RWorksheet_Gonzaga#4a.Rmd

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1. Data Frame about shoe size and height.

#a

```
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, 8.5, 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, 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, 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', 'M', 'F', 'F', 'F', 'M', 'F', 'M', 'F', 'M',
            'M', 'M', 'F', 'F', 'M', 'F', 'F', 'M', 'M', 'F', 'M', 'M',
            'M', 'M')

data1<- data.frame(
  Shoe_Size = shoe_size,
  Height = height,
  Gender = gender
)
```

output shows the tabular data of shoe size which consist the shoe sizes of 29 individuals, height consists the height in inches, and gender consists the gender of the individuals where 'M' represents the males and 'F' the females.

#b

```
male_subset <- subset(data1, gender == 'M', select = c(Shoe_Size, Height))
male_subset
```

```
##    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_subset <- subset(data1, gender == 'F', select = c(Shoe_Size, Height))
female_subset
```

```
##    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

```
mean(data1$Shoe_Size)
```

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

```
mean(data1$Height)
```

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

#d

A positive correlation nearing the value of 1 exemplifies that there exists a positive relationship – as the size of a shoe increases, usually, the height goes up too.

#2.

```
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
```

```
levels(factor_months_vector)
```

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

The factor version (factor_months_vector) is more beneficial for categorical data such as months because it transforms and tally's the specific levels (months) at once. The character vector (months) are less effective in this case because it doesn't provide any sense of aggregation of the data. Rather, it just considers the months as separate single text values

The number of elements and character vector (months) will have been accomplished by using the summary() on the character vector. This will be obtained with the help of the summary() function applied to the factor called factor_months_vector, which will offer the frequency of each level in the data base, or in other words, it will show how many times each month was mentioned in the data set.

#4.

```
direction <- c("East", "West", "North")
frequency <- c(1, 4, 3)

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

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

#5.

#a.

```r
file1 <- read.table("import_march.csv", header = TRUE, sep = ",")
```

#b.

```r
print(file1)
```

```
##   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.

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

user_input <- readline(prompt = "Select a number from 1 - 50: ")
```

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

```r
e_search(user_input)
```

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

#7 Change

```r
minimum_bills <- function(price){
  bills <- c(1000, 500, 200, 100, 50)
  total_bills <- 0

  for (bill in bills) {
    count <- floor(price / bill)
    price <- price - count * bill
    total_bills <- total_bills + count
  }

  return(total_bills)
}

price <- as.numeric(readline(prompt = "Enter the price of the snack: "))
```

```
## Enter the price of the snack:
```

```
print(paste("Minimum number of bills needed to purchase a snack:", minimum_bills(price)))
```

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

#8

#a

```
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)

student_grade <- data.frame(
  Name = name,
  Grade1 = grade1,
  Grade2 = grade2,
  Grade3 = grade3,
  Grade4 = grade4
)
student_grade
```

```
##    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

```
for (i in 1:4) {
  total <- sum(student_grade[i, 2:5])
  average <- total / 4

  if (average > 90){
    print(paste0(student_grade[i, 1], "'s average grade this semester is ", average))
  }
}
```

#c

```
for (i in 2:4){
  total <- 0
  for (j in 1:4){
    total <- total + student_grade[j, i]
  }

  average <- total / 4
```

```
  if (average < 80){
    print(paste("The", colnames(student_grade[i]), "test was difficult"))
  }
}
```

```
## [1] "The Grade2 test was difficult"
```

#d

```
for (j in 1:nrow(student_grade)) {
  highest <- student_grade[j, 2]

  for (i in 3:ncol(student_grade)) {
    if (student_grade[j, i] > highest) {
      highest <- student_grade[j, i]
    }
  }

  if (highest > 90){
    print(paste0(student_grade[j, 1], "'s grade this semester is ", highest))
  }
}
```

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