

Assignment 1

Please submit your answers in R format through Canvas and name your file using the convention LastName_FirstName_AssignmentNumber. For example, *Yazdi_Mohammad_1.R*.

Please practice “Basics.R” and read “Introduction to R_1.pdf” which provides a brief R tutorial about the basics. You can also watch [the recording of Session 1](#). Desired output and the number of lines of code for each question is provided. For example, for problem #1, you should write 3 lines of code to generate 120.

Question 1: Variables and Vectors

1. Declare a variable `num1` and assign it the value 15. Create another variable `num2` with the value 8. Calculate and print the product of `num1` and `num2`.

Desired output: 120

Number of lines of code: 3

2. Create a vector `vec1` with values 2, 4, 6, 8, and 10. Find the length of this vector and print it.

Desired output: 5

Number of lines of code: 2

3. Write only one line of code to extract the first and third elements from vector `vec1`.

Desired output: 2 6

Number of lines of code: 1

4. Create a new vector `vec2` with values 1, 3, 5, 7, and 9. Calculate the sum of `vec1` and `vec2`.

Desired output: 3 7 11 15 19

Number of lines of code: 2

5. Write only one line of code to check if `num1` is less than 20 and `num2` is greater than 5.

Desired output: TRUE

Number of lines of code: 1

Question 2: Vector Operations

6. Create a vector `scores` with values 85, 92, 78, 65, and 90, representing test scores. Find the mean of the `scores` vector.

Desired output: 82

Number of lines of code: 2

7. Add 10 to each element in the `scores` vector, and save it on a new vector `updated_scores`. Print the `updated_scores` vector.

Desired output: 95 102 88 75 100 *Number of lines of code: 2*

8. Create a vector `curve` with values -2, 3, 1, -5, and 4. Add the `curve` to the `updated_scores` vector to adjust the scores. Print the adjusted scores.

Desired output: 93 105 89 70 104 *Number of lines of code: 2*

9. Write only one line of code to find the test scores that are less than 70.

Desired output: 65

Number of lines of code: 1

Question 3: Data Frames

10. Load the `ISLR` library and display the first 6 rows of the `Auto` data frame using the `head` function. You can read more about the Auto dataset [here](#).

Desired output:

```
mpg cylinders displacement horsepower weight acceleration year origin name
1 18 8 307 130 3504 12.0 70 1 chevrolet chevelle malibu
2 15 8 350 165 3693 11.5 70 1 buick skylark 320
3 18 8 318 150 3436 11.0 70 1 plymouth satellite
4 16 8 304 150 3433 12.0 70 1 amc rebel sst
5 17 8 302 140 3449 10.5 70 1 ford torino
6 15 8 429 198 4341 10.0 70 1 ford galaxie 500
```

Number of lines of code: 2

11. Write only one line of code to calculate the average miles per gallon (`mpg`) for all the cars in the dataset rounded to 1 digit.

Desired output: 23.4

Number of lines of code: 1

12. What are the unique values of the number of `cylinders` in the dataset?

Desired output: `8 4 6 3 5`

Number of lines of code: 1

13. Write only one line of code to calculate the median of `mpg` for cars with `mpg` greater than 25.

Desired output: `31`

Number of lines of code: 1

14. Filter the data to include only rows where the `name` is "ford pinto".

Desired output:

```
mpg cylinders displacement horsepower weight acceleration year origin name
113 19.0 4 122 85 2310 18.5 73 1 ford pinto
131 26.0 4 122 80 2451 16.5 74 1 ford pinto
169 23.0 4 140 83 2639 17.0 75 1 ford pinto
175 18.0 6 171 97 2984 14.5 75 1 ford pinto
207 26.5 4 140 72 2565 13.6 76 1 ford pinto
```

Number of lines of code: 1

15. Filter the `Auto` data frame to include only rows 5 to 10 and print it.

Desired output:

```
mpg cylinders displacement horsepower weight acceleration year origin name
5 17 8 302 140 3449 10.5 70 1 ford torino
6 15 8 429 198 4341 10.0 70 1 ford galaxie 500
7 14 8 454 220 4354 9.0 70 1 chevrolet impala
8 14 8 440 215 4312 8.5 70 1 plymouth fury iii
9 14 8 455 225 4425 10.0 70 1 pontiac catalina
10 15 8 390 190 3850 8.5 70 1 amc ambassador dpl
```

Number of lines of code: 1