RWorksheet_Eusuya#4A

Jonjeyl M. Eusuya

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1

A

```
data <- data.frame(
  ShoeSize = c(6.5,9.0,8.5,8.5,10.5,7.0,9.5,9.0,13.0,7.5,10.5,8.5,12.0,10.5,13.0,11.5,8.5,5.0,10.0,6.5,

  Height = c(66.0,68.0,64.5,65.0,70.0,64.0,70.0,71.0,72.0,64.0,74.5,67.0,71.0,71.0,77.0,72.0,59.0,62.0,

  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
)
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
```

B

```
male_sub <- subset(data, Gender == "M", select = c(ShoeSize, Height))
female_sub <- subset(data, Gender == "F", select = c(ShoeSize, Height))
male_sub
```

```
##    ShoeSize 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_sub
```

```
##    ShoeSize 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

```
shoe_mean <- mean(data$ShoeSize)
height_mean <- mean(data$Height)
shoe_mean
```

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

```
height_mean
```

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

D Is there a relationship between shoe size and height? Why?

No, because the shoe size does not affect the height

2

```
months_vector <- c("March","April","January","November","January","September","October","September","No
"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

```
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
```

Interpret the results of both vectors. Are they both equally useful in this case?

Yes, because they show the lenght, data type and contents of both vectors.

4

```
Direction <- c("East","West","North")
Frequency <- c(1, 4, 3)

data2 <- cbind(Direction,Frequency)
data2
```

```
##      Direction Frequency
## [1,] "East"    "1"
## [2,] "West"    "4"
## [3,] "North"   "3"
```

```
new_data2 <- factor(data2, levels = c("East","West","North"))
new_data2
```

```
## [1] East  West  North <NA>  <NA>  <NA>
## Levels: East West North
```

5

```
march <- read.csv("/cloud/project/RWorksheet_Eusuya#4A/import_march.csv")
march
```

```
##   Students Strategy1 Strategy2 Strategy3
## 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

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

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

```
if(!is.na(num) && num == 20){
  print("TRUE")
}else {
  print("Invalid Input")
}
```

```
## [1] "Invalid Input"
```

```
if(!is.na(num) && num>=1 && num<=50){
  num
}else{
  print("The number selected is beyond the range 1 to 50")
}
```

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

7

```
price <- as.numeric(readline(prompt="Enter Price: "))
```

```
## Enter Price:
```

```
min_bills <- function(price) {
  bills_used <- 0

  if (!is.na(price) && price >= 1000) {
    bills_used <- bills_used + price %/% 1000
    price <- price %% 1000
  }
```

```
  if (!is.na(price) && price >= 500) {
    bills_used <- bills_used + price %/% 500
    price <- price %% 500
  }
  if (!is.na(price) && price >= 200) {
    bills_used <- bills_used + price %/% 200
    price <- price %% 200
  }
  if (!is.na(price) && price >= 100) {
    bills_used <- bills_used + price %/% 100
    price <- price %% 100
  }
  if (!is.na(price) && price >= 50) {
    bills_used <- bills_used + price %/% 50
    price <- price %% 50
  }
  return(bills_used)
}
min_bills(price)
```

```
## [1] 0
```

8

A

```
data <- 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)
)
data
```

```
##    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

```
avg_scores <- rowSums(data[,-1]) / (ncol(data) - 1)

if (any(avg_scores > 90)) {
  high_avg_names <- data$Name[avg_scores > 90]
  high_avg_scores <- avg_scores[avg_scores > 90]
  cat(paste(high_avg_names, "'s average grade this semester is ", high_avg_scores, ".\n", sep = ""))
} else {
  cat("No student's average grade is over 90.\n")
}
```

```
## No student's average grade is over 90.
```

C

```
test_averages <- colSums(data[,-1]) / nrow(data)

if (any(test_averages < 80)) {
  difficult_tests <- which(test_averages < 80)
  cat(paste("The", difficult_tests, "th test was difficult.\n"))
} else {
  cat("All tests had average scores of 80 or above.\n")
}
```

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

D

```
highest_scores <- apply(data[,-1], 1, function(x) sort(x, decreasing = TRUE)[1])

if (any(highest_scores > 90)) {
  high_score_names <- data$Name[highest_scores > 90]
  high_scores <- highest_scores[highest_scores > 90]
  cat(paste(high_score_names, "'s highest grade this semester is ", high_scores, ".\n"))
} else {
  cat("No student's highest grade exceeded 90.\n")
}
```

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