

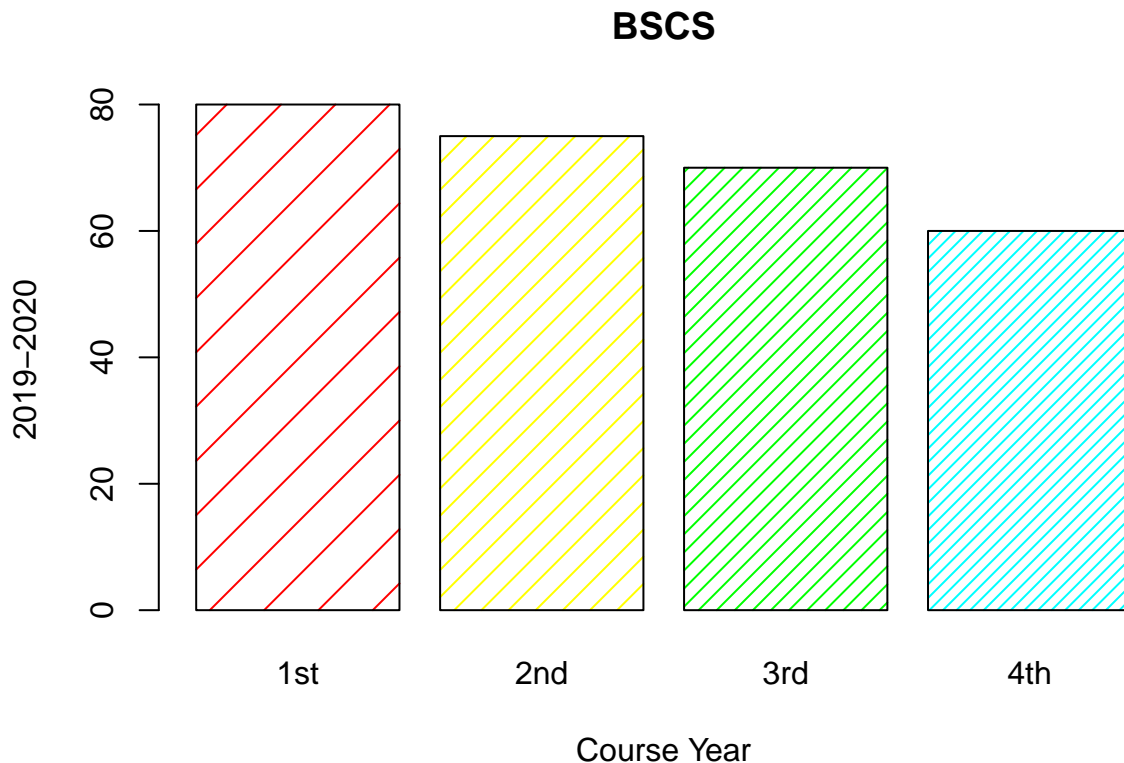
# RWorksheet5\_Frias

2022-12-04

## R Markdown

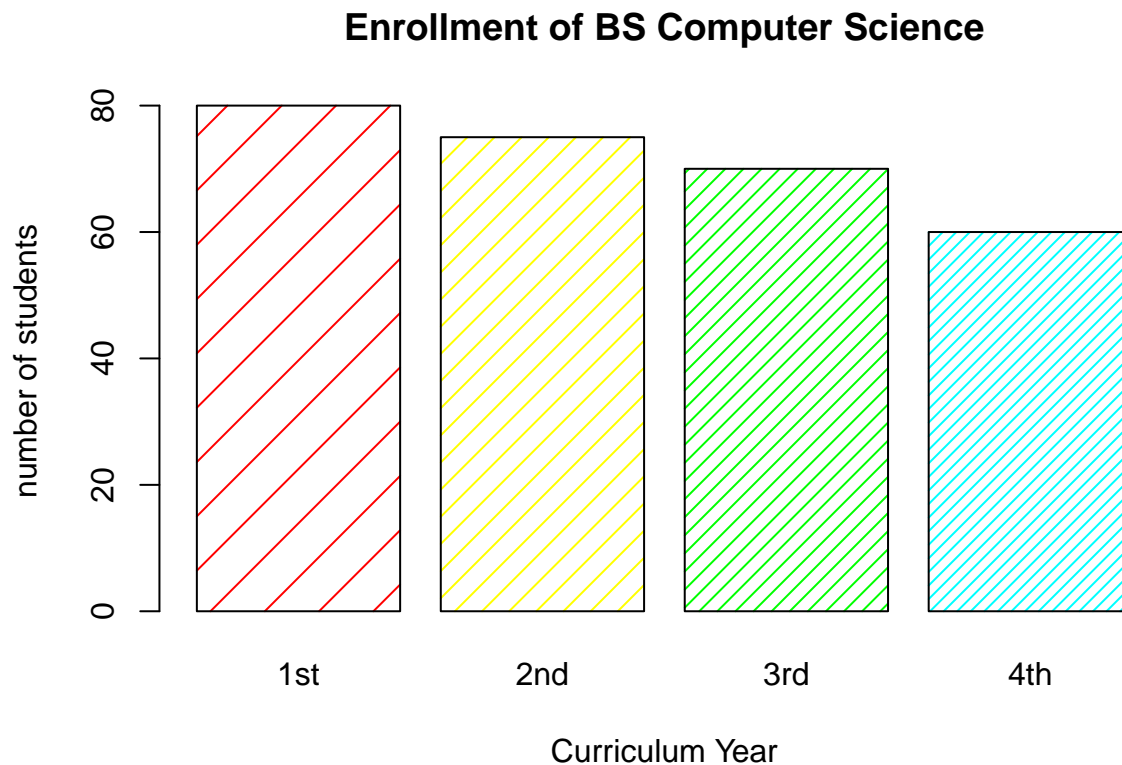
*#1. The table shows the enrollment of BS in Computer Science , SY 2010-2011.  
#a. Plot the data using a bar graph. Write the codes and copy the result.*

```
BSCS <- c (80, 75, 70, 60)
barplot(BSCS, col = rainbow(6), density = c(5, 10, 15, 20),
        main = "BSCS",
        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"  
#vertical axis = "number of students"*

```
BSCS <- c (80, 75, 70, 60)
