RWorksheet_guion#4a

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1. Create a data frame.

```
houseHo <- 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
  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", 
)
houseHo
```

```
##    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

The data Household Data shows the shoe size, height, and gender.

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

```
male_data <- subset(houseHo, Gender == "M", select = c(Shoe_size, Height))
female_data <- subset(houseHo, Gender == "F", select = c(Shoe_size, Height))
male_data
```

```
##    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
```

```
female_data
```

```
##    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.

```
mean(houseHo$Shoe_size)
```

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

```
mean(houseHo$Height)
```

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

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

Yes, the greater the the height the bigger shoe size it ranges. However, if you look at it closely it's not consistent. For instance, one female has a height of 59.0 and the other 62.0 and their shoe sizes are 8.5 and 5.0 respectively.

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_vector <- 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_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 both vectors. Are they both equally useful in this case?

```
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
```

The summary of months_vector only shows how many values the vector contains and the data type while the summary of factor_months_vector shows the frequency of each month or level. The summary of the factor is more useful since it provides clearer details about the values.

4. Create a vector and factor

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

a. Import the excel file into the Environment Pane using read.table() function.

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

b. View the dataset. Write the R scripts and its result.

```
data
```

```
##   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. 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.

```
user_input =(readline(prompt = "Enter a random number from 1 to 50: "))
```

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

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

```
## [1] "The number selected is beyond the range of 1 to 50"
```

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

```
minBills <- function(price) {
  bills <- c(1000, 500, 200, 100, 50)
  count <- 0
  for (bill in bills) {

    while (price >= bill) {
      price <- price - bill
      count <- count + 1
    }
  }
  return(count)
}
snack_price <- 1650
cat("Minimum number of bills needed:", minBills(snack_price), "\n")
```

```
## Minimum number of bills needed: 4
```

8.

```
students_df <- 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(students_df)
```

```
##    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.
calculate_average <- function(grades) {
total <- sum(grades)
avg <- total / length(grades)
return(avg)
}

for (i in 1:nrow(students_df)) {
grades <- as.numeric(students_df[i, 2:5])
avg_grade <- calculate_average(grades)

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

```r
# c.
for (j in 2:ncol(students_df)) {
total <- sum(students_df[, j])
avg_test <- total / nrow(students_df)

if (avg_test < 80) {
cat("The ", j - 1, "nd test was difficult.\n", sep = "")
}
}
```

```
## The 2nd test was difficult.
```

```r
# d.
calculate_max <- function(grades) {
max_grade <- grades[1]
for (grade in grades) {
if (grade > max_grade) {
max_grade <- grade
}
}
return(max_grade)
}

for (i in 1:nrow(students_df)) {
grades <- as.numeric(students_df[i, 2:5])
highest_grade <- calculate_max(grades)

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

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