MECHELLE SIMPRON BSIT 2A

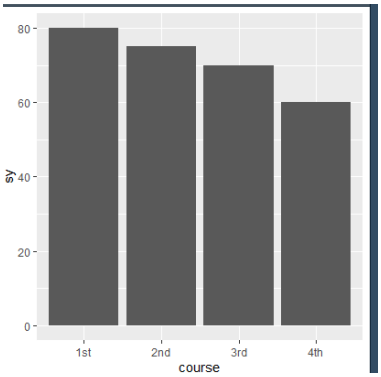
RWORKSHEET_5

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

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

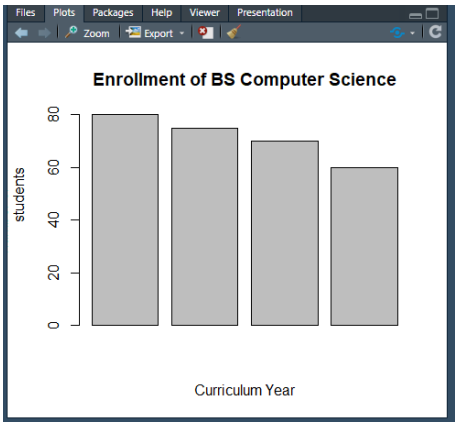
```
qplot()
library(ggplot2)

df <- data.frame("course"=c("1st", "2nd", "3rd", "4th"), "sy"= c(80, 75, 70, 60))
ggplot(df) + geom_col(aes(course, sy))
```



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”

```
pl <- barplot(sy, 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.

```
food <- 60
electricity <- 10
savings <- 5
misc <- 25

exp <- data.frame(food, electricity, savings,misc)
exp
```

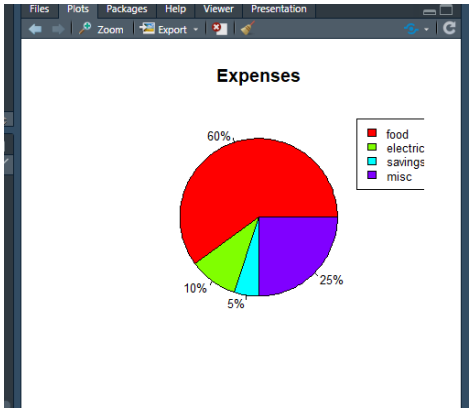
```
> exp <- data.frame(food, electricity, savings,misc)
> exp
  food electricity savings misc
1   60          10       5   25
>
```

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

```
expn <- c(60, 10, 5, 25)
pie(expn, main = "Expenses", col = rainbow(length(expn)),
   labels = c("food", "electricity", "savings", "misc"))

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

pie(expn, main = "Expenses", col = rainbow(length(expn)),
   labels = expn_label, cex=0.8)
legend(1, c("food", "electricity", "savings", "misc"),
      cex = 0.8, fill = rainbow(length(expn)))
```

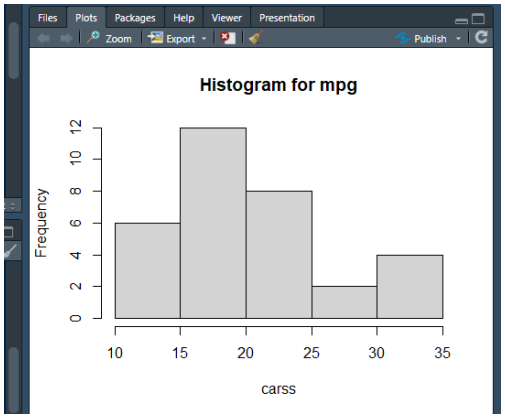


3.Open the mtcars dataset.

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

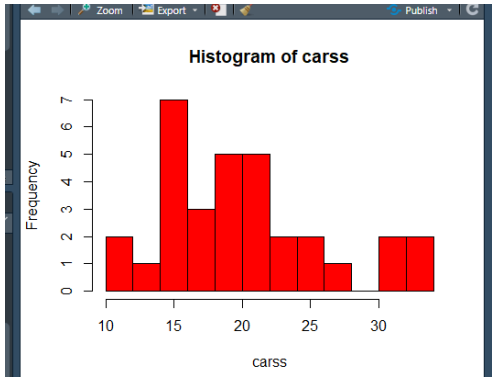
```
data("mtcars")
carss  <- mtcars$mpg

hist(carss, main = "Histogram for mpg")
```



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

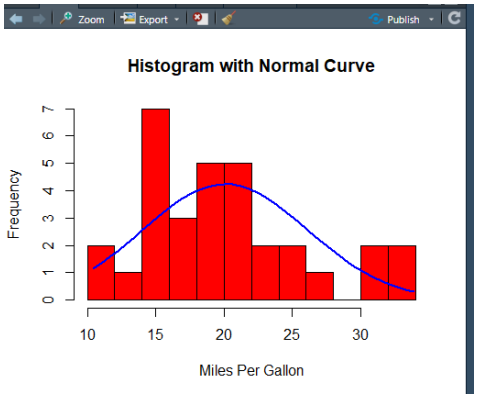
```
hist(carss, breaks=12, col="red")
```



c. Add a Normal Curve

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

Copy the result.



4. Open the iris dataset. Create a subset for each species.

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

a. Write the codes and its result.

Codes:

```
data_i <- data.frame(iris)
data_i
s_data <- subset(data_i, Species == 'setosa')
s_data

data_r <- data.frame(iris)
data_r
v_data <- subset(data_r, Species == 'versicolor')
v_data

data_is <- data.frame(iris)
data_is
vg_data <-subset(data_is, Species == 'virginica')
vg_data
```

Result:

```
data_i <- data.frame(iris)
data_i
## 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
7
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
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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
9
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
s_data <- subset(data_i, Species == 'setosa')
s_data
## 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
10
## 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_s <- data.frame(iris)
data_s
## 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
11
## 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
12
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
13
## 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
v_data <- subset(data_s, Species == 'versicolor')
v_data
## 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
14
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_is <- data.frame(iris)
data_is
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
15
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
16
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
17
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
vg_data <-subset(data_is, Species == 'virginica')
vg_data
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
18
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(s_data[sapply(s_data,is.numeric)])
setosa
```

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

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

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

```
virginica <- colMeans(vg_data[sapply(vg_data,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()

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

```
           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.