

# 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 the start and end dates
start_date <- as.Date("2023-01-01")
end_date <- as.Date("2023-01-31")

# Calculate the number of minutes
minutes <- as.numeric(difftime(end_date, start_date, units = "mins"))

# Print the result
cat("There are", minutes, "minutes in January 2023.")
```

## There are 43200 minutes in January 2023.

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

```
# Define the numbers
x <- c(3, 1, 4, 1, 5, 9, 2, 6)

# Calculate the sum
result <- sum(x)

# Print the result
cat("The sum of", paste(x, 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.

```
# Create the vector x
x <- seq(from = -1, to = 1, by = 0.1)

# Print the vector
x
```

```
## [1] -1.0 -0.9 -0.8 -0.7 -0.6 -0.5 -0.4 -0.3 -0.2 -0.1 0.0 0.1 0.2 0.3 0.4
## [16] 0.5 0.6 0.7 0.8 0.9 1.0
```

**Question 4** How do we get R to print the text “SBF!” 30 times without repeatedly typing it?

```
# Print "SBF!" 30 times
cat(rep("SBF! ", 30))
```

```
## 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.

```
# Create the vectors
wizards <- c("Harry", "Ron", "Fred", "George", "Sirius")
ranking <- c(4, 2, 5, 1, 3)

# Print the vectors
wizards
```

```
## [1] "Harry" "Ron" "Fred" "George" "Sirius"
```

```
ranking
```

```
## [1] 4 2 5 1 3
```

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

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

# Print/Extract the second element
wizards[2]
```

```
## [1] "Ron"
```

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

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

# Replace the names
wizards[c(3, 4, 5)] <- c("Hermione", "Ginny", "Malfoy")

# Print the updated vector
wizards
```

```
## [1] "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.

```
# Create the vector
wizards <- c("Harry", "Ron", "Hermione", "Ginny", "Malfoy")

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

# Print the updated 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.

```
# Create the 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 mean, median, and range
mean_score <- mean(scores)
median_score <- median(scores)
range_score <- range(scores)

# Print the results
cat("Mean score:", mean_score, "\n")
```

```
## Mean score: 78.5
```

```
cat("Median score:", median_score, "\n")
```

```
## Median score: 81.5
```

```
cat("Range of scores:", range_score[1], "-", range_score[2])
```

```
## Range of scores: 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'.

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

# Calculate the annual savings and store in a vector named 'savings'
savings <- income - expenses

# Print the results
cat("Years:", years, "\n")
```

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

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

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

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

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

```
cat("Savings:", savings)
```

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