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Faculty of CHAIR & SCOPE

BCSE351E L[25+26]

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Lab Report – 3

Using R-Studio to Visualize Sample Codes

Aim:

- R programming and performing required operations.
- Reading datasets using RStudio.
- To view the details with RStudio.
- To learn about Data Framing using Data Structures in R programming with R Studio [Latest Version with ALL Required Packages Installed].

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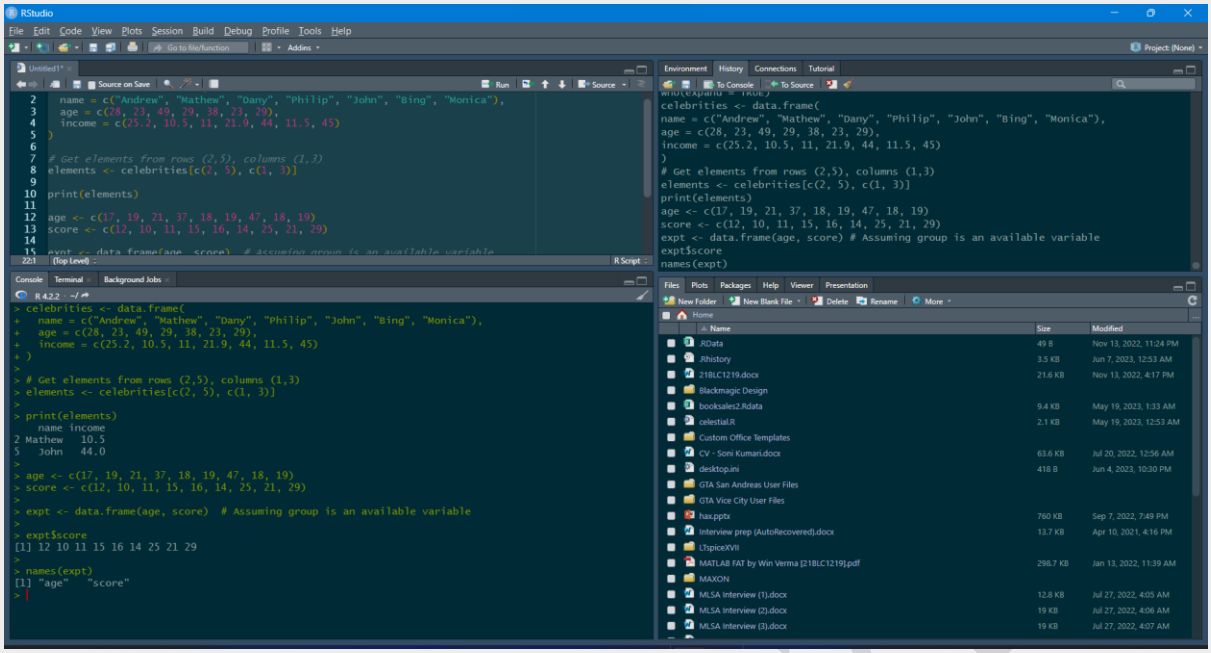
1. Data_frame0.R:

```
celebrities <- data.frame(
                    name = c("Andrew", "Mathew", "Dany", "Philip", "John", "Bing", "Monica"),
                    age = c(28, 23, 49, 29, 38, 23, 29),
                    income = c(25.2, 10.5, 11, 21.9, 44, 11.5, 45)
                              )

# Get elements from rows (2,5), columns (1,3)
elements <- celebrities[c(2, 5), c(1, 3)]

print(elements)

age <- c(17, 19, 21, 37, 18, 19, 47, 18, 19)
score <- c(12, 10, 11, 15, 16, 14, 25, 21, 29)

who()

expt <- data.frame(age, gender, group, score)  # Assuming gender and group are available
variables

expt$score

names(expt)

who(expand = TRUE)
```

