ELEC IT-E1

IT ELECTIVE 1

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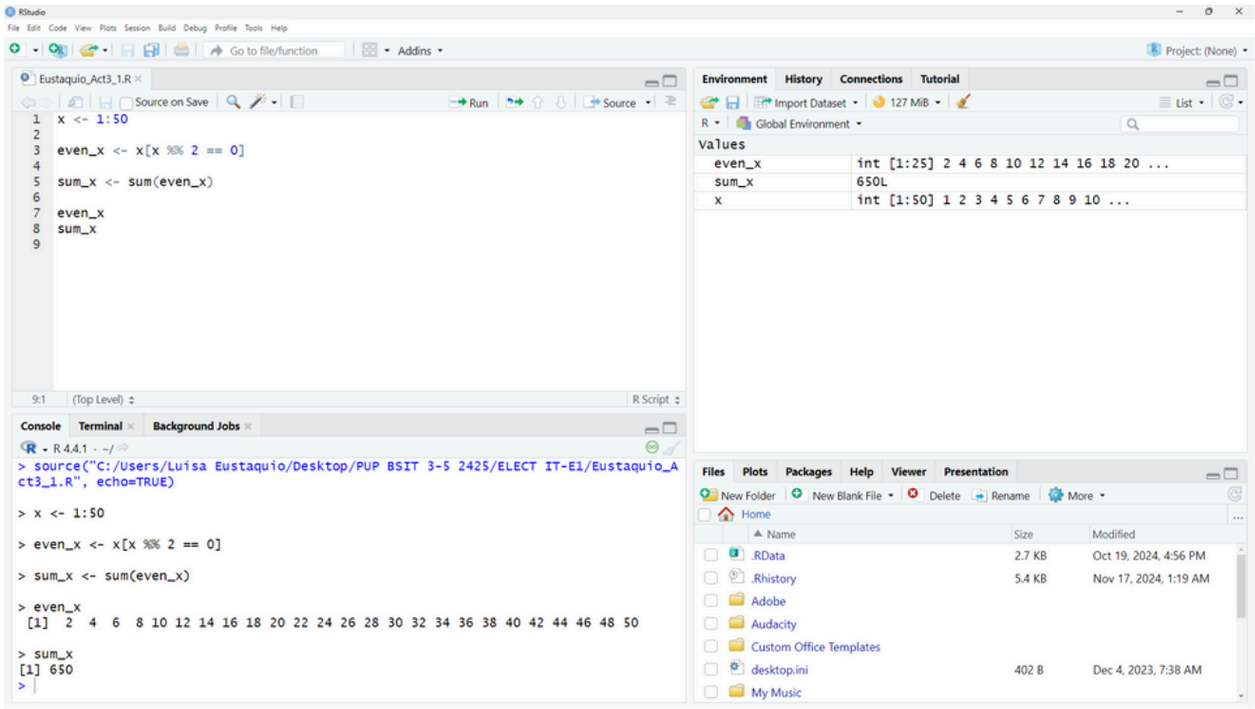
ACTIVITY #3 - WORKING WITH VECTORS AND DATA FRAMES

Instructions: Perform the tasks below using R programming. Write the corresponding R code for each question and explain the output briefly. Ensure your code is properly formatted and test it in RStudio or an equivalent IDE.

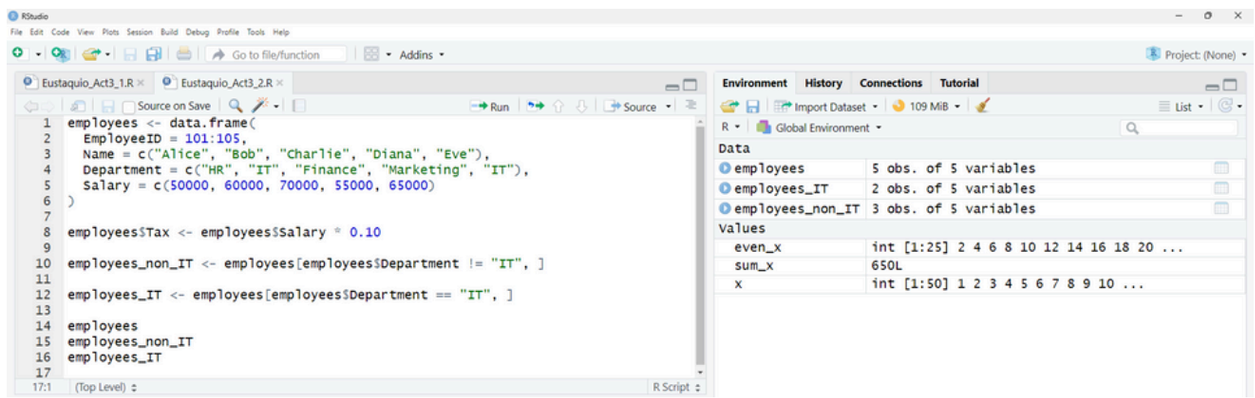
- Create a numeric vector x with values from 1 to 50. Extract all even numbers and calculate their sum using a combination of indexing and functions.

