

# RWorksheet\_Songaling#4a.Rmd

Charles Daniel Songaling

2023-10-25

*#1. The table below shows the data about shoe size and height. Create a data frame.*

```
Household_data <- data.frame(  
  Shoe_size =c(6.5, 9.0, 8.5, 8.5, 10.5, 7.0, 9.5, 9.0, 13.0, 7.5, 10.5, 8.5, 12.0, 10.5, 13.0, 11.5,  
  
  Height =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,  
  
  Gender =c("F", "F", "F", "F", "M", "F", "F", "F", "M", "F", "M", "F", "M", "M", "M", "M", "F", "F",  
)  
Household_data
```

##	Shoe_size	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	10.5	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	12.0	71.0	M
## 14	10.5	71.0	M
## 15	13.0	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

*#a. Describe the data.*

*#It shows the corresponding shoe size along with their height and gender. It also shows that most mal*

*#b. Create a subset by males and females with their corresponding shoe size and height. What its result?*

```
male <- subset(Household_data, Gender == "M", select = c(Shoe_size, Height))
female <- subset(Household_data, Gender == "F", select = c(Shoe_size, Height))
```

```
print(male)
```

```
##      Shoe_size Height
## 5          10.5   70.0
## 9          13.0   72.0
## 11         10.5   74.5
## 13         12.0   71.0
## 14         10.5   71.0
## 15         13.0   77.0
## 16         11.5   72.0
## 19         10.0   72.0
## 22          8.5   67.0
## 23         10.5   73.0
## 25         10.5   72.0
## 26         11.0   70.0
## 27          9.0   69.0
## 28         13.0   70.0
```

```
print(female)
```

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

*#c. Find the mean of shoe size and height of the respondents. Write the R scripts and its result.*

```
mean_shoesize <- mean(Household_data$Shoe_size)
mean_height <- mean(Household_data$Height)
```

```
cat("Mean shoe size:", (mean_shoesize))
```

```
## Mean shoe size: 9.410714
```

```
cat("Mean height:", (mean_height))
```

```
## Mean height: 68.57143
```

*#d. Is there a relationship between shoe size and height? Why?*

*#Yes, because the data shows that the taller the height, the bigger the shoe size.*

```
#Factors
```

```
#2. Construct character vector months to a factor with factor() and assign the result to factor_months_
```

```
Months <-c("March","April","January","November","January",  
"September","October","September","November","August",  
"January","November","November","February","May","August", "July","December","August","August","September")  
  
factor_Months <- factor(Months)  
factor_Months
```

```
## [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. Then check the summary() of the months_vector and factor_months_vector. / Interpret the results of  
summary(Months)
```

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

```
summary(factor_Months)
```

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

```
#The results display how many the months that put in the vector and display how many of the same mon
```

```
#4. Create a vector and factor for the table below.
```

```
Direction <-c("East", "West", "North")  
Frequency <-c(1,4,3)
```

```
factor_direction <- factor(Direction)  
factor_direction
```

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

```
factor_freq <- factor(Frequency)  
factor_freq
```

```
## [1] 1 4 3  
## Levels: 1 3 4
```

```
new_data <- factor(factor_direction,levels = c("East","West","North"))  
print(new_data)
```

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

```
new_data2 <- factor(factor_freq,levels = c(1,4,3))  
print(new_data2)
```

```
## [1] 1 4 3
## Levels: 1 4 3
```

*#5. Enter the data below in Excel with file name = import\_march.csv*

*#a. Import the excel file into the Environment Pane using read.table() function. Write the code.*

```
Exceldata <- read.csv("import_march.csv")
```

*#b. View the data set. Write the R scripts and its result.*

```
Exceldata
```

```
##   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
```

