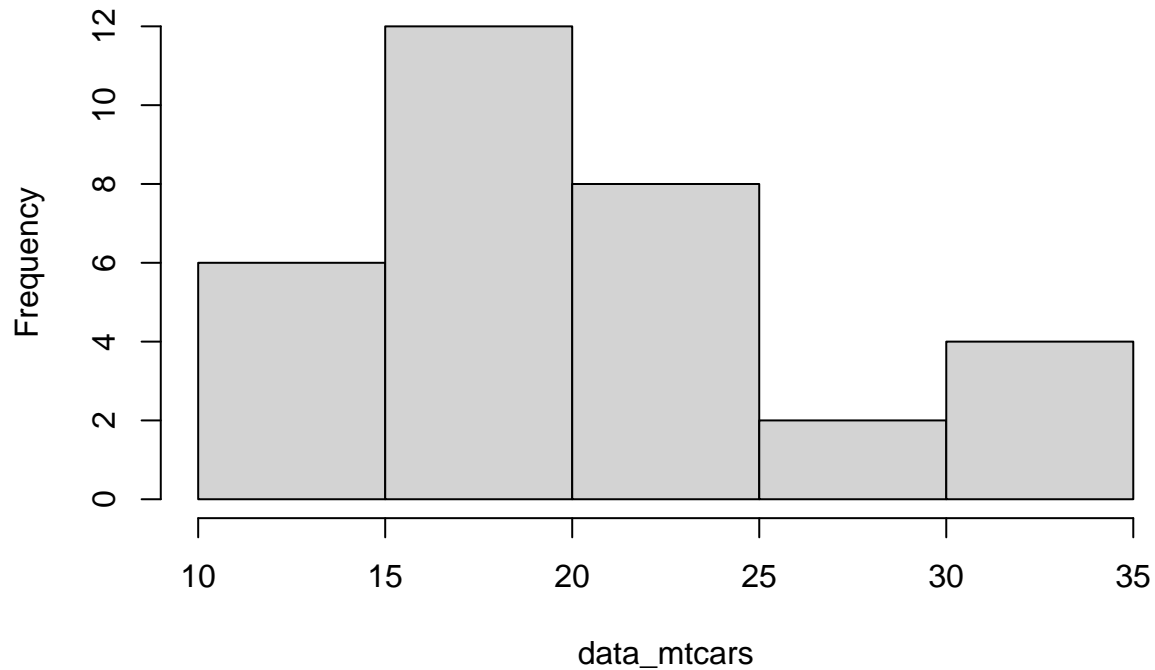
3. Open the mtcars dataset. a. Create a simple histogram specifically for mpg (miles per gallon) variable. Use \$ to select the mpg only. Write the codes and its result.

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

```
## [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(data_mtcars, breaks = 5)
```