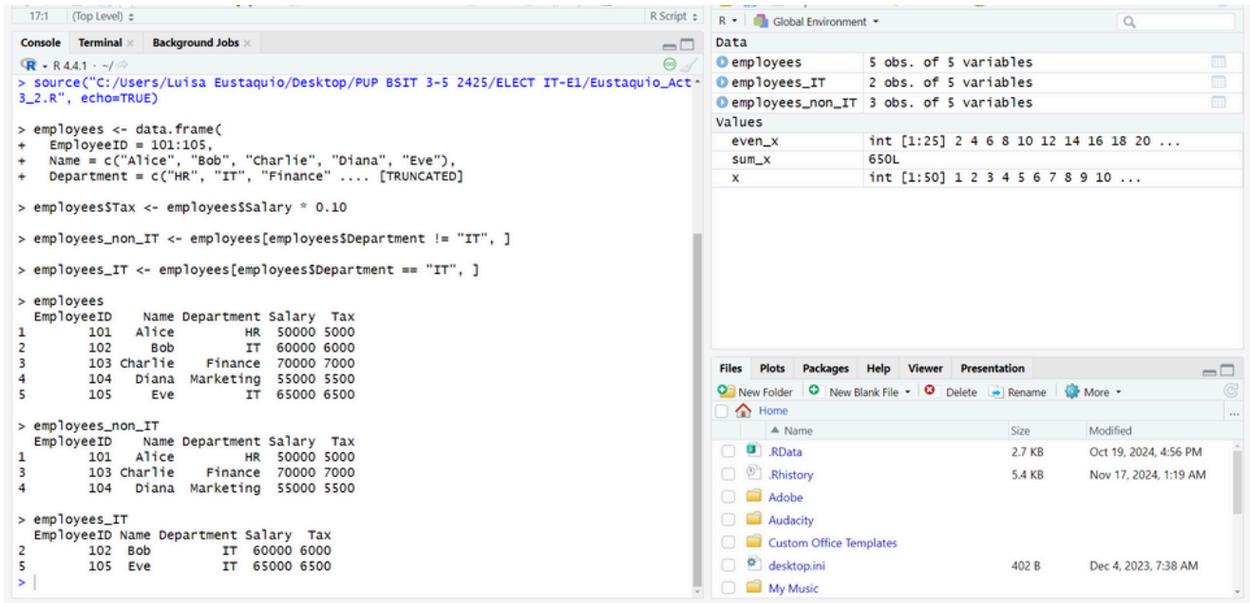


x <- 1:50	Creates a numeric vector with integers from 1 to 50.
x %% 2 == 0	Identifies the indices of even numbers (those divisible by 2).
x[x %% 2 == 0]	Uses indexing to extract only even numbers from the vector x.
sum(even_x)	Calculates the sum of all extracted even numbers.
even_x	Displays the extracted even numbers.
sum_x	Displays the sum of those even numbers.

The extracted even numbers (even_x) are all even integers between 1 and 50, and their total sum (sum_x) is 650.

- Construct a data frame employees with columns:

