RWorksheet_Calambro#4a

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

```
library(readxl)
Household <- read_excel("HouseHold_Data.xlsx")

Household
```

```
## # A tibble: 28 x 3
##    Shoe_size Height Gender
##        <dbl>  <dbl> <chr>
##  1       6.5   66   F
##  2       9     68   F
##  3       8.5   64.5 F
##  4       8.5   65   F
##  5      10.5   70   M
##  6       7     64   F
##  7       9.5   70   F
##  8       9     71   F
##  9      13     72   M
## 10       7.5   64   F
## # i 18 more rows
```

a. Describe the data

The data set includes 25 people with information on their shoe size, height, and gender. Shoe sizes range from 5.0 to 13.0, and heights range from 59.0 to 77.0 inches. Males generally have larger shoe sizes and are taller than females. Taller individuals tend to have bigger shoe sizes.

b. Create a subset by males and females with their corresponding shoe size and height. What its result? Show the R scripts.

```
males <- subset(Household, Gender == "M", select = c(Shoe_size, Height))
females <- subset(Household, Gender == "F", select = c(Shoe_size, Height))
males
```

```
## # A tibble: 14 x 2
##    Shoe_size Height
##        <dbl>  <dbl>
##  1      10.5   70
##  2      13     72
##  3      10.5   74.5
##  4      12     71
##  5      10.5   71
##  6      13     77
##  7      11.5   72
##  8      10     72
```

```
##  9       8.5   67
## 10      10.5   73
## 11      10.5   73
## 12      11     70
## 13       9     69
## 14      13     70
```

```
females
```

```
## # A tibble: 14 x 2
##    Shoe_size Height
##        <dbl>  <dbl>
##  1       6.5   66
##  2       9     68
##  3       8.5   64.5
##  4       8.5   65
##  5       7     64
##  6       9.5   70
##  7       9     71
##  8       7.5   64
##  9       8.5   67
## 10       8.5   59
## 11       5     62
## 12       6.5   66
## 13       7.5   64
## 14       8.5   69
```

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

```
meanofshoes <- mean(Household$Shoe_size)
meanofheight <- mean(Household$Height)

paste("The Mean of Shoes:", meanofshoes)
```

```
## [1] "The Mean of Shoes: 9.41071428571429"
```

```
paste("The Mean of Height:", meanofheight)
```

```
## [1] "The Mean of Height: 68.6071428571429"
```

d. Is there a relationship between shoe size and height? Why? Yes, there is a relationship between the shoe size and the height.The taller individuals tend to have larger shoe sizes.

FACTORS

2. Construct character vector months to a factor with factor() and assign the result to factor_months_vector. Print out factor_months_vector and assert that R prints out the factor levels below the actual values.

```
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 <- 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
```

```
levels(Months)
```

```
## NULL
```

3. Then check the summary() of the months_vector and factor_months_vector. | Inter- pret the results of both vectors. Are they both equally useful in this case?

```
("The Summary of Months:")
```

```
## [1] "The Summary of Months:"
```

```
summary(Months)
```

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

```
("The Summary of Factor_Months:")
```

```
## [1] "The Summary of Factor_Months:"
```

```
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
```

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

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

Frequency <- c(1, 4, 3)

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

("Directions Factor with Specified Order:")
```

```
## [1] "Directions Factor with Specified Order:"
```

```
new_order_data
```

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

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

```
library(readxl)
data <- read_excel("import_march.csv")

data
```

```
## # A tibble: 6 x 4
##   Students Strategy1 Strategy2 Strategy3
##   <chr>        <dbl>     <dbl>     <dbl>
## 1 Male             8        10         8
## 2 Male             4         8         6
## 3 Male             0         6         4
```

```
## 4 Female          14         4        15
## 5 Female          10         2        12
## 6 Female           6         0         9
```

6. a. Create an R Program that allows the User to randomly select numbers from 1 to 50. Then display the chosen number. If the number is beyond the range of the selected choice, it will have to display a string "The number selected is beyond the range of 1 to 50". If number 20 is inputted by the User, it will have to display "TRUE", otherwise display the input number.

