

RWorksheet_Esmalla#4a.Rmd

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```
```r
```

```
#1
```

```
shoesize_vec<- c(6.5,9.0,8.5,8.5,10.0,7.0,9.5,9.0,13.0,7.5,10.5,8.5,12.5,10.5,13.5,11.5,8.5,5.0,10.0,6.5,
```

```
height_vec <- c(66.0,68.0,64.5,65.0,70.0,64.0,70.0,71.0,72.0,64.0,74.5,67.0,71.0,71.0,77.0,72.0,59.0,62.0,
```

```
gender_vec <-c("F","F","F","F","M","F","F","F","M","F","M","F","M","M","M","M","F","F","M","F","F","M",
```

```
householdData <- data.frame(Shoesize = shoesize_vec,
 Height = height_vec,
 Gender = gender_vec)
```

```
householdData
```

```
Shoesize Height Gender
1 6.5 66.0 F
2 9.0 68.0 F
3 8.5 64.5 F
4 8.5 65.0 F
5 10.0 70.0 M
6 7.0 64.0 F
7 9.5 70.0 F
8 9.0 71.0 F
9 13.0 72.0 M
10 7.5 64.0 F
11 10.5 74.5 M
12 8.5 67.0 F
13 12.5 71.0 M
14 10.5 71.0 M
15 13.5 77.0 M
16 11.5 72.0 M
17 8.5 59.0 F
18 5.0 62.0 F
19 10.0 72.0 M
20 6.5 66.0 F
21 7.5 64.0 F
22 8.5 67.0 M
23 10.5 73.0 M
24 8.5 69.0 F
25 10.5 72.0 M
26 11.0 70.0 M
```

```
27 9.0 69.0 M
28 13.0 70.0 M
```

```
1.a
```

```
In the data, there are three variables which are the shoe size, height, and gender. There are 28 observations.
```

```
1.b
```

```
males <- householdData[householdData$Gender == "M",]
males
```

```
Shoesize Height Gender
5 10.0 70.0 M
9 13.0 72.0 M
11 10.5 74.5 M
13 12.5 71.0 M
14 10.5 71.0 M
15 13.5 77.0 M
16 11.5 72.0 M
19 10.0 72.0 M
22 8.5 67.0 M
23 10.5 73.0 M
25 10.5 72.0 M
26 11.0 70.0 M
27 9.0 69.0 M
28 13.0 70.0 M
```

```
females <- householdData[householdData$Gender == "F",]
females
```

```
Shoesize Height Gender
1 6.5 66.0 F
2 9.0 68.0 F
3 8.5 64.5 F
4 8.5 65.0 F
6 7.0 64.0 F
7 9.5 70.0 F
8 9.0 71.0 F
10 7.5 64.0 F
12 8.5 67.0 F
17 8.5 59.0 F
18 5.0 62.0 F
20 6.5 66.0 F
21 7.5 64.0 F
24 8.5 69.0 F
```

```
1.c
```

```
meanOfShoesize <- mean(householdData$Shoesize)
meanOfShoesize
```

```
[1] 9.428571
```

```
meanOfHeight <- mean(householdData$Height)
meanOfHeight
```

```
[1] 68.57143
```

```
1.d
The relationship of the two is that the shoe size is directly proportional to the height. If the height is 1.8m, the shoe size is 42.
```

```
2
```

```
months_vec <- c("March", "April", "January", "November", "January", "September", "October", "September", "November")
```

```
months_vec
```

```
[1] "March" "April" "January" "November" "January" "September"
[7] "October" "September" "November" "August" "January" "November"
[13] "November" "February" "May" "August" "July" "December"
[19] "August" "August" "September" "November" "February" "April"
```

```
factor_months_vec <- factor(months_vec)
```

```
factor_months_vec
```

```
[1] March April January November January September October
[8] September November August January November November February
[15] May August July December August August September
[22] November February April
11 Levels: April August December February January July March May ... September
```

```

```

```
3
```

```
summary(months_vec)
```

```
Length Class Mode
24 character character
```

```
summary(factor_months_vec)
```

```
April August December February January July March May
2 4 1 2 3 1 1 1
November October September
5 1 3
```

```
In the summary of months_vector, it shows the number of observations, class, and mode of the vector.
```

```
In the summary of factor_months_vector, it shows the frequency of each months.
```

```
Both are useful in different cases where the no. of observations, class, mode, or the frequency is needed.
```

```