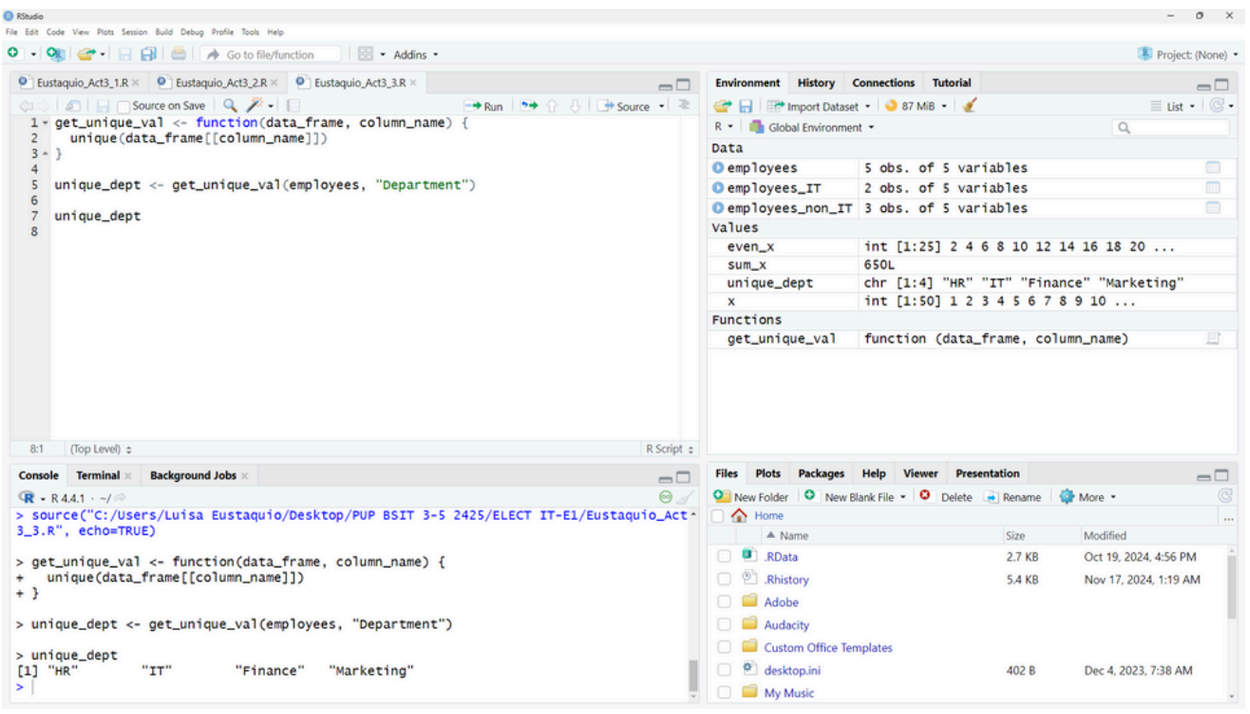




employees <- data.frame(●●●)	Creates a data frame employees with employee details.
employees$Tax <- employees$Salary * 0.10	Adds a new column Tax to the employees data frame, calculated as 10% of the Salary.
employees[employees$Department != "IT",]	Filters the employees data frame, containing only employees not in the IT department.
employees[employees$Department == "IT",]	Filters the employees data frame, containing only employees in the IT department.

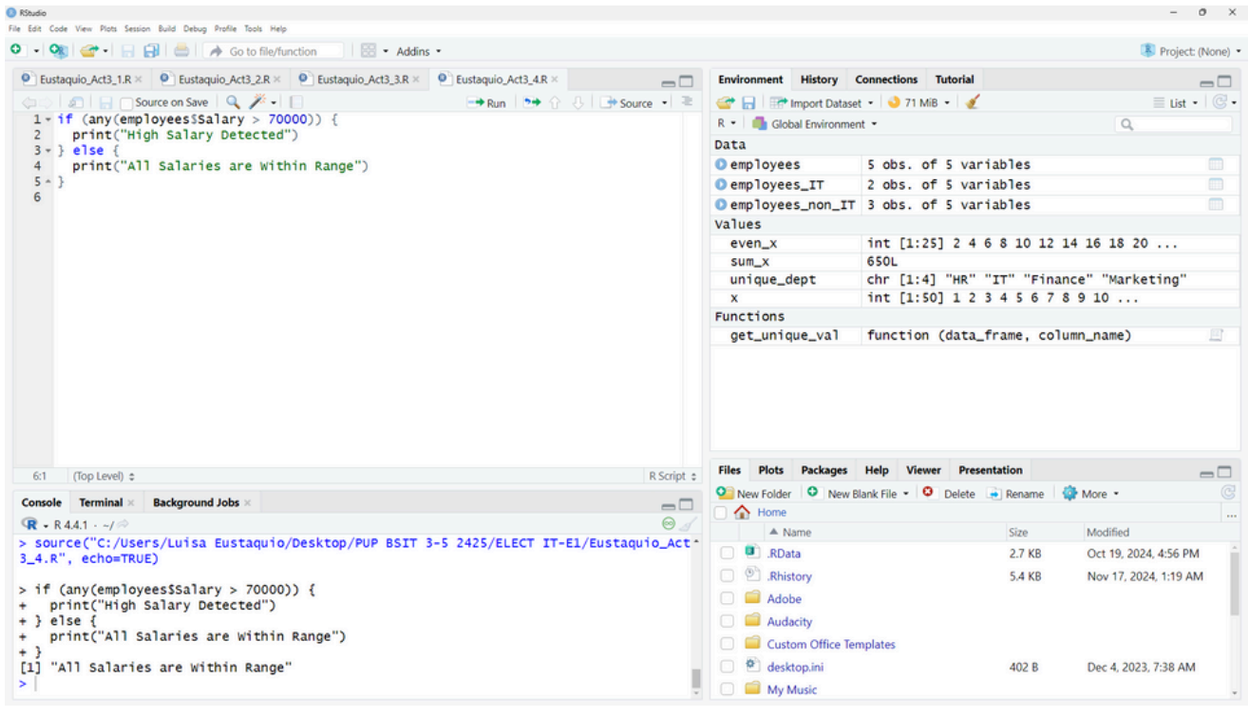
The employees data frame includes details (EmployeeID, Name, Department, Salary) and a newly added Tax column (10% of Salary). The employees_non_IT data frame lists non-IT employees, while employees_IT lists IT employees.

