Homework 2

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Before attempting to solve these homework questions make sure that you've install `tinytex` package onto your system with `install.packages(tinytex)` and `tinytex::install_tinytex()` commands.

Question 1 Calculate how many minutes in January.

```
 # Set start and end dates for January
start_date <- as.Date("2023-01-01")
end_date <- as.Date("2023-01-31")

# Calculate the number of days in January
num_days <- as.numeric(difftime(end_date, start_date, units = "days")) + 1

# Calculate the number of minutes in a day
num_minutes_in_day <- 24 * 60

# Calculate the total number of minutes in January
total_minutes <- num_days * num_minutes_in_day

# Print the result
cat(paste("Total minutes in January is: ",total_minutes))
```

```
## Total minutes in January is:  44640
```

Question 2 Add the numbers 3 1 4 1 5 9 2 6 without *using the addition sign.*

```
# Store the numbers in a vector
numbers <- c(3, 1, 4, 1, 5, 9, 2, 6)

# Use the sum() function to add up the numbers
result <- sum(numbers)

# Print the result
cat(paste("The sum of", paste(numbers, collapse = ", "), "is", result))
```

```
## The sum of 3, 1, 4, 1, 5, 9, 2, 6 is 31
```

Question 3 Create a vector named `x` containing the series -1, -0.9, . . . , 0, 0.1, . . . , 0.9, 1 and print the result.

```r
# Create a vector containing the numbers from -1 to 1 in steps of 0.1
x <- seq(-1, 1, by = 0.1)

# Print the vector
cat("The vector x contains the following elements:\n\n")
```

```
## The vector x contains the following elements:
```

```r
cat(x)
```

```
## -1 -0.9 -0.8 -0.7 -0.6 -0.5 -0.4 -0.3 -0.2 -0.1 0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1
```

Question 4 How do we get R to print the text "SBF!" 30 times without repeatingly typing it?

```r
# Use the rep() function to repeat "SBF!" 30 times
message <- rep("SBF!", 30)

# Print the message
cat(paste(message, collapse = " "))
```

```
## SBF! SBF! SBF! SBF! SBF! SBF! SBF! SBF! SBF! SBF! SBF! SBF! SBF! SBF! SBF! SBF! SBF! SBF! SBF! SBF!
```

Question 5 Create two vectors named "wizards" and "ranking". Let the "wizards" include the names Harry, Ron, Fred, George and Sirius, while the "ranking" includes the numbers 4, 2, 5, 1, and 3.

```r
# Create the "wizards" vector
wizards <- c("Harry", "Ron", "Fred", "George", "Sirius")

# Create the "ranking" vector
ranking <- c(4, 2, 5, 1, 3)

# Print the vectors
cat("The wizards are:\n")
```

```
## The wizards are:
```

```r
cat(wizards, sep = ", ")
```

```
## Harry, Ron, Fred, George, Sirius
```

```r
cat("\n\nThe ranking of the wizards is:\n")
```

```
##
##
## The ranking of the wizards is:
```

```r
cat(ranking, sep = ", ")
```

```
## 4, 2, 5, 1, 3
```

Question 6 Print/extract the second element of the wizards vector.

```r
# Create the "wizards" vector
wizards <- c("Harry", "Ron", "Fred", "George", "Sirius")

# Extract the second element of the "wizards" vector
second_wizard <- wizards[2]

# Print the second wizard's name
cat("The second wizard in the list is:", second_wizard)
```

```
## The second wizard in the list is: Ron
```

Question 7 Replace the names Fred, George and Sirius in the vector 'wizards' with the names Hermione, Ginny, and Malfoy.

```r
# Create the "wizards" vector
wizards <- c("Harry", "Ron", "Fred", "George", "Sirius")

# Create a vector of replacement names
replacement_names <- c("Hermione", "Ginny", "Malfoy")

# Replace the names in the "wizards" vector
wizards[c(3, 4, 5)] <- replacement_names

# Print the updated "wizards" vector
cat("The updated wizards list is:", wizards, sep = "\n")
```

```
## The updated wizards list is:
## Harry
## Ron
## Hermione
## Ginny
## Malfoy
```

Question 8 Anyone who hasn't read Harry Potter (like the professor of this class) needs tags to know who these characters are. Name the elements of the `wizards` vector as **Lead**, **Friend**, **Friend**, **Wife** and **Rival**. Print the results.

```r
wizards <- c("Harry", "Ron", "Hermione", "Ginny", "Malfoy")

# Rename the elements of the "wizards" vector
names(wizards) <- c("Lead", "Friend", "Friend", "Wife", "Rival")

# Print the renamed "wizards" vector
wizards
```

```
##       Lead     Friend     Friend       Wife      Rival
##    "Harry"      "Ron" "Hermione"    "Ginny"   "Malfoy"
```

Question 9 26 students entered the PEC206 midterm exam. The grades of these students are: 18, 95, 76, 90, 84, 83, 80, 79, 63, 76, 55, 78, 90, 81, 88, 89, 92, 73, 83, 72, 85, 66, 77, 82, 99 and 87. Save test scores in a vector named 'scores'. Calculate the mean, median, and range of exam grades.

```r
# Create the "scores" vector
scores <- c(18, 95, 76, 90, 84, 83, 80, 79, 63, 76, 55, 78, 90, 81, 88, 89, 92, 73, 83, 72, 85, 66, 77,

# Calculate the mean, median, and range of the "scores" vector
mean_score <- mean(scores)
median_score <- median(scores)
range_score <- range(scores)

# Print the results
cat("The mean score is:", mean_score, "\n")
```

```
## The mean score is: 78.5
```

```r
cat("The median score is:", median_score, "\n")
```

```
## The median score is: 81.5
```

```r
cat("The range of scores is:", range_score[1], "-", range_score[2], "\n")
```

```
## The range of scores is: 18 - 99
```

Question 10 In 2015, Nilay had an annual income of 22,000 TL, and total expenses of 3,000 TL. In 2016, his annual income was 67,000 TL, and his total expenses were 23,000 TL. In 2017, his annual income was 70,000TL, and his total expenses were 32,000TL. Finally, in 2018, his annual income was 72,000 TL and his total expenses were 35,000 TL. To save this information, create 3 different vectors named 'years', 'income' and 'expenses'. Calculate Nilay's annual savings and save these values in a vector named 'savings'.

```r
# Create the "years", "income", and "expenses" vectors
years <- c(2015, 2016, 2017, 2018)
income <- c(22000, 67000, 70000, 72000)
expenses <- c(3000, 23000, 32000, 35000)

# Calculate the annual savings for each year and save the results in the "savings" vector
savings <- income - expenses

# Print the "years", "income", "expenses", and "savings" vectors
cat("Years:", years, "\n")
```

```
## Years: 2015 2016 2017 2018
```

```r
cat("Income:", income, "\n")
```

```
## Income: 22000 67000 70000 72000
```

```r
cat("Expenses:", expenses, "\n")
```

```
## Expenses: 3000 23000 32000 35000
```

```r
cat("Savings:", savings, "\n")
```

```
## Savings: 19000 44000 38000 37000
```