*#Using Conditional Statements (IF-ELSE)*

*#6. Full Search*

*#a. Create an R Program that allows the User to randomly select numbers from 1 to 50. Then display the*

```
user_input <- readline(prompt = "Enter numbers from 1 to 50: ")
```

```
## Enter numbers from 1 to 50:
```

```
  if(user_input>50){
    print("The number is beyond the range of 1 to 50")
  }else{
    print("TRUE")
  }
```

```
## [1] "TRUE"
```

*#7 Change*

*#a. Write a function that prints the minimum number of bills that must be paid, given the price of the*

```
minimum_price <- function(price){
```

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

```
minimum_price(200)
```

```
## [1] "The minimum no. of bills: 4"
```

*#8. The following is each student's math score for one semester. Based on this, answer the following questions*

*#a. Create a dataframe from the above table. Write the R codes and its output.*

```
math_scores <- data.frame(
  Name = 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)
)
math_scores

##      Name Grade1 Grade2 Grade3 Grade4
## 1 Annie      85      65      85     100
## 2 Thea       65      75      90      90
## 3 Steve      75      55      80      85
## 4 Hanna      95      75     100      90

#b. Without using the rowMean function, output the average score of students whose average math score

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

highgrades <- math_scores[math_scores$Average > 90, ]

if(nrow(highgrades)>0){
  print(highgrades$Name, "'s average grade this semester is:", highgrades)
}else{
  print("There is no student that got 90 average grades")
}

## [1] "There is no student that got 90 average grades"

#c. Without using the mean function, output as follows for the tests in which the average score was

average_scores <- colMeans(math_scores[, -1])

if (average_scores[1] < 80) {
  print("The 1st test was difficult.")
}else if (average_scores[2] < 80) {
  print("The 2nd test was difficult.")
}else if (average_scores[3] < 80) {
  print("The 3rd test was difficult.")
}else if (average_scores[4] < 80) {
  print("The 4th test was difficult.")
}else{
  print("No test that students find it difficult")
}

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

#d. Without using the max function, output as follows for students whose highest score for a semester

#Annie

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

```

```

}

# Thea scores
if (math_scores[2,2] > math_scores[2,3] && math_scores[2,2] > math_scores[2,4] && math_scores[2,2] > math_scores[2,5]) {
  theascore <- math_scores[2,2]
} else if (math_scores[2,3] > math_scores[2,4] && math_scores[2,3] > math_scores[2,5]) {
  theascore <- math_scores[2,3]
} else if (math_scores[2,4] > math_scores[2,5] && math_scores[2,2] > math_scores[2,5]) {
  theascore <- math_scores[2,4]
} else {
  theascore <- math_scores[2,5]
}

# Steve scores
if (math_scores[3,2] > math_scores[3,3] && math_scores[3,2] > math_scores[3,4] && math_scores[3,2] > math_scores[3,5]) {
  stevescore <- math_scores[3,2]
} else if (math_scores[3,3] > math_scores[3,4] && math_scores[3,3] > math_scores[3,5]) {
  stevescore <- math_scores[3,3]
} else if (math_scores[3,4] > math_scores[3,5] && math_scores[3,2] > math_scores[3,5]) {
  stevescore <- math_scores[3,4]
} else {
  stevescore <- math_scores[3,5]
}

# Hanna scores
if (math_scores[4,2] > math_scores[4,3] && math_scores[4,2] > math_scores[4,4] && math_scores[4,2] > math_scores[4,5]) {
  hannascore <- math_scores[4,2]
} else if (math_scores[4,3] > math_scores[4,4] && math_scores[4,3] > math_scores[4,5]) {
  hannascore <- math_scores[4,3]
} else if (math_scores[4,4] > math_scores[4,5] && math_scores[4,2] > math_scores[4,5]) {
  hannascore <- math_scores[4,4]
} else {
  hannascore <- math_scores[4,5]
}

math_scores$HighestGrades <- c(anniescore, theascore, stevescore, hannascore)

highest90 <- math_scores[math_scores$HighestGrades > 90,]
highest90

##      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(highest90) > 0) {
  paste(highest90$Name, "'s highest grade this semester is", highest90$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"

```