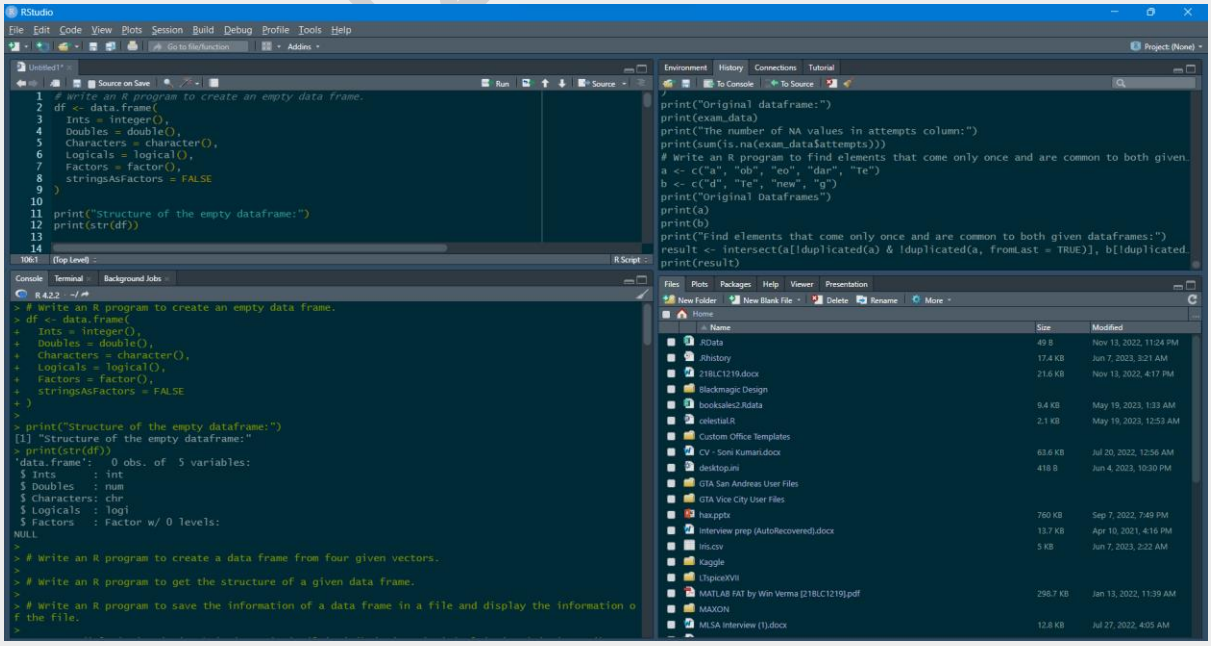


2. Data_frame1.R:

```
# Write an R program to create an empty data frame.
df <- data.frame(
  Ints = integer(),
  Doubles = double(),
  Characters = character(),
  Logicals = logical(),
  Factors = factor(),
  stringsAsFactors = FALSE
)

print("Structure of the empty dataframe:")
print(str(df))

# Write an R program to create a data frame from four given vectors.

# Write an R program to get the structure of a given data frame.

# Write an R program to save the information of a data frame in a file and display the
information of the file.

name <- c('Alex', 'Roy', 'Kathe', 'James', 'Emily', 'Mike', 'Matt', 'Little', 'Kevin', 'Jonas')
score <- c(12.5, 9, 16.5, 12, 9, 20, 14.5, 13.5, 8, 19)
attempts <- c(1, 3, 2, 3, 2, 3, 1, 1, 2, 1)
qualify <- c('yes', 'no', 'yes', 'no', 'no', 'yes', 'yes', 'no', 'no', 'yes')

print("Original data frame:")
print(name)
print(score)
print(attempts)
print(qualify)
```

```
exam_data <- data.frame(name, score, attempts, qualify)

print("Original dataframe:")
print(exam_data)

print("Structure of the said data frame:")
print(str(exam_data))

save(exam_data, file = "data.rda")

load("data.rda")

file.info("data.rda")

# Write an R program to extract 3rd and 5th rows with 1st and 3rd columns from a given
data frame.

print("Extract 3rd and 5th rows with 1st and 3rd columns:")
result <- exam_data[c(3, 5), c(1, 3)]
print(result)

# Write an R program to replace NA values with 3 in a given data frame.

exam_data <- data.frame(
  name = c('Alex', 'Roy', 'Kathe', 'James', 'Emily', 'Mike', 'Matt', 'Little', 'Kevin', 'Jonas'),
  score = c(12.5, 9, 16.5, 12, 9, 20, 14.5, 13.5, 8, 19),
  attempts = c(1, NA, 2, NA, 2, NA, 1, NA, 2, 1),
  qualify = c('yes', 'no', 'yes', 'no', 'no', 'yes', 'yes', 'no', 'no', 'yes')
)

print("Original dataframe:")
print(exam_data)

exam_data[is.na(exam_data)] <- 3

print("After removing NA with 3, the said dataframe becomes:")
print(exam_data)

# Write an R program to create a data frame using two given vectors and display the
duplicated elements and unique rows of the said data frame.

