Basic in R

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2024-10-21

```
                          ##BASIC IN R

# Input data
age <- c(2, 2.5, 3, 4, 4.5, 4.5, 5, 3, 6, 6.5)
mileage <- c(22, 34, 33, 37, 40, 45, 49, 30, 58, 58)
```

Reading the data.

```
# Create a data frame
mydata <- data.frame(Age = age, Mileage = mileage)
```

creating a data frame.

```
# Display the data frame
print(mydata)
```

```
##    Age Mileage
## 1  2.0      22
## 2  2.5      34
## 3  3.0      33
## 4  4.0      37
## 5  4.5      40
## 6  4.5      45
## 7  5.0      49
## 8  3.0      30
## 9  6.0      58
## 10 6.5      58
```

the data frame has two columns.

```
# Save the data frame as a CSV file
write.csv(mydata, file = "mydata.csv", row.names = FALSE)
```

saving my data into a specific file (csv file)

```
# Save the data frame to a specific folder
write.csv(mydata, file = "C:/Users/PC/Desktop/3.1 N/statistical programming practicals/mydata.csv", row
```

saving my file into a specific location using path

```
# Load the dataset into the R environment and name it Loan
Loan <- read.csv("C:/Users/PC/Desktop/3.1 N/statistical programming practicals/mydata.csv")
```

Loadind the csv file for use

```
# Display the first 5 rows of the Loan dataset
head(Loan, 5)
```

```
##   Age Mileage
## 1 2.0      22
## 2 2.5      34
## 3 3.0      33
## 4 4.0      37
## 5 4.5      40
```

Limitted to only five rows to be displayed.

```
# Display the last 5 rows of the Loan dataset
tail(Loan, 5)
```

```
##    Age Mileage
## 6  4.5      45
## 7  5.0      49
## 8  3.0      30
## 9  6.0      58
## 10 6.5      58
```

limited to only 5 last rows to be displayed.

```
# Generate summary statistics of the data variables
summary(Loan)
```

```
##       Age           Mileage
##  Min.   :2.000   Min.   :22.00
##  1st Qu.:3.000   1st Qu.:33.25
##  Median :4.250   Median :38.50
##  Mean   :4.100   Mean   :40.60
##  3rd Qu.:4.875   3rd Qu.:48.00
##  Max.   :6.500   Max.   :58.00
```

```
# v. Output the dimension of the dataset
dim(Loan)
```

```
## [1] 10  2
```

The dimension is displayed.

```
# Input the data into the R environment
# Creating a data frame for the Student Performance Data
student_data <- data.frame(
  Gender = c("Female", "Female", "Female", "Male", "Male", "Female"),
  Race = c("Group B", "Group C", "Group B", "Group A", "Group C", "Group B"),
  Lunch = c("Standard", "Standard", "Standard", "Free", "Standard", "Standard"),
  Prep_Course = c("None", "Completed", "None", "None", "None", "None"),
  Statistics_Score = c(72, 69, 90, 47, 76, 71),
  Reading_Score = c(72, 90, 95, 57, 78, 83),
  Writing_Score = c(74, 88, 93, 44, 75, 78)
)
```

Creating a data frame for the Student Performance Data

```
#Output the data frame
print(student_data)
```

```
##   Gender    Race    Lunch Prep_Course Statistics_Score Reading_Score
## 1 Female Group B Standard        None               72            72
## 2 Female Group C Standard   Completed               69            90
## 3 Female Group B Standard        None               90            95
```

```
## 4   Male Group A     Free        None               47            57
## 5   Male Group C Standard        None               76            78
## 6 Female Group B Standard        None               71            83
##   Writing_Score
## 1            74
## 2            88
## 3            93
## 4            44
## 5            75
## 6            78
```

