

RWorksheet4a in R

Keir G. Sumayo

2025-11-03

#1.

#A.

```
shoe_size <- c(6.5,9.0,8.5,8.5,10.5,7.5,9.5,9.0,13.0,7.5,10.5,8.5,12.0,10.5,13.0,11.5,8.5,5.0,10.0,6.5,
shoe_height <- c(66,68,64.5,65,70,64,70,71,72,64,74.5,67,71,71,77,72,59,62,72,66,64,67,73,69,72,70,69,70)
```

```
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", "Female",  
                  "Male", "Female", "Male", "Female", "Male", "Female", "Male", "Female", "Male", "Fema  
                  "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.

```