a <- c(10, 20, 10, 10, 40, 50, 20, 30)
b <- c(10, 30, 10, 20, 0, 50, 30, 30)

print("Original data frame:")
ab <- data.frame(a, b)
print(ab)

print("Duplicate elements of the said data frame:")
print(duplicated(ab))
```

```
print("Unique rows of the said data frame:")
print(unique(ab))

# Write an R program to count the number of NA values in a data frame column.

exam_data <- data.frame(
  name = c('Alex', 'Roy', 'Kathe', 'James', 'Emily', 'Mike', 'Jonas'),
  score = c(12.5, 9, 16.5, 12, 9, 20, 13.5),
  attempts = c(1, NA, 2, NA, 2, NA, NA),
  qualify = c('yes', 'no', 'yes', 'no', 'no', 'yes', 'no')
)

print("Original dataframe:")
print(exam_data)

print("The number of NA values in attempts column:")
print(sum(is.na(exam_data$attempts)))

# Write an R program to find elements that come only once and are common to both given
data frames.

a <- c("a", "ob", "eo", "dar", "Te")
b <- c("d", "Te", "new", "g")

print("Original Dataframes")
print(a)
print(b)

print("Find elements that come only once and are common to both given dataframes:")
result <- intersect(a[!duplicated(a) & !duplicated(a, fromLast = TRUE)], b[!duplicated(b) &
!duplicated(b, fromLast = TRUE)])
print(result)
```



```
R 4.2.2 · ~/
> print("Original dataframe:")
[1] "Original dataframe:"
> print(exam_data)
     name score attempts qualify
1    Alex  12.5        1     yes
2     Roy   9.0       NA      no
3   Kathe  16.5        2     yes
4   James  12.0       NA      no
5   Emily   9.0        2      no
6    Mike  20.0       NA     yes
7    Matt  14.5        1     yes
8  Little  13.5       NA      no
9   Kevin   8.0        2      no
10  Jonas  19.0        1     yes
>
> exam_data[is.na(exam_data)] <- 3
>
> print("After removing NA with 3, the said dataframe becomes:")
[1] "After removing NA with 3, the said dataframe becomes:"
> print(exam_data)
     name score attempts qualify
1    Alex  12.5        1     yes
2     Roy   9.0        3      no
3   Kathe  16.5        2     yes
4   James  12.0        3      no
5   Emily   9.0        2      no
6    Mike  20.0        3     yes
7    Matt  14.5        1     yes
```