The table has 5 columns.

```
#Output the first 5 rows of the data
head(student_data, 5)
```

```
##   Gender    Race    Lunch Prep_Course Statistics_Score Reading_Score
## 1 Female Group B Standard        None               72            72
## 2 Female Group C Standard   Completed               69            90
## 3 Female Group B Standard        None               90            95
## 4   Male Group A     Free        None               47            57
## 5   Male Group C Standard        None               76            78
##   Writing_Score
## 1            74
## 2            88
## 3            93
## 4            44
## 5            75
```

first 5 rows are displayed.

```
#Filter observations for female students
female_students <- subset(student_data, Gender == "Female")
print(female_students)
```

```
##   Gender    Race    Lunch Prep_Course Statistics_Score Reading_Score
## 1 Female Group B Standard        None               72            72
## 2 Female Group C Standard   Completed               69            90
## 3 Female Group B Standard        None               90            95
## 6 Female Group B Standard        None               71            83
##   Writing_Score
## 1            74
## 2            88
## 3            93
## 6            78
```

Only female students displayed.

```
#sort the observation using the statistic score in ascending order and reading score in descending orde
sort<-student_data[order(student_data$Statistics_Score,student_data$Reading_Score),]
sort
```

```
##   Gender    Race    Lunch Prep_Course Statistics_Score Reading_Score
## 4   Male Group A     Free        None               47            57
## 2 Female Group C Standard   Completed               69            90
## 6 Female Group B Standard        None               71            83
## 1 Female Group B Standard        None               72            72
## 5   Male Group C Standard        None               76            78
```

```
## 3 Female Group B Standard        None               90            95
##   Writing_Score
## 4            44
## 2            88
## 6            78
## 1            74
## 5            75
## 3            93
```

Sorting the observations by Statistics Scores in ascending order

```
#Create a new column titled "Total_Score" that calculates the total score for each student
student_data$Total_Score <- student_data$Statistics_Score + student_data$Reading_Score + student_data$Wr
print(student_data)
```

```
##   Gender    Race    Lunch Prep_Course Statistics_Score Reading_Score
## 1 Female Group B Standard        None               72            72
## 2 Female Group C Standard   Completed               69            90
## 3 Female Group B Standard        None               90            95
## 4   Male Group A     Free        None               47            57
## 5   Male Group C Standard        None               76            78
## 6 Female Group B Standard        None               71            83
##   Writing_Score Total_Score
## 1            74         218
## 2            88         247
## 3            93         278
## 4            44         148
## 5            75         229
## 6            78         232
```

