Rworksheet_Canonicato#4a

Dianah Marie Canonicato

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```
#Worksheet-4a in R

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



Household_Data<- data.frame(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,
                 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.
                 Gender = c('F','F','F','F','M','F','F','F', 'M','F','M','F','M','M', 'M','M','F','F','
)
Household_Data
```

```
##    Shoesize 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
```

```r
#a. Describe the data.

#Household_Data  is a data frame containing 27 observations of three variables: Shoe size, Height, and

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

Males <- subset (Household_Data, Gender =="M" )
Females <- subset (Household_Data, Gender =="F")

Males
```

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

```r
Females
```

```
##    Shoesize 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
## 6       7.0   64.0      F
## 7       9.5   70.0      F
## 8       9.0   71.0      F
## 10      7.5   64.0      F
## 12      8.5   67.0      F
## 17      8.5   59.0      F
## 18      5.0   62.0      F
## 20      6.5   66.0      F
## 21      7.5   64.0      F
## 24      8.5   69.0      F
```

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

# Calculate the mean shoe size and height of the respondents
mean_shoe_size <- mean(Household_Data$Shoesize)

mean_height <- mean(Household_Data$Height)

cat("The mean shoe size of the respondents is:", mean_shoe_size, "\n")
```

```
## The mean shoe size of the respondents is: 9.410714
```

```r
cat("The mean height of the respondents is:", mean_height, "\n")
```

```
## The mean height of the respondents is: 68.57143
```

```r
#d. Is there a relationship between shoe size and height? Why?
#There is no apparent relationship between shoe size and height in this dataset. This can be seen from

#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","August",
                       "January","November","November","February","May","August","July","December","Augus
                           "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
```

```r
#3. Then check the summary() of the months_vector and factor_months_vector. | Inter-pret the results of

summary(months_vector)
```

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

```r
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
```

```r
#Interpretation: Both vectors are useful in their own right, but the factor vector allows R to treat th

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

factor_data <- rep (c("East", "West", "North"), c(1,4,3))

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

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

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

imported_table <- read.table(file =  "/cloud/project/worksheet#4/import_march.csv", header = TRUE, sep =

imported_table
```

```
##          X        X.1        X.2        X.3
## 1 Students Strategy 1 Strategy 2 Strategy 3
## 2     Male          8         10          8
## 3                   4          8          6
```

```
## 4                   0          6          4
## 5   Female         14          4         15
## 6                  10          2         12
## 7                   6          0          9
```

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


#6. Full Search
#a
input_number <- readline(prompt = "Enter number from 1 to 50: ")
```

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

```
paste("The number you have chosen is", input_number)
```

```
## [1] "The number you have chosen is "
```

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

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

```
#7. Change

min_bills <- function(snack_price) {
  if (snack_price %% 50 != 0) {
    return("Price of snack must be divisible by 50")
  }

  bills <- c(500, 200, 100, 50, 10)
  min_bills <- Inf

  for (bill in bills) {
    if (snack_price >= bill) {
      min_bills <- min(min_bills, ceiling(snack_price / bill))
    }
  }

  return(min_bills)
}

# Call the function with a specific snack_price and print the result
result <- min_bills(200)
cat("Minimum number of bills:", result, "\n")
```

```
## Minimum number of bills: 1
```

```
#8. The following is each student's math score for one semester. Based on this, answer the following qu

#a.
students_math_score <- data.frame(
  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)


)

students_math_score
```

```
##   Names 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.

students_math_score$Average <- (students_math_score$Grade1 + students_math_score$Grade2 + students_math

HighGrades <- students_math_score[students_math_score$Average > 90, ]

if(nrow(HighGrades)>0){
  print(HighGrades$Name,"'s average grade this semester is:",HighGrades)
}else{
  print("there is no student that got 90 average grades")
}
```

```
## [1] "there is no student that got 90 average grades"
```

```
#c.

AverageScores <- colMeans(students_math_score[, -1])

if (AverageScores[1] < 80) {
    print("The 1st test was difficult")
}else if (AverageScores[2] < 80) {
    print("The 2nd test was difficult")
}else if (AverageScores[3] < 80) {
    print("The 3rd test was difficult")
}else if (AverageScores[4] < 80) {
    print("The 4th test was difficult")
}else{
  print("No test that students find it difficult")
}
```

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

```
#d.

 #Annie Scores

if (students_math_score[1,2] > students_math_score[1,3] && students_math_score[1,2] > students_math_sco
  AnnieScores <-students_math_score[1,2]
} else if (students_math_score[1,3] > students_math_score[1,4] && students_math_score[1,3] > students_ma
  AnnieScores <- students_math_score[1,3]
```

```
} else if (students_math_score[1,4] > students_math_score[1,5] && students_math_score[1,2] > students_ma
  AnnieScores <- students_math_score[1,4]
} else {
  AnnieScores <- students_math_score[1,5]
}


# Thea Scores
if (students_math_score[2,2] >students_math_score[2,3] && students_math_score[2,2] >students_math_score
  TheaScores <- students_math_score[2,2]
} else if (students_math_score[2,3] > students_math_score[2,4] &&students_math_score[2,3] >students_mat
  theaScores <- students_math_score[2,3]
} else if (students_math_score[2,4] > students_math_score[2,5] && students_math_score[2,2] > students_ma
  TheaScores <- students_math_score[2,4]
} else {
  TheaScores <-students_math_score[2,5]
}

# Steve Scores
if (students_math_score[3,2] > students_math_score[3,3] &&students_math_score[3,2] > students_math_score
  SteveScores <- students_math_score[3,2]
} else if (students_math_score[3,3] > students_math_score[3,4] && students_math_score[3,3] > students_ma
 SteveScores <- students_math_score[2,3]
} else if (students_math_score[3,4] > students_math_score[3,5] && students_math_score[3,2] > students_ma
  SteveScores <- students_math_score[3,4]
} else {
  SteveScores <- students_math_score[3,5]
}

# Hanna Scores
if (students_math_score[4,2] > students_math_score[4,3] && students_math_score[4,2] >students_math_score
  HannaScores <- students_math_score[4,2]
} else if (students_math_score[4,3] >students_math_score[4,4] && students_math_score[4,3] > students_mat
  HannaScores <- students_math_score[2,3]
} else if (students_math_score[4,4] > students_math_score[4,5] && students_math_score[4,2] > students_ma
  HannaScores <- students_math_score[4,4]
} else {
  HannaScores <- students_math_score[4,5]
}

students_math_score$HighestGrades <- c(AnnieScores, TheaScores, SteveScores, HannaScores)


NinetyHighest <- students_math_score[students_math_score$HighestGrades > 90,]
NinetyHighest
```

```
##   Names 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(NinetyHighest) > 0) {
  paste(NinetyHighest$Name, "'s highest grade this semester is", NinetyHighest$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"
```