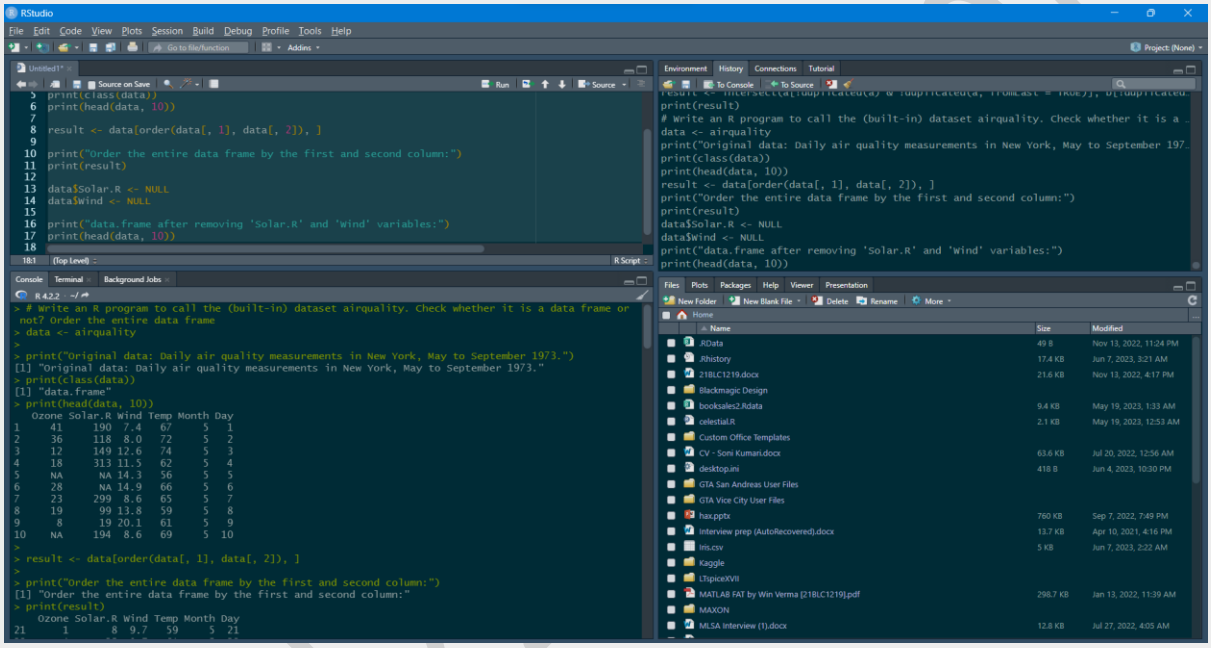
```
R 4.2.2 · ~/
5 Emily   9.0        2      no
6  Mike  20.0       NA     yes
7 Jonas  13.5       NA      no
>
> print("The number of NA values in attempts column:")
[1] "The number of NA values in attempts column:"
> print(sum(is.na(exam_data$attempts)))
[1] 4
>
> # Write an R program to find elements that come only once and are common to both given data frames.
>
> a <- c("a", "ob", "eo", "dar", "Te")
> b <- c("d", "Te", "new", "g")
>
> print("Original Dataframes")
[1] "Original Dataframes"
> print(a)
[1] "a"   "ob"  "eo"  "dar" "Te"
> print(b)
[1] "d"   "Te"  "new" "g"
>
> print("Find elements that come only once and are common to both given dataframes:")
[1] "Find elements that come only once and are common to both given dataframes:"
> result <- intersect(a[!duplicated(a) & !duplicated(a, fromLast = TRUE)], b[!duplicated(b) & !duplica
ted(b, fromLast = TRUE)])
> print(result)
[1] "Te"
>
```

