RWorksheet_Malayas#4a.Rmd

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

```
df <- data.frame(
shoesize = c(6.5, 9.0, 8.5, 8.5, 7.0, 9.0, 9.5, 13.0, 7.5, 10.5, 10.5, 12.0, 10.5,
             13.0, 11.5, 8.5, 5.0, 10.0, 6.5, 7.5, 8.5, 10.5, 8.5, 10.5, 11.0, 9.0, 13.0),
height = c(66.0, 68.0, 65.0, 65.0, 64.0, 71.0, 72.0, 72.0, 74.5, 67.0, 74.5, 71.0, 71.0,
           77.0, 72.0, 59.0, 62.0, 72.0, 66.0, 64.0, 67.0, 73.0, 69.0, 72.0, 70.0, 69.0, 70.0),
gender = c("F", "F", "F", "F", "F", "F", "F", "M", "F", "M", "M", "M", "M",
           "M", "M", "F", "F", "M", "F", "F", "F", "M", "F", "M", "M", "M", "M")
)

df
```

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

a. Describe the data.

- The dataset contains 27 entries with information on shoe size, height, and gender. Shoe sizes range from 5.0 to 13.0, while heights vary from 59 to 77 inches. Gender is categorized as either "F" for female or "M" for male.

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

- The data displays the shoe size and height for each male and female included in the dataset.

```
male <- subset(df, gender == "M", select = c(shoesize, height))


female <- subset(df, gender == "F", select = c(shoesize, height))


male
```

```
##    shoesize height
## 8      13.0   72.0
## 10     10.5   67.0
## 11     10.5   74.5
## 12     12.0   71.0
## 13     10.5   71.0
## 14     13.0   77.0
## 15     11.5   72.0
## 18     10.0   72.0
## 22     10.5   73.0
## 24     10.5   72.0
## 25     11.0   70.0
## 26      9.0   69.0
## 27     13.0   70.0
```

```
female
```

```
##    shoesize height
## 1       6.5   66.0
## 2       9.0   68.0
## 3       8.5   65.0
## 4       8.5   65.0
## 5       7.0   64.0
## 6       9.0   71.0
## 7       9.5   72.0
## 9       7.5   74.5
## 16      8.5   59.0
## 17      5.0   62.0
## 19      6.5   66.0
## 20      7.5   64.0
## 21      8.5   67.0
## 23      8.5   69.0
```

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

```r
meanS <- mean(df$shoesize)


meanH <- mean(df$height)


meanS
```

```
## [1] 9.444444
```

```r
meanH
```

```
## [1] 69
```

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

- Yes, as taller individuals often have larger feet, there is frequently a correlation between shoe size and height. This can vary, though, and the strength of this association may be influenced by things like heredity.

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.

```r
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")

factormonths <- factor(months)

print(factormonths)
```

```
##  [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
```

```r
levels(factormonths)
```

```
##  [1] "April"     "August"    "December"  "February"  "January"   "July"
##  [7] "March"     "May"       "November"  "October"   "September"
```

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 result of months_vector is that is states the Length, Class and Mode. While the factor_months_vector states how many months in the data for example April, April has 2. -I think they are both useful because it is easy for me to understand and determine how many types of data from the raw data itself.

```
summary(months)
```

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

```
summary(factormonths)
```

```
##     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.

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

factordata <- factor(direction)

newdata <- factor(factordata,levels = c("East","West","North"))
newdata
```

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

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.

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

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

```
data_ex
```

```
##   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

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.

```
numpick <- function(SelectedNumber) {

  if(SelectedNumber < 1 || SelectedNumber > 50) {
    print("The selected number is beyond the range of 1 to 50")
  } else if(SelectedNumber == 20) {
    print("TRUE")
  } else {
    print(SelectedNumber)
  }
}
SelectedNumber <- readline(prompt = "Select a number from 1 to 50: ")
```

```
## Select a number from 1 to 50:
```

```
  numpick(SelectedNumber)
```

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

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.

```
Payment <- function(price) {
  bills <- c(1000, 500, 200, 100, 50)

  CountBill <- 0
  for(bill in bills) {
    count <- price %/% bill
    CountBill <- CountBill + count

    price <- price %% bill
  }

  print(paste("Minimum number of bills needed to purchase a snack: ", CountBill))
}

Payment(1640)
```

```
## [1] "Minimum number of bills needed to purchase a snack:  3"
```

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.

```r
students <- 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)
)

students
```

```
##    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 over 90 points during the semester. write R code and its output. Example Output: Annie's average grade this semester is 88.75.

```r
for (i in 1:nrow(students)) {
  TotalScore <- students$Grade1[i] + students$Grade2[i] + students$Grade3[i] + students$Grade4[i]
  AvgScore <- TotalScore / 4

  if (AvgScore > 90) {
     AvgGrade <- sprintf("%s's average grade this semester is %.2f.", students$Name[i], AvgScore)
    print(AvgGrade)
  }
}
```

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.

```r
for (j in 2:5) {
  TotalTestScore <- sum(students[, j])
  AvgTestScore <- TotalTestScore / nrow(students)

  if (AvgTestScore < 80) {
    print(paste("The", j-1, "th test was difficult."))
  }
}
```

```
## [1] "The 2 th 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.

```r
for (i in 1:nrow(students)) {

  Grade <- c(students$Grade1[i], students$Grade2[i], students$Grade3[i], students$Grade4[i])
```

```
  HighestGrade_ <- Grade[1]
  for (grade in Grade) {
    if (grade > HighestGrade_) {
      HighestGrade_ <- grade
    }
  }

  if (HighestGrade_ > 90) {
    print(paste(students$Name[i], "'s highest grade this semester is", HighestGrade_))
  }
}
```

```
## [1] "Annie 's highest grade this semester is 100"
## [1] "Hanna 's highest grade this semester is 100"
```