R basics

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1. Calculation: Use R as a calculator

```
31/4*(37-25)
```

```
## [1] 93
```

```
3^2
```

```
## [1] 9
```

```
sqrt(36)
```

```
## [1] 6
```

```
log(4)
```

```
## [1] 1.386294
```

```
cos(6)
```

```
## [1] 0.9601703
```

2. Objects

Assign values to object 'x' using any one of the following:

```
x = 5
x <- 5
5 -> x
```

Calculation

```
x+3
```

```
## [1] 8
```

```r
x^2
```

```
## [1] 25
```

```r
sqrt(x)
```

```
## [1] 2.236068
```

```r
y = x^2
```

Overwrite the existing objects

```r
x = 10
x = x+1
```

3. Vectors

```r
# Create a vector
c(1,3,2,4)
```

```
## [1] 1 3 2 4
```

```r
# Save the vector as 'x'
x = c(1,3,2,4)

# R applies functions to every element of a vector
x - 10
```

```
## [1] -9 -7 -8 -6
```

```r
x^2
```

```
## [1]  1  9  4 16
```

4. Some useful functions

```r
mean(x) # mean
```

```
## [1] 2.5
```

```r
sd(x) # standard deviation
```

```
## [1] 1.290994
```

```r
var(x) # variance
```

```
## [1] 1.666667
```

```r
summary(x)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##    1.00    1.75    2.50    2.50    3.25    4.00
```

```r
sum(x) # sum of all elements
```

```
## [1] 10
```

```r
prod(x) # product of all elements
```

```
## [1] 24
```

```r
length(x) # number of elements
```

```
## [1] 4
```

```r
x[1:3] # the first three elements
```

```
## [1] 1 3 2
```

5. Import the data

- Use "Import Dataset" button in the menu of Environment:
  - Read .txt file or .csv file : Import Dataset>From Text(base)>choose file>open>import
  - Read Excel file : Import Dataset>From Excel>choose file>open>import
- Read in a data set by specifying the full file path (remember to replace "\" with "/" if your file path include "\"):

```r
data1 = read.table("~/Desktop/datasets/airfreight+breakage.txt")
```

- Read in a data set by setting the parent folder as working directory, then use "read.csv" or "read.table" function:

```r
setwd("~/Desktop/datasets")#set working directory to "datasets" folder
data1 = read.table("airfreight+breakage.txt")#read the data set in the folder
```

6. Accessing specific rows and columns in a dataframe

```r
head(data1)#Display the first six rows
```

```
##   V1 V2
## 1 16  1
## 2  9  0
## 3 17  2
## 4 12  0
## 5 22  3
## 6 13  1
```

```r
data1[1:3,]#Display the first six rows by row index
```

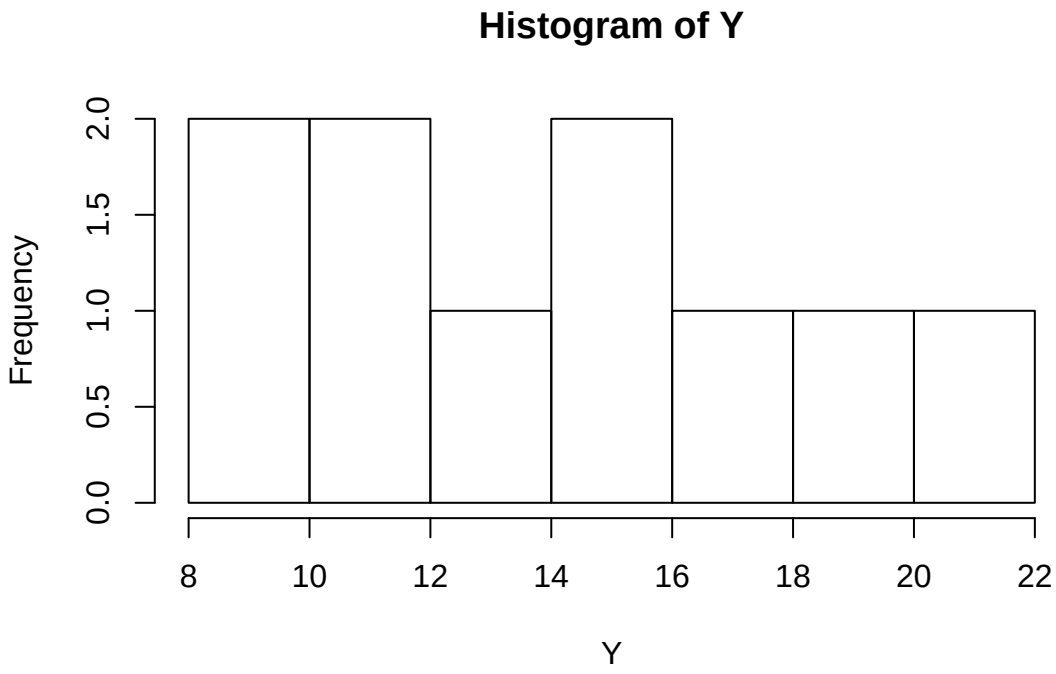
```
##   V1 V2
## 1 16  1
## 2  9  0
## 3 17  2
```

```r
Y = data1[,1] # Extract variables from dataset
X = data1[,2]
data1[3,2]#Display the value is row 3 and column 2
```

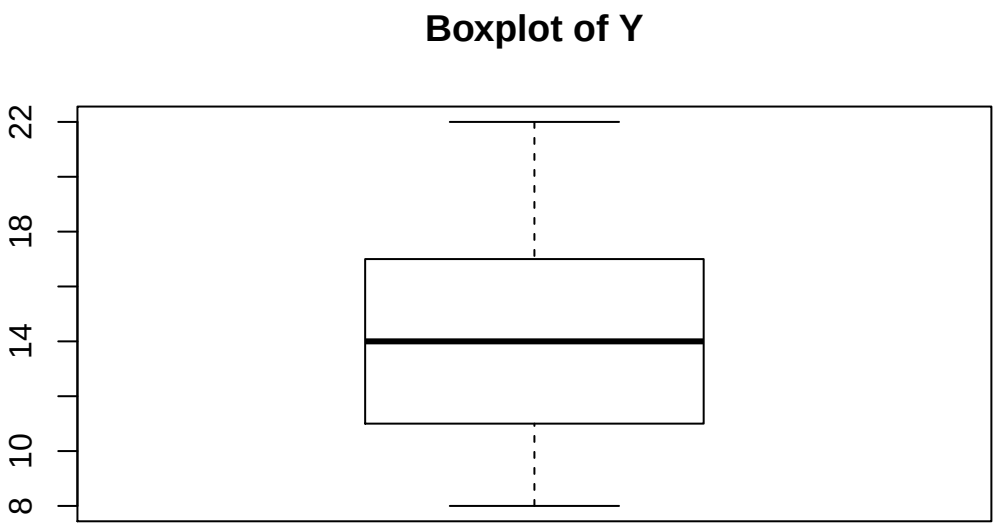
```
## [1] 2
```

7. Plot

```r
# histograms
hist(Y)
```



```r
# boxplots
boxplot(Y, main = 'Boxplot of Y')
```




```r
# scatterplots
plot(X, Y, xlab = 'X', ylab = 'Y', main = 'Plot of Y versus X')
```