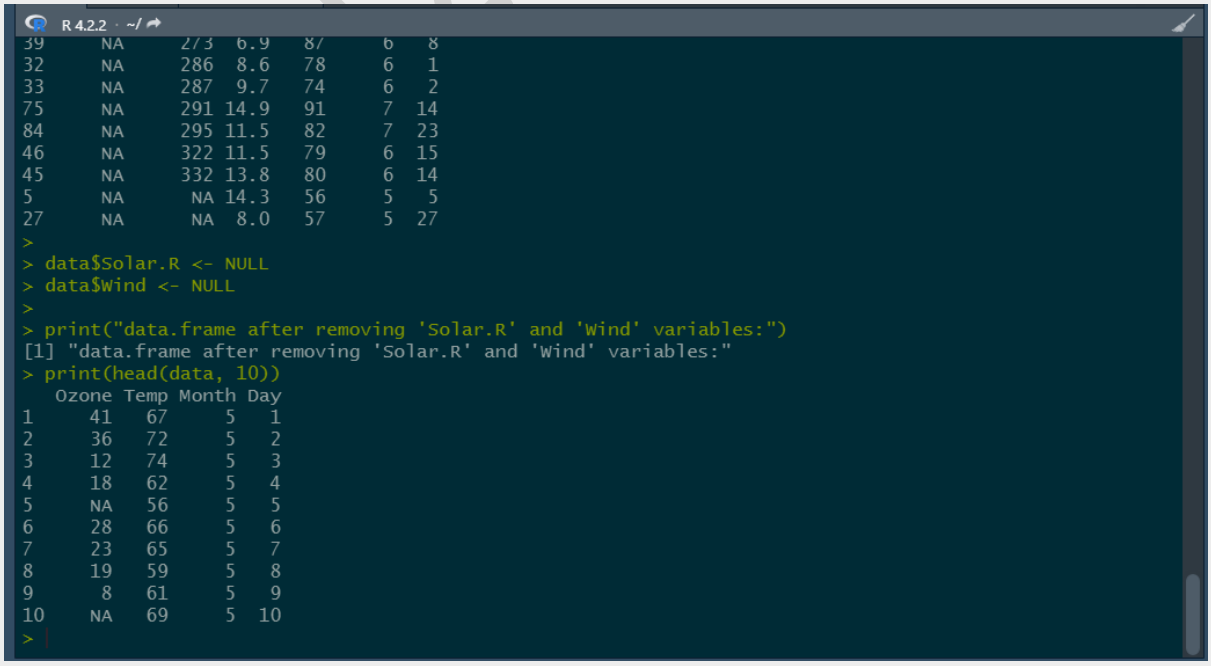
3. Data_frame2.R:

# Write an R program to call the (built-in) dataset airquality. Check whether it is a data frame or not? Order the entire data frame
data <- airquality

print("Original data: Daily air quality measurements in New York, May to September 1973.")
print(class(data))
print(head(data, 10))

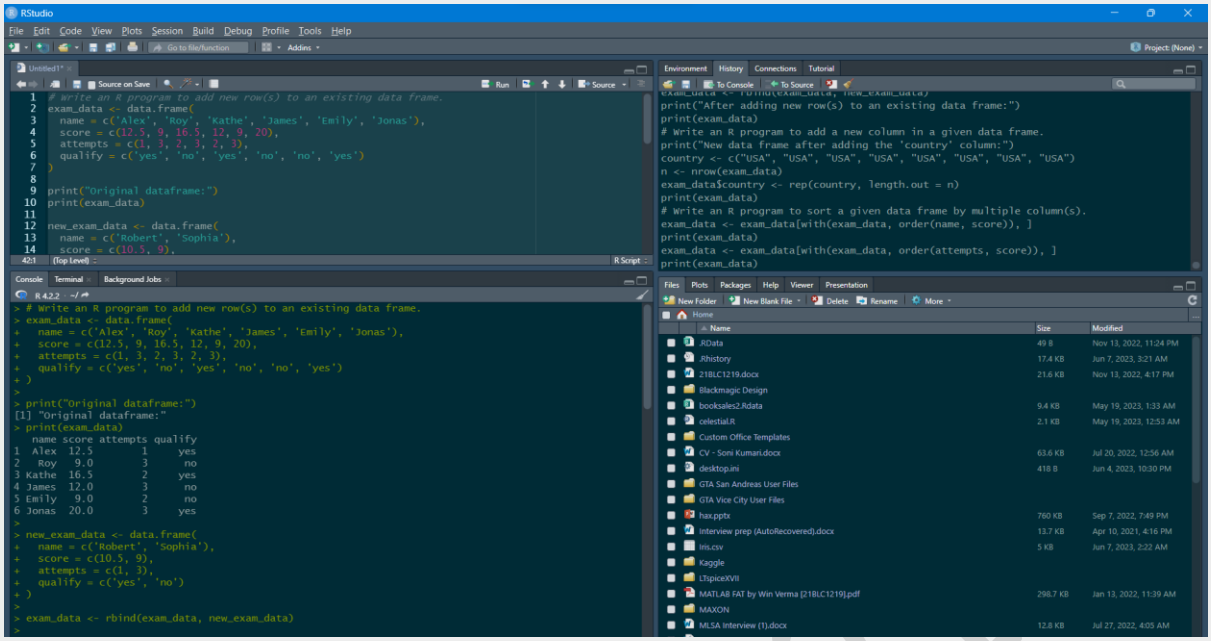
```
result <- data[order(data[, 1], data[, 2]), ]

print("Order the entire data frame by the first and second column:")
print(result)

data$Solar.R <- NULL
data$Wind <- NULL

print("data.frame after removing 'Solar.R' and 'Wind' variables:")
print(head(data, 10))
```