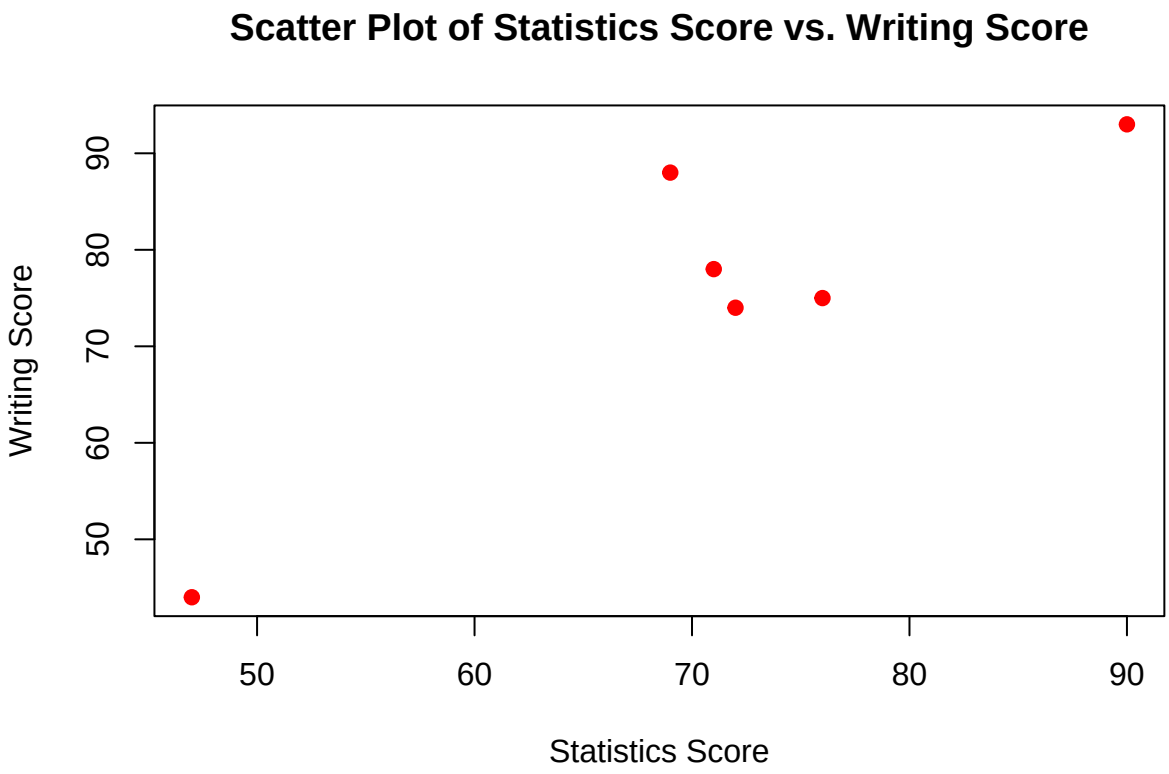
the column of a total score is displayed

```
#Perform correlation between Statistics Score and Writing Score
correlation <- cor(student_data$Statistics_Score, student_data$Writing_Score)
print(paste("Correlation between Statistics Score and Writing Score:", correlation))
```

```
## [1] "Correlation between Statistics Score and Writing Score: 0.890605141184602"
```

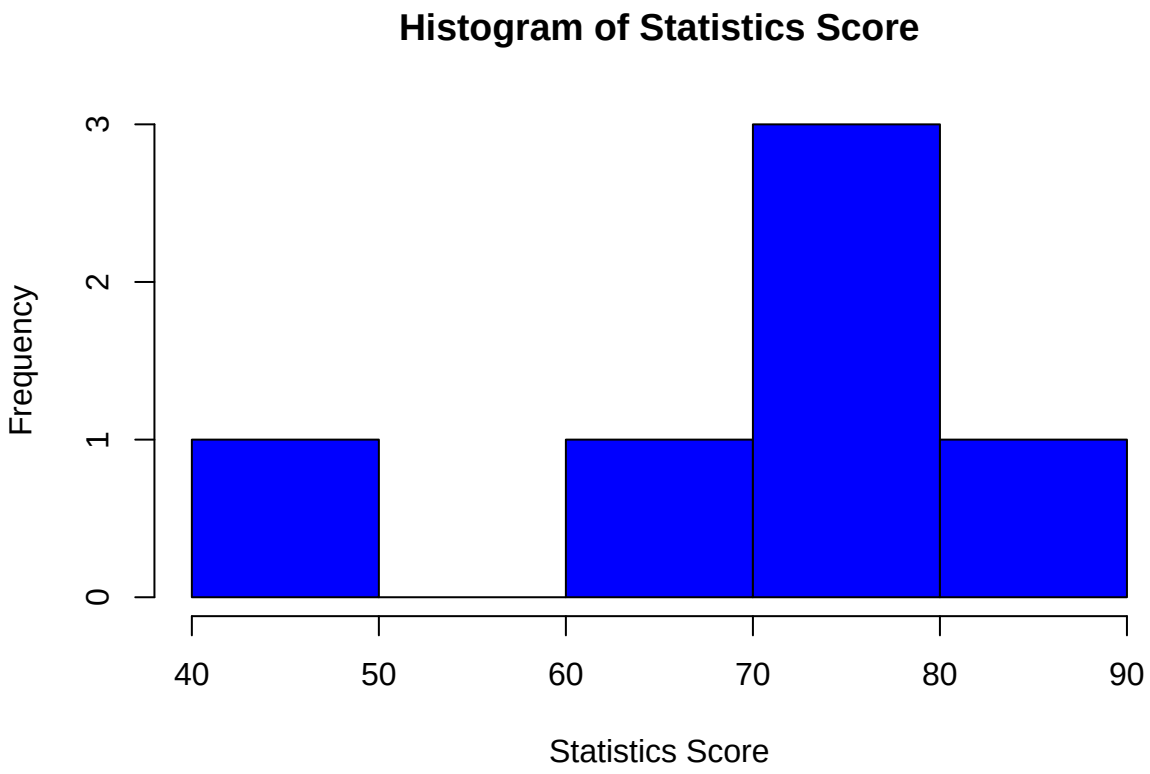
There is an evidence of a high correlation between Statistics Score and Writing Score

```
#Plot a scatter plot of Statistics Score vs. Writing Score
plot(student_data$Statistics_Score, student_data$Writing_Score,
     main = "Scatter Plot of Statistics Score vs. Writing Score",
     xlab = "Statistics Score",
     ylab = "Writing Score",
     pch = 19, col = "red")
```