barplot(BSCS, col = rainbow(6), density = c(5, 10, 15, 20),
        main = "Enrollment of BS Computer Science",
        xlab = "Curriculum Year",
        ylab = "number of students", names.arg = c("1st", "2nd", "3rd", "4th"))
```



*#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.*

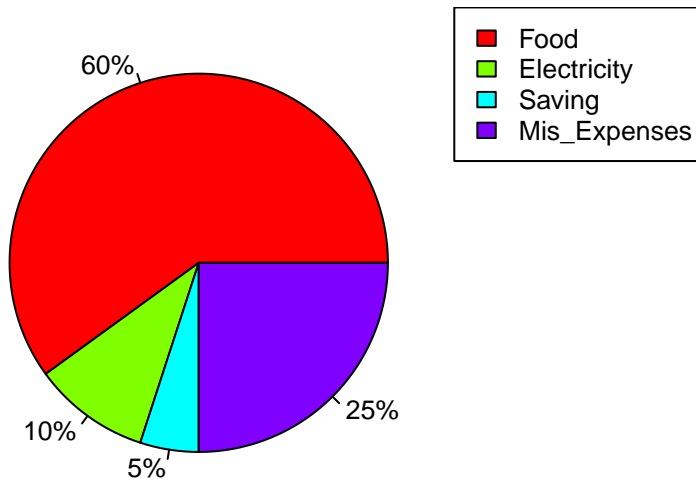
```
Income = matrix(c("60%", "10%", "5%", "25%"), ncol= 4, byrow=TRUE)
colnames(Income) <- c('Food', 'Electricity', 'Savings', 'Mis_expenses')
row.names(Income)<- c( 'Expenses')
Income_De_Jesus_Fam <- as.table(Income)
Income_De_Jesus_Fam
```