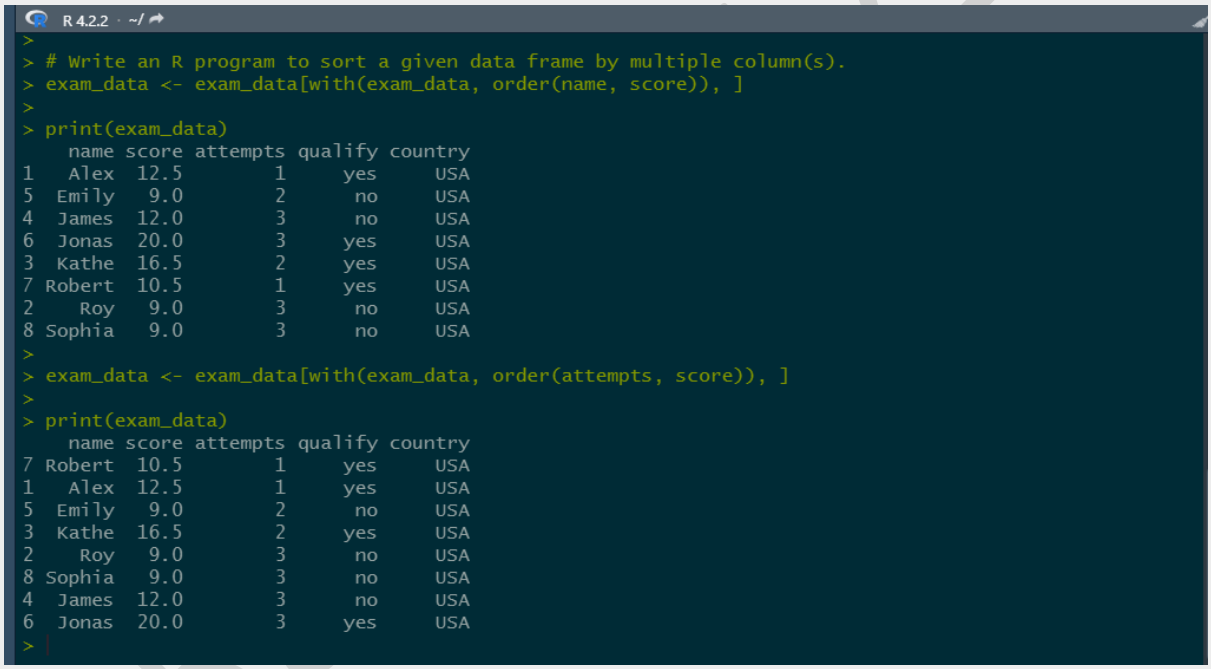




4. Data_frame3.R:

```
# Write an R program to add new row(s) to an existing data frame.
exam_data <- data.frame(
  name = c('Alex', 'Roy', 'Kathe', 'James', 'Emily', 'Jonas'),
  score = c(12.5, 9, 16.5, 12, 9, 20),
  attempts = c(1, 3, 2, 3, 2, 3),
  qualify = c('yes', 'no', 'yes', 'no', 'no', 'yes')
)

print("Original dataframe:")
print(exam_data)

new_exam_data <- data.frame(
  name = c('Robert', 'Sophia'),
  score = c(10.5, 9),
  attempts = c(1, 3),
  qualify = c('yes', 'no')
)

exam_data <- rbind(exam_data, new_exam_data)

print("After adding new row(s) to an existing data frame:")
print(exam_data)

# Write an R program to add a new column in a given data frame.
print("New data frame after adding the 'country' column:")

