

## RWorksheet\_Salinas#4a

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#1. The table below shows the data about shoe size and height. Create a 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, 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, 70.0)
gender <- c("F","F","F","F","M","F","F","F","M","F","M","F","M","M","M","M","F","F","M","F","F","M","M")
```

```
# Create a data frame
```

```
data <- data.frame(ShoeSize = shoe_size, Height = height, Gender = gender)
```

#a. Describe the data.

```
summary(data)
```

```
##      ShoeSize      Height      Gender
##  Min.   : 5.000   Min.   :59.00   Length:28
##  1st Qu.: 8.500   1st Qu.:65.75   Class :character
##  Median : 9.000   Median :69.50   Mode  :character
##  Mean   : 9.411   Mean   :68.57
##  3rd Qu.:10.500   3rd Qu.:71.25
##  Max.   :13.000   Max.   :77.00
```

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

#What its result? Show the R scripts.

```
males <- data[data$Gender == "M", c("Gender", "ShoeSize", "Height")]
females <- data[data$Gender == "F", c("Gender", "ShoeSize", "Height")]
```

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
```

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

```
mean_shoe_size <- mean(data$ShoeSize)
```

```
mean_height <- mean(data$Height)
```

```
mean_shoe_size
```

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

```
mean_height
```

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

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

*#No, Both shoe size and height can change over a person's lifetime.*

```
correlation <- cor(data$ShoeSize, data$Height)
```

```
correlation
```

```
## [1] 0.7766089
```

*#2. Create a character vector of months*

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

```
factor_months_vector <- factor(months)
```

```
print(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
```

```
levels(factor_months_vector)
```

```
## [1] "April"      "August"     "December"   "February"   "January"    "July"
```

```
## [7] "March"      "May"         "November"    "October"     "September"
```

```
#3 summary
```

```
# character vector  
#for numerical analysis  
summary(months)
```

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

```
# the factor  
# for categorical analysis  
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
```

```
#4 Create a vector and factor
```

```
direction_vector <- c("north", "east", "west")  
frequency_vector <- c(1, 4, 3)
```

```
factor_data <- factor(direction_vector, levels = c("east", "west", "north"), c(1, 4, 3))  
print(factor_data)
```

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

```
#5 A Import the excel
```

```
imported <- read.table(file = "import_march.csv", header = TRUE, sep = ",")
```

```
#5 B.View the dataset
```

```
imported
```

```
##      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 Full Search
```

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

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

```
paste("Your entered number is ", num)
```

```
## [1] "Your entered number is "
```

```
if(num == 50) {  
  paste("The number you selected is beyond the range of 1 to 50")  
} else if (num <= 50){
```

```

    paste("TRUE")
  } else {
    paste(num)
  }

```

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

```

#7 Change
minimum <- function (price) {

  bill <- price%% 50
  paste("The minimum number of bills:", bill)
}

snackprice <- 250
minimum(snackprice)

```

```
## [1] "The minimum number of bills: 5"
```

*#8 A. Create a dataframe*

```

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)

mathgrades <- data.frame(name, grade1, grade2, grade3, grade4)
print(mathgrades)

```

```

##   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

```

*#8 B. the average score of students whose average math score over 90 points during the semester.*

```

mathgrades <- 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)
)

print(mathgrades)

```

```

##   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

```

```

mathgrades$average <- (mathgrades$grade1 + mathgrades$grade2 + mathgrades$grade3 + mathgrades$grade4) / 4

top <- mathgrades[mathgrades$average >= 90,]
top

```

```
##   name grade1 grade2 grade3 grade4 average
## 4 Hanna     95     75    100     90     90
```

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

```
## [1] "Hanna 's average grade this semester is 90"
```

```
#8 C. the average score was less than 80 out of 4 tests.
```

```
test1 <- sum(mathgrades$grade1) / nrow(mathgrades)
test1
```

```
## [1] 80
```

```
test2 <- sum(mathgrades$grade2) / nrow(mathgrades)
test2
```

```
## [1] 67.5
```

```
test3 <- sum(mathgrades$grade3) / nrow(mathgrades)
test3
```

```
## [1] 88.75
```

```
test4 <- sum(mathgrades$grade4) / nrow(mathgrades)
test4
```

```
## [1] 91.25
```

```
if (test1 < 80) {
  paste("The 1st test was difficult")
} else if (test2 < 80) {
  paste("The 2nd test was difficult")
} else if (test3 < 80) {
  paste("The 3rd test was difficult")
} else if (test4 < 80) {
  paste("The 4th test was difficult")
} else {
  paste("No test had an average grade less than 80")
}
```

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

```
#8 D. students whose highest score for a semester exceeds 90 points.
```

```
# annie scores
```

```
if (mathgrades[1,2] > mathgrades[1,3] && mathgrades[1,2] > mathgrades[1,4] && mathgrades[1,2] > mathgrades[1,5]) {
  annie <- mathgrades[1,2]
} else if (mathgrades[1,3] > mathgrades[1,4] && mathgrades[1,3] > mathgrades[1,5]) {
  annie <- mathgrades[1,3]
} else if (mathgrades[1,4] > mathgrades[1,5] && mathgrades[1,2] > mathgrades[1,5]) {
  annie <- mathgrades[1,4]
} else {
  annie <- mathgrades[1,5]
}
```

```

# thea scores
if (mathgrades[2,2] > mathgrades[2,3] && mathgrades[2,2] > mathgrades[2,4] && mathgrades[2,2] > mathgrades[2,5]) {
  thea <- mathgrades[2,2]
} else if (mathgrades[2,3] > mathgrades[2,4] && mathgrades[2,3] > mathgrades[2,5]) {
  thea <- mathgrades[2,3]
} else if (mathgrades[2,4] > mathgrades[2,5] && mathgrades[2,2] > mathgrades[2,5]) {
  thea <- mathgrades[2,4]
} else {
  thea <- mathgrades[2,5]
}

# steve scores
if (mathgrades[3,2] > mathgrades[3,3] && mathgrades[3,2] > mathgrades[3,4] && mathgrades[3,2] > mathgrades[3,5]) {
  steve <- mathgrades[3,2]
} else if (mathgrades[3,3] > mathgrades[3,4] && mathgrades[3,3] > mathgrades[3,5]) {
  steve <- mathgrades[3,3]
} else if (mathgrades[3,4] > mathgrades[3,5] && mathgrades[3,2] > mathgrades[3,5]) {
  steve <- mathgrades[3,4]
} else {
  steve <- mathgrades[3,5]
}

# hanna scores
if (mathgrades[4,2] > mathgrades[4,3] && mathgrades[4,2] > mathgrades[4,4] && mathgrades[4,2] > mathgrades[4,5]) {
  hanna <- mathgrades[4,2]
} else if (mathgrades[4,3] > mathgrades[4,4] && mathgrades[4,3] > mathgrades[4,5]) {
  hanna <- mathgrades[4,3]
} else if (mathgrades[4,4] > mathgrades[4,5] && mathgrades[4,2] > mathgrades[4,5]) {
  hanna <- mathgrades[4,4]
} else {
  hanna <- mathgrades[4,5]
}

mathgrades$highest <- c(annie, thea, steve, hanna)

abovegradeof90 <- mathgrades[mathgrades$highest >= 90,]

if (nrow(abovegradeof90) > 0) {
  paste(abovegradeof90$name, "'s highest grade this semester is", abovegradeof90$highest)
} else {
  paste("No students have an average math score over 90.")
}

## [1] "Annie 's highest grade this semester is 100"
## [2] "Thea 's highest grade this semester is 90"
## [3] "Hanna 's highest grade this semester is 100"

```