

RWorksheet_Octaviano#4

2023-10-25

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

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

```
shoeSize <- 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, 8.5)
```

```
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, 72.0, 59.0, 62.0)
```

```
householdData <- data.frame(
  Gender = Gender,
  ShoeSize = shoeSize,
  Height = Height
)
householdData
```

##	Gender	ShoeSize	Height
## 1	F	6.5	66.0
## 2	F	9.0	68.0
## 3	F	8.5	64.5
## 4	F	8.5	65.0
## 5	M	10.5	70.0
## 6	F	7.0	64.0
## 7	F	9.5	70.0
## 8	F	9.0	71.0
## 9	M	13.0	72.0
## 10	F	7.5	64.0
## 11	M	10.5	74.5
## 12	F	8.5	67.0
## 13	M	12.0	71.0
## 14	M	10.5	71.0
## 15	M	13.0	77.0
## 16	M	11.5	72.0
## 17	F	8.5	59.0
## 18	F	5.0	62.0
## 19	M	10.0	72.0
## 20	F	6.5	66.0
## 21	F	7.5	64.0
## 22	M	8.5	67.0
## 23	M	10.5	73.0
## 24	F	8.5	69.0
## 25	M	10.5	72.0
## 26	M	11.0	70.0
## 27	M	9.0	69.0
## 28	M	13.0	70.0

```
#a  
# The data contains 28 unique data entries on individuals, including gender, shoe size, and height.
```

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

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

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

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

```
#c  
meanOfShoeSize <- mean(householdData$ShoeSize)  
meanOfShoeSize
```

```
## [1] 9.410714
```

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

```
## [1] 68.57143
```

```
#d.  
# The relationship between the two is that the shoe size is directly proportional to the height. If the
```

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

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

```
months_vector
```

```
## [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_vector <- factor(months_vector)
```

```
factor_months_vector
```

```
## [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_vector)
```

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

```
summary(factor_months_vector)
```

```
##      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 month.

#Both are useful in different cases where the number of observations, class, mode, or frequency are needed.

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

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

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

```
print(new_order_data)
```

```
## [1] <NA> <NA> <NA>
```

```
## Levels: East West North
```

5. Enter the data below in Excel with file name = import_march.csv

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

```
### Using Conditional Statements (IF-ELSE)
```

```
# 6. Full Search
```

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

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

```
#can't 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. Change
```

```
minimumBills <- function(price) {  
  
  minBills <- price %/% 50  
  paste("The minimum no. of bills:", minBills)  
}  
minimumBills(90)
```

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

*# 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.*

```
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  
)
```

#b. Without using the rowMean function, output the average score of students whose average math score is greater than 80.

```
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."
```

#c. Without using the mean function, output as follows for the tests in which the average score was less than 80.

```
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."
```

#d. d. Without using the max function, output as follows for students whose highest score for a semester was less than 80.

```
# -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"

```