country <- c("USA", "USA", "USA", "USA", "USA", "USA", "USA", "USA")
n <- nrow(exam_data)
exam_data$country <- rep(country, length.out = n)

print(exam_data)

# Write an R program to sort a given data frame by multiple column(s).
exam_data <- exam_data[with(exam_data, order(name, score)), ]

print(exam_data)

exam_data <- exam_data[with(exam_data, order(attempts, score)), ]

print(exam_data)
```



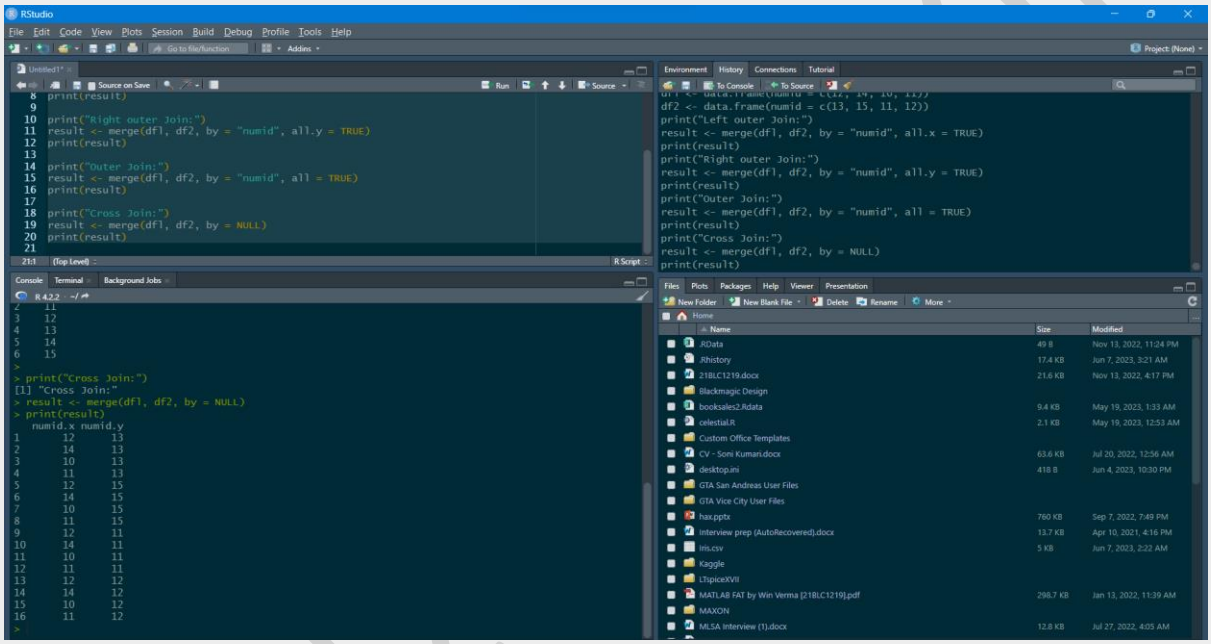


5. Data_frame4.R:

Write an R program to create inner, outer, left, right join (merge) from given two data frames.

```
dfl <- data.frame(numid = c(12, 14, 10, 11))
df2 <- data.frame(numid = c(13, 15, 11, 12))

print("Left outer Join:")
result <- merge(dfl, df2, by = "numid", all.x = TRUE)
print(result)
```