```
##           Food Electricity Savings Mis_expenses
## Expenses 60%   10%           5%           25%
```

*#b. Plot the data using Pie chart. Add labels, colors and legend.  
 #Write the codes and its result.*

```
A <- c(0.6, 0.1, 0.05, 0.25)
a <- round(A/sum(A) * 100, 1)
a <- paste(a, "%", sep = "")
pie(A, labels = a, cex = 0.8, col = rainbow(4),
     main = "De Jesus Family Expenses")
legend("topright", c("Food", "Electricity", "Saving", "Mis_Expenses"),
       cex = 0.8, fill = rainbow(4))
```

## De Jesus Family Expenses



*#3. Open the mtcars dataset*

*#a. Create a simple histogram for mpg(miles per gallon) variable.*

*#Use \$ to select the mpg only. Write the codes and its result.*

```
data(mtcars)
```

```
Mt <- c(mtcars$mpg)
```

```
Mt
```

```
## [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
```

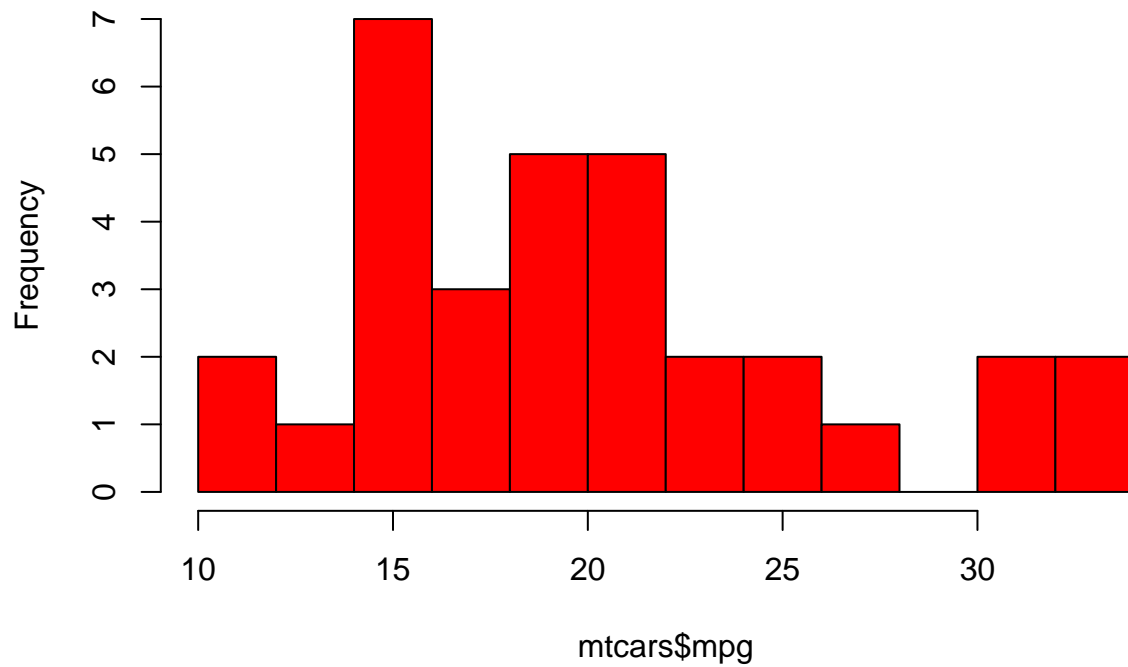
```
## [16] 10.4 14.7 32.4 30.4 33.9 21.5 15.5 15.2 13.3 19.2 27.3 26.0 30.4 15.8 19.7
```