- Write an R function that takes a column name as input and returns all unique values of that column from a data frame. Demonstrate this using the employees data frame.



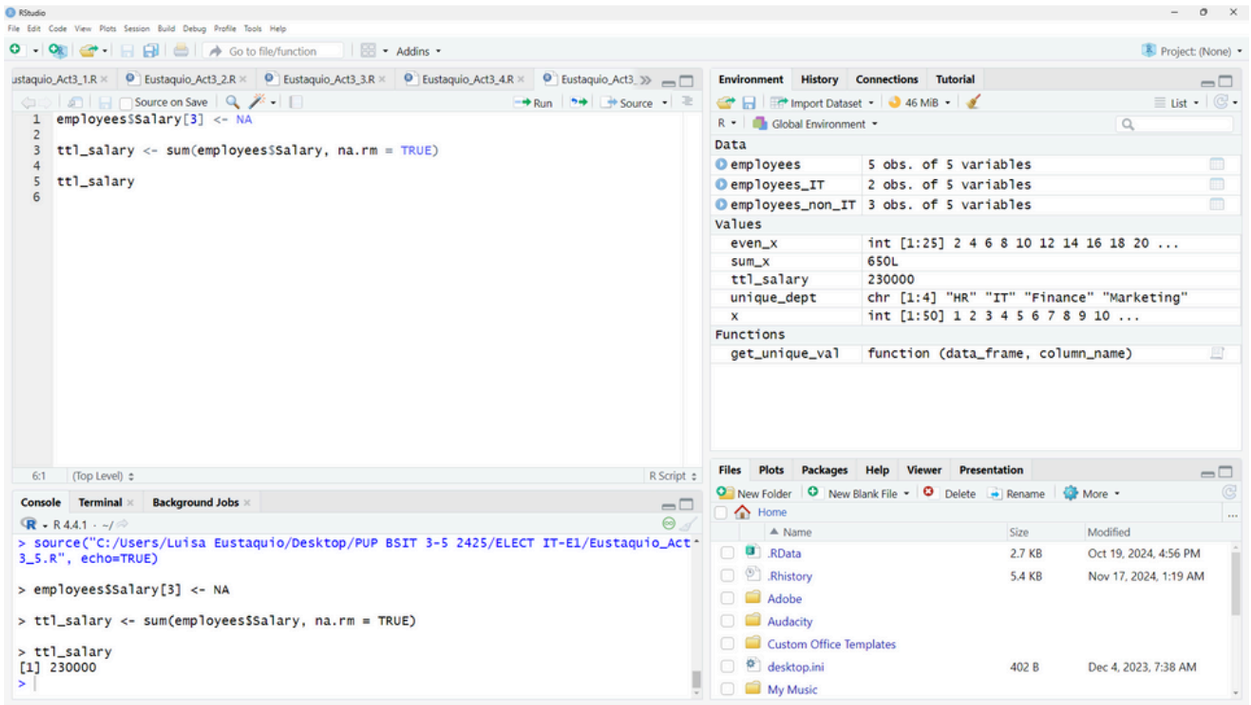
get_unique_val <- (data_frame, column_name)	Takes a data frame and a column name as input, accesses the specified column dynamically, and applies the unique() function to extract its unique values.	The get_unique_val function extracts unique values from a data frame column. Applied to the Department column of employees, it returns: "HR", "IT", "Finance", and "Marketing".

- Write an R script to check if any Salary in the employees data frame is above 70,000. If found, print "High Salary Detected"; otherwise, print "All Salaries are Within Range".



any(employees$Salary > 70000)	Takes a data frame and a column name as input, accesses the specified column dynamically, and applies the unique() function to extract its unique values.	The script checks if any salary in the employees data frame exceeds 70,000. Since no salaries are above 70,000, the output is: "All Salaries are Within Range".
if and else conditions	Prints "High Salary Detected" if the condition is TRUE, otherwise "All Salaries are Within Range".	

- Modify the employees data frame so that one Salary value is set to NA. Write code to calculate the total salary excluding the NA values and explain the output.



employees$Salary[3] <- NA	Sets the third employee's salary to NA (missing value).
sum(employees$Salary, na.rm = TRUE)	Calculates the total salary while excluding NA values.
na.rm = TRUE argument	Tells R to remove missing values before performing the sum.

The total_salary is the sum of all salaries excluding the NA for the third employee. With salaries 50,000, 60,000, NA, 55,000, and 65,000, the total is 230,000.