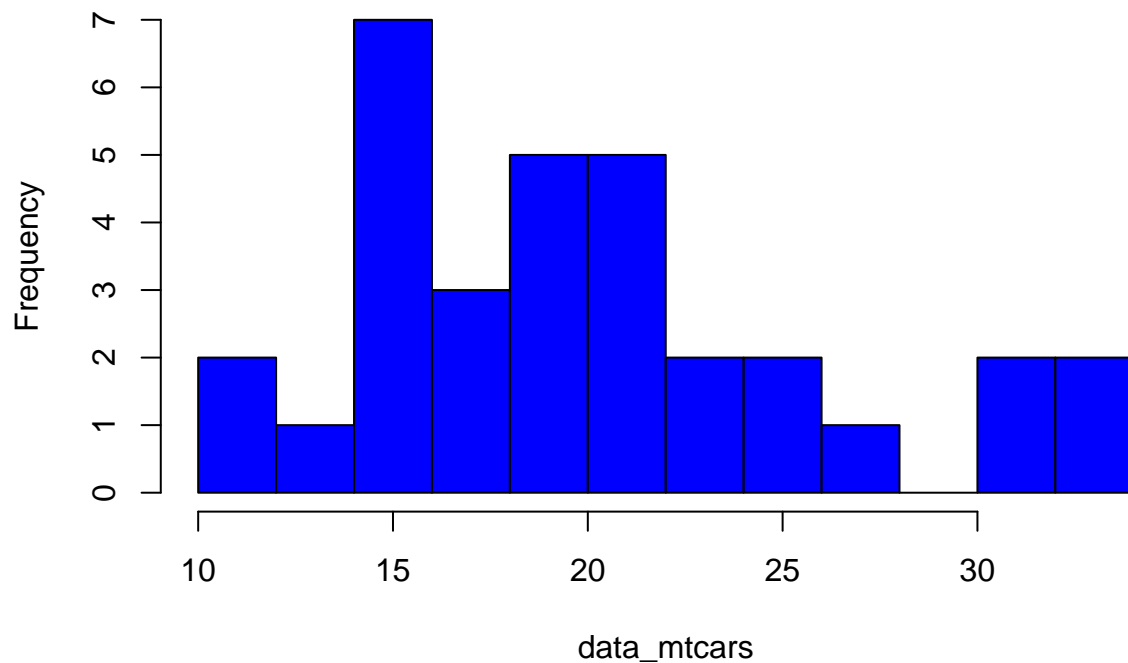
### Histogram of data\_mtcars



b. Colored histogram with different number of bins. `hist(mtcars$mpg, breaks=12, col="red")` Note: `breaks=` controls the number of bins.

```
hist(data_mtcars, breaks=12, col="blue")
```

### Histogram of data\_mtcars



c. Add a Normal Curve `x <- mtcars$mpg` `h <- hist(x, breaks = 10, col = "red", xlab = "MilesPerGallon", main = "Histogram with Normal Curve")` `xfit <- seq(min(x), max(x), length = 40)` `yfit <- dnorm(xfit, mean =`

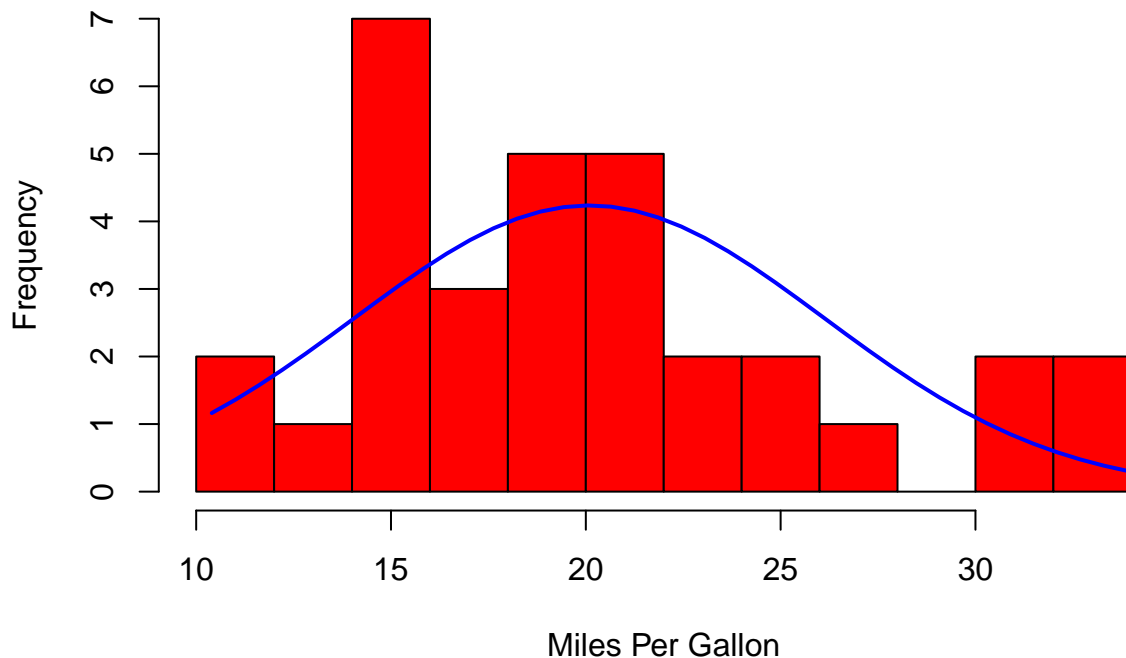
$mean(x), sd = sd(x))$   $yfit < -yfit * diff(hmids[1:2]) * length(x)$   $lines(xfit, yfit, col="blue", lwd=2)$  Copy the result.

```
data_curve <- data_mtcars
data_curve
```

```
## [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
```

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

## Histogram with Normal Curve



```
data_hist
```

```
## $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] "data_curve"
##
## $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
```

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

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

```
data_virg <- subset(data_iris, Species == 'virginica' )
data_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(data_seto[sapply(data_seto,is.numeric)])
setosa

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

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

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

virginica <- colMeans(data_virg[sapply(data_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:

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

##      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

grp_df <- data.frame(grp_data)
grp_df

##      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. The barplot should be like this.

```
barplot (height= as.matrix(grp_df), main = "Iris Data",
        xlab = "Characteristics",
        ylab = "Mean Scores",
        beside = T, col = rainbow(3))
```