```
## [31] 15.0 21.4
```

*#b. Colored histogram with different number of bins.*

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

Histogram of mtcars\$mpg

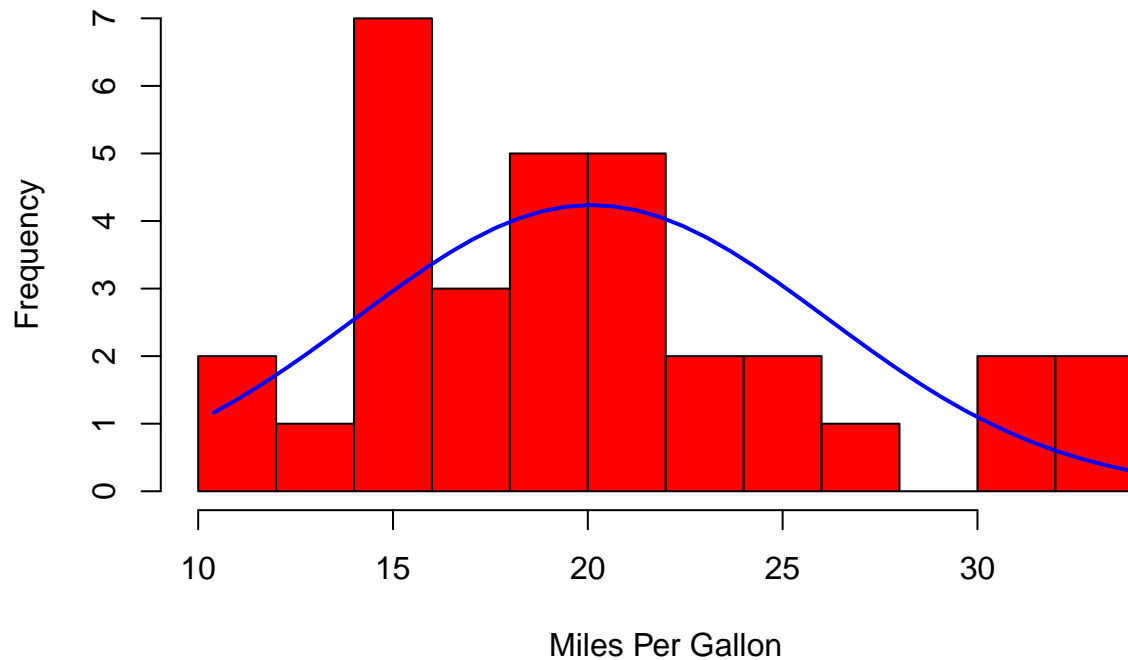


*#Note: breaks= controls the number of bin*

*#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



*#4. Open the iris dataset. create a subset for each species.  
#a. create the code and its result.*

```
data("iris")

a <- data.frame(iris)
a
```

| ##    | 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 |

```
asetosa <- data.frame(iris)
asetosa
```

| ##    | 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
```

```
aversicolor <- data.frame(iris)
aversicolor
```

```
##      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
```

```
avirginica <- data.frame(iris)
avirginica
```

| ##    | 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  |

```
Setosa <- subset(asetosa, Species == 'setosa')
Setosa
```



| ##    | 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  |

```
Versicolor <- subset(aversicolor, Species == 'versicolor')
Versicolor
```

| ##     | 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 |

```
Virginica <- subset(avirginica, Species == 'virginica')
Virginica
```

| ##     | 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 code and its res*

```
Asetosa <- colMeans(Setosa[sapply(asetosa, is.numeric)])
Asetosa
```

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

```
Aversicolor <- colMeans(Versicolor[sapply(aversicolor, is.numeric)])
Aversicolor
```

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

```
Avirginica <- colMeans(Virginica[sapply(avirginica, is.numeric)])
Avirginica
```

```
## 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 look like this.*

```
mine <- rbind (Asetosa, Aversicolor, Avirginica)
yours <- data.frame(mine)
yours
```

```
##           Sepal.Length Sepal.Width Petal.Length Petal.Width
## Asetosa           5.006           3.428           1.462           0.246
## Aversicolor       5.936           2.770           4.260           1.326
## Avirginica        6.588           2.974           5.552           2.026
```

*#d. From the data in 4-c: Create the barplot(). Write the code and its result. The bar plot should be l*

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