Visualisation of a scatter plot of Statistics Score vs. Writing Score.There is a higher writing score above a statistic score of 70.

```
#Plot a histogram of the Statistics Score
hist(student_data$Statistics_Score,
     main = "Histogram of Statistics Score",
     xlab = "Statistics Score",
     col = "blue",
     border = "black")
```




```
#subtopic .dealing with matrices
Mat1<-matrix(c(5,0,6,1,3,5,9,5,7,1,5,3),3,4)
Mat1
```

```
##      [,1] [,2] [,3] [,4]
## [1,]    5    1    9    1
## [2,]    0    3    5    5
## [3,]    6    5    7    3
```

Visualisation of statistics score in form of a histogram, whith the highest score been between 70-80 mark.

```
library(MASS)
Mat1_pseudoinv<- ginv(Mat1)#solving the inverse Mat1_pseudoinv
Mat1_pseudoinv
```

```
##             [,1]         [,2]         [,3]
## [1,] -0.01788491 -0.141135303  0.142690513
## [2,] -0.14580093 -0.002008813  0.166861068
## [3,]  0.14346812  0.063310005 -0.097524624
## [4,] -0.05598756  0.137895283 -0.002592017
```

Finding the inverse of a matrix.

```
#marices
mat2<-matrix(c(3,3,2,1,1,4,1,1,0,0,1,5,1,2,2),ncol = 3)
mat2
```

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

```
## [2,]    3    1    5
## [3,]    2    1    1
## [4,]    1    0    2
## [5,]    1    0    2
```

Forming a matrix.

```
#creating rowand column labels
colnames(mat2)<-c("gold","silver","bronze")
rownames(mat2)<-c("United States","Great Britain","Canada","Russia","Switzerland")
mat2
```

```
##               gold silver bronze
## United States    3      4      1
## Great Britain    3      1      5
## Canada           2      1      1
## Russia           1      0      2
## Switzerland      1      0      2
```

Namming columns and rows.

```
#dimension of the matrix
dim(mat2)
```

```
## [1] 5 3
```

Finding the dimensuon of a matrix

```
#using sequences to create matrices
b<-1:9
b
```

```
## [1] 1 2 3 4 5 6 7 8 9
```

The Cbind matrix.

```
cbind(b)
```

```
##       b
##  [1,] 1
##  [2,] 2
##  [3,] 3
##  [4,] 4
##  [5,] 5
##  [6,] 6
##  [7,] 7
##  [8,] 8
##  [9,] 9
```

The Rbind matrix.

```
rbind(b)
```

```
##   [,1] [,2] [,3] [,4] [,5] [,6] [,7] [,8] [,9]
## b    1    2    3    4    5    6    7    8    9
```