```

```
4
```

```
factor_data <- c("East", "West", "North")
```

```
factor_frequency <- c(1,4,3)
```

```
new_order_data <- factor(factor_data, levels = c("East", "West", "North"))
```

```
print(new_order_data)
```

```
[1] East West North
Levels: East West North
```

```

5
```

```
imported_table <- read.table(file = "/cloud/project/Rworksheet_Esmalla#4/import_march.csv", header = T)

imported_table
```

```
Students Strategy.1 Strategy.2 Strategy.3
1 Male 8 10 8
2 4 8 6
3 0 6 4
4 Female 14 4 15
5 10 2 12
6 6 0 9
```

```

6
```

```
randomNum <- readline(prompt = "Enter number from 1 to 50: ")
```

```
Enter number from 1 to 50:
```

```
#cant knit if there is as.numeric
#randomNum <- as.numeric(randomNum)
```

```
paste("The number you have chosen is", randomNum)
```

```
[1] "The number you have chosen is "
```

```
if (randomNum > 50) {
 paste("The number selected is beyond the range of 1 to 50")
} else if (randomNum == 20) {
 paste("TRUE")
} else {
 paste(randomNum)
}
```

```
[1] ""
```

```

7
```

```
minimumBills <- function(price) {

 minBills <- price %/% 50
 paste("The minimum no. of bills:", minBills)
}
```

```
minimumBills(90)
```

```
[1] "The minimum no. of bills: 1"
```

```

8.a

names <- c("Annie", "Thea", "Steve", "Hanna")
grade1 <- c(85,65,75,95)
grade2 <- c(65,75,55,75)
grade3 <- c(85,90,80,100)
grade4 <- c(100,90,85,90)

mathScore <- data.frame(
 Name = names,
 Grade1 = grade1,
 Grade2 = grade2,
 Grade3 = grade3,
 Grade4 = grade4
)

8.b

mathScore$Average <- (mathScore$Grade1 + mathScore$Grade2 + mathScore$Grade3 + mathScore$Grade4) / 4

highscorers <- mathScore[mathScore$Average > 90,]
highscorers

[1] Name Grade1 Grade2 Grade3 Grade4 Average
<0 rows> (or 0-length row.names)

if (nrow(highscorers) > 0) {
 paste(highscorers$Name, "'s average grade this semester is", highscorers$Average)
} else {
 paste("No students have an average math score over 90.")
}

[1] "No students have an average math score over 90."

8.c

firstTest <- sum(mathScore$Grade1) / nrow(mathScore)
firstTest

[1] 80

secondTest <- sum(mathScore$Grade2) / nrow(mathScore)
secondTest

[1] 67.5

thirdTest <- sum(mathScore$Grade3) / nrow(mathScore)
thirdTest

[1] 88.75

fourthTest <- sum(mathScore$Grade4) / nrow(mathScore)
fourthTest

[1] 91.25

```

```

if (firstTest < 80) {
 paste("The 1st test was difficult.")
} else if(secondTest < 80) {
 paste("The 2nd test was difficult.")
} else if(thirdTest < 80) {
 paste("The 3rd test was difficult.")
} else if(fourthTest < 80) {
 paste("The 4th test was difficult.")
} else {
 paste("No test had an average score less than 80.")
}

```

```
[1] "The 2nd test was difficult."
```

```
8.d
```

```
annie scores
```

```

if (mathScore[1,2] > mathScore[1,3] && mathScore[1,2] > mathScore[1,4] && mathScore[1,2] > mathScore[1,5]) {
 annieHighest <- mathScore[1,2]
} else if (mathScore[1,3] > mathScore[1,4] && mathScore[1,3] > mathScore[1,5]) {
 annieHighest <- mathScore[1,3]
} else if (mathScore[1,4] > mathScore[1,5] && mathScore[1,2] > mathScore[1,5]) {
 annieHighest <- mathScore[1,4]
} else {
 annieHighest <- mathScore[1,5]
}

```

```
thea scores
```

```

if (mathScore[2,2] > mathScore[2,3] && mathScore[2,2] > mathScore[2,4] && mathScore[2,2] > mathScore[2,5]) {
 theaHighest <- mathScore[2,2]
} else if (mathScore[2,3] > mathScore[2,4] && mathScore[2,3] > mathScore[2,5]) {
 theaHighest <- mathScore[2,3]
} else if (mathScore[2,4] > mathScore[2,5] && mathScore[2,2] > mathScore[2,5]) {
 theaHighest <- mathScore[2,4]
} else {
 theaHighest <- mathScore[2,5]
}

```

```
steve scores
```

```

if (mathScore[3,2] > mathScore[3,3] && mathScore[3,2] > mathScore[3,4] && mathScore[3,2] > mathScore[3,5]) {
 steveHighest <- mathScore[3,2]
} else if (mathScore[3,3] > mathScore[3,4] && mathScore[3,3] > mathScore[3,5]) {
 steveHighest <- mathScore[3,3]
} else if (mathScore[3,4] > mathScore[3,5] && mathScore[3,2] > mathScore[3,5]) {
 steveHighest <- mathScore[3,4]
} else {
 steveHighest <- mathScore[3,5]
}

```

```
hanna scores
```

```

if (mathScore[4,2] > mathScore[4,3] && mathScore[4,2] > mathScore[4,4] && mathScore[4,2] > mathScore[4,5]) {
 hannaHighest <- mathScore[4,2]
} else if (mathScore[4,3] > mathScore[4,4] && mathScore[4,3] > mathScore[4,5]) {
 hannaHighest <- mathScore[4,3]
}

```

```

} else if (mathScore[4,4] > mathScore[4,5] && mathScore[4,2] > mathScore[4,5]) {
 hannaHighest <- mathScore[4,4]
} else {
 hannaHighest <- mathScore[4,5]
}

mathScore$HighestGrades <- c(annieHighest, theaHighest, steveHighest, hannaHighest)

above90 <- mathScore[mathScore$HighestGrades > 90,]
above90

Name Grade1 Grade2 Grade3 Grade4 Average HighestGrades
1 Annie 85 65 85 100 83.75 100
4 Hanna 95 75 100 90 90.00 100

if (nrow(above90) > 0) {
 paste(above90$Name, "'s highest grade this semester is", above90$HighestGrade)
} else {
 paste("No students have an average math score over 90.")
}

[1] "Annie 's highest grade this semester is 100"
[2] "Hanna 's highest grade this semester is 100"

```