

## RWorksheet4a in R

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#1.

#A.

```
table <- data.frame (Shoe_Size = shoe_size, Shoe_Height = shoe_height)
```

```
print(table)

##      Shoe_Size Shoe_Height
## 1          6.5       66.0
## 2          9.0       68.0
## 3          8.5       64.5
## 4          8.5       65.0
## 5         10.5      70.0
## 6          7.5       64.0
## 7          9.5      70.0
## 8          9.0      71.0
## 9         13.0      72.0
## 10         7.5       64.0
## 11         10.5      74.5
## 12         8.5       67.0
## 13         12.0      71.0
## 14         10.5      71.0
## 15         13.0      77.0
## 16         11.5      72.0
## 17         8.5       59.0
## 18         5.0       62.0
## 19         10.0      72.0
## 20         6.5       66.0
## 21         7.5       64.0
## 22         8.5       67.0
## 23         10.5      73.0
## 24         8.5       69.0
## 25         10.5      72.0
## 26         11.0      70.0
## 27         9.0       69.0
## 28         13.0      70.0
```

```
#It create a data base containing the shoe size and height.
```

```
#B.
```

```
table$gender <- c("Male", "Male", "Female", "Male", "Female", "Male", "Female", "Male",  
                  "Male", "Female", "Male", "Female", "Male", "Female", "Male", "Female", "Male", "Female",  
                  "Male", "Female", "Male", "Female", "Male", "Female", "Male", "Female", "Male")
```

```
print(table)
```

```
##      Shoe_Size Shoe_Height gender  
## 1        6.5       66.0   Male  
## 2        9.0       68.0   Male  
## 3        8.5       64.5 Female  
## 4        8.5       65.0   Male  
## 5       10.5       70.0 Female  
## 6        7.5       64.0   Male  
## 7        9.5       70.0 Female  
## 8        9.0       71.0   Male  
## 9       13.0       72.0 Female  
## 10       7.5       64.0   Male  
## 11       10.5      74.5 Female  
## 12       8.5       67.0   Male  
## 13       12.0      71.0 Female  
## 14       10.5      71.0   Male  
## 15       13.0      77.0 Female  
## 16       11.5      72.0   Male  
## 17       8.5       59.0 Female  
## 18       5.0       62.0   Male  
## 19       10.0      72.0 Female  
## 20       6.5       66.0   Male  
## 21       7.5       64.0 Female  
## 22       8.5       67.0   Male  
## 23       10.5      73.0 Female  
## 24       8.5       69.0   Male  
## 25       10.5      72.0 Female  
## 26       11.0      70.0   Male  
## 27       9.0       69.0 Female  
## 28       13.0      70.0   Male
```

```
males <- subset(table, gender == "Male")
```

```
females <- subset(table, gender == "Female")
```

```
print(males)
```

```
##      Shoe_Size Shoe_Height gender  
## 1        6.5       66   Male  
## 2        9.0       68   Male  
## 4        8.5       65   Male  
## 6        7.5       64   Male  
## 8        9.0       71   Male  
## 10       7.5       64   Male  
## 12       8.5       67   Male  
## 14       10.5      71   Male
```

```

## 16      11.5      72   Male
## 18       5.0      62   Male
## 20       6.5      66   Male
## 22       8.5      67   Male
## 24       8.5      69   Male
## 26      11.0      70   Male
## 28      13.0      70   Male

```

```
print(females)
```

```

##      Shoe_Size Shoe_Height gender
##  3        8.5       64.5 Female
##  5       10.5       70.0 Female
##  7        9.5       70.0 Female
##  9       13.0       72.0 Female
## 11       10.5       74.5 Female
## 13       12.0       71.0 Female
## 15       13.0       77.0 Female
## 17       8.5       59.0 Female
## 19       10.0       72.0 Female
## 21        7.5       64.0 Female
## 23       10.5       73.0 Female
## 25       10.5       72.0 Female
## 27        9.0       69.0 Female

```

*#C.*

```
mean(table$Shoe_Height)
```

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

*#D.*

*#Yes there are, because taller individuals tend to have bigger footsize.*

####2.

```

months <- c("March", "April", "January", "November", "January", "September", "October", "September", "November"
factor_months_vector <- factor(months)

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)

##      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

####4.

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

table <- data.frame (
  Direction = direction,
  Frequency = frequency
)
print(table)

##   Direction Frequency
## 1      Easy         1
## 2      West         4
## 3     North         3

factor_direction <- factor(direction,levels = c("Easy", "West", "North"))
print(factor_direction)

## [1] Easy  West  North
## Levels: Easy West North

####5.

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

#B.
print(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.

```

```

exhaustive_search <- function(num) {
  if (is.na(num)) {
    cat("Invalid input. Please enter a numeric value.\n")
  } else if (num < 1 || num > 50) {
    cat("The number selected is beyond the range of 1 to 50\n")
  } else {
    if (num == 20) {
      cat("TRUE\n")
    } else {
      cat(num, "\n")
    }
  }
}

# Test with sample inputs
exhaustive_search(20)

```

## TRUE

```
exhaustive_search(25)
```

## 25

```
exhaustive_search(100)
```

## The number selected is beyond the range of 1 to 50

####7.

```

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

  if (price %% 50 != 0) {
    cat("Error: Price must be divisible by 50.\n")
    return(NULL)
  }

  count <- 0
  remaining <- price

  #large first
  for (bill in bills) {
    if (remaining >= bill) {
      num_bills <- remaining %/% bill
      count <- count + num_bills
      remaining <- remaining %% bill
    }
  }

  cat("Minimum number of bills needed:", count, "\n")
  return(count)
}

```

```
}
```

```
min_bills(300)
```

```
## Minimum number of bills needed: 2
```

```
## [1] 2
```

```
min_bills(1000)
```

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

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

```
min_bills(650)
```

```
## Minimum number of bills needed: 3
```

```
## [1] 3
```

```
## #8.
```

```
#A.
```

```
grades_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)
```

```
)
```

```
grades_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.
```

```
averages <- (grades_df$Grade1 + grades_df$Grade2 + grades_df$Grade3 + grades_df$Grade4) / 4
```

```
high_achievers <- grades_df[averages >= 90, ]
```

```
high_averages <- averages[averages >= 90]
```

```
for (i in 1:nrow(high_achievers)) {
```

```
  cat(high_achievers$name[i], "'s average grade this semester is ", high_averages[i], ".\n", sep = "")
```

```
## Hanna's average grade this semester is 90.
```

```

#C.
avg_grade1 <- sum(grades_df$Grade1) / nrow(grades_df)
avg_grade2 <- sum(grades_df$Grade2) / nrow(grades_df)
avg_grade3 <- sum(grades_df$Grade3) / nrow(grades_df)
avg_grade4 <- sum(grades_df$Grade4) / nrow(grades_df)

test_avgs <- c(avg_grade1, avg_grade2, avg_grade3, avg_grade4)
test_names <- c("Grade1", "Grade2", "Grade3", "Grade4")

for (i in 1:length(test_avgs)) {
  if (test_avgs[i] < 80) {
    cat("The", test_names[i], "was difficult.\n")
  }
}

```

## The Grade2 was difficult.

```

#D.
highest_grades <- apply(grades_df[, 2:5], 1, function(row) {
  sorted <- sort(as.numeric(row))
  sorted[length(sorted)]
})

for (i in 1:nrow(grades_df)) {
  name <- grades_df>Name[i]
  high_score <- highest_grades[i]
  if (high_score > 90) {
    cat(name, "'s highest grade this semester is ", high_score, ".\n", sep = "")
  }
}

```

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