```
Num <- readline(prompt = "Enter a number from 1-50:")
```

```
## Enter a number from 1-50:
```

```
Num
```

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

If the number is beyond the range of the selected choice, it will have to display a string "The number selected is beyond the range of 1 to 50". If number 20 is inputted by the User, it will have to display "TRUE", otherwise display the input number.

```
Num <- readline(prompt = "Enter a number from 1-50:")
```

```
## Enter a number from 1-50:
```

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

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

7. Change At ISATU University's traditional cafeteria, snacks can only be purchased with bills. A long-standing rule at the concession stand is that snacks must be purchased with as few coins as possible. There are three types of bills: 50 pesos, 100 pesos, 200 pesos, 500 pesos, 1000 pesos.

a. Write a function that prints the minimum number of bills that must be paid, given the price of the snack. Input: Price of snack (a random number divisible by 50) Output: Minimum number of bills needed to purchase a snack.

```
min_amount <- function(price) {
  count <- 0

  if (price >= 1000) {
    count <- count + (price %/% 1000)
    price <- price %% 1000
  }

  if (price >= 500) {
    count <- count + (price %/% 500)
    price <- price %% 500
  }

  if (price >= 200) {
    count <- count + (price %/% 200)
    price <- price %% 200
  }
```

```
  if (price >= 100) {
    count <- count + (price %/% 100)
    price <- price %% 100
  }

  if (price >= 50) {
    count <- count + (price %/% 50)
    price <- price %% 50
  }

  else(count)
}


price <- 1150
cat("Minimum number of bills needed:", min_amount(price), "\n")
```

```
## Minimum number of bills needed: 0
```

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, 85, 100)
grade2 <- c(65, 75, 90, 90)
grade3 <- c(75, 55, 80, 85)
grade4 <- c(95, 75, 100, 90)

names_grades <- data.frame(Name = names , Grade1 = grade1, Grade2 = grade2, Grade3 = grade3, Grade4 = g

print(names_grades)
```

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

b. Without using the rowMean function, output the average score of students whose average math score over 90 points during the semester. write R code and its output. Example Output: Annie's average grade this semester is 88.75.

```
for (i in 1:nrow(names_grades)) {

  average <- (names_grades$Grade1[i] + names_grades$Grade2[i] + names_grades$Grade3[i] + names_grades$G

  # Check if the average is over 90
  if (average > 90) {
    cat(names_grades$Name[i], "'s average grade this semester is ", average, ".\n", sep = "")
  }
}
```

```
## Hanna's average grade this semester is 91.25.
```

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

than 80 out of 4 tests. Example output: The nth test was difficult.

```
for (test in 1:4) {

  total_score <- sum(names_grades[[paste0("Grade", test)]])


  average <- total_score / nrow(names_grades)


  if (average < 80) {
    cat("The", test, "test was difficult.\n")
  }
}
```

```
## The 3 test was difficult.
```

d. Without using the max function, output as follows for students whose highest score for a semester exceeds 90 points. Example Output: Annie's highest grade this semester is 95.

```
for (i in 1:nrow(names_grades)) {

  highest <- names_grades$Grade1[i]
  if (names_grades$Grade2[i] > highest) {
    highest <- names_grades$Grade2[i]
  }
  if (names_grades$Grade3[i] > highest) {
    highest <- names_grades$Grade3[i]
  }
  if (names_grades$Grade4[i] > highest) {
    highest <- names_grades$Grade4[i]
  }


  if (highest > 90) {
    cat(names_grades$Name[i], "'s highest grade this semester is ", highest, ".\n", sep = "")
  }
}
```

```
## Annie's highest grade this semester is 95.
## Steve's highest grade this semester is 100.
## Hanna's highest grade this semester is 100.
```