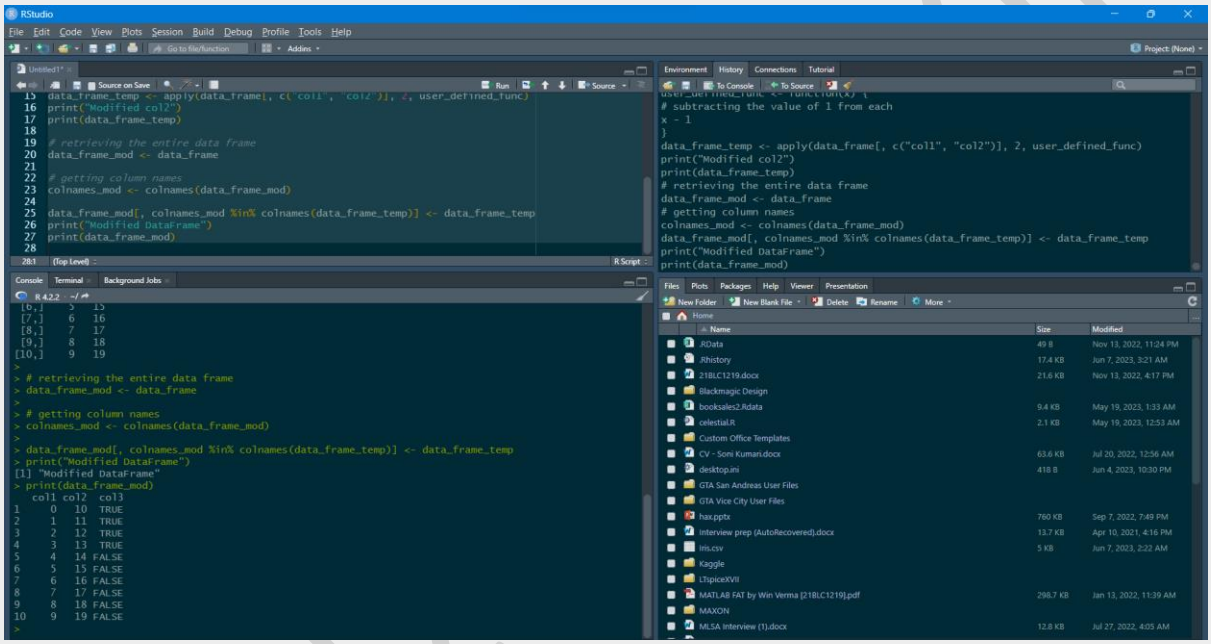
```
print("Right outer Join:")
result <- merge(df1, df2, by = "numid", all.y = TRUE)
print(result)

print("Outer Join:")
result <- merge(df1, df2, by = "numid", all = TRUE)
print(result)

print("Cross Join:")
result <- merge(df1, df2, by = NULL)
print(result)
```



6. Data_frame5.R:

```
# creating a data frame
data_frame <- data.frame(col1 = 1:10,
                         col2 = 11:20,
                         col3 = c(rep(TRUE, 4), rep(FALSE, 6)))

print("Original DataFrame")
print(data_frame)

# defining the function
user_defined_func <- function(x) {
  # subtracting the value of 1 from each
  x - 1
}

data_frame_temp <- apply(data_frame[, c("col1", "col2")], 2, user_defined_func)
```

```
print("Modified col2")
print(data_frame_temp)

# retrieving the entire data frame
data_frame_mod <- data_frame

# getting column names
colnames_mod <- colnames(data_frame_mod)

data_frame_mod[, colnames_mod %in% colnames(data_frame_temp)] <- data_frame_temp
print("Modified DataFrame")
print(data_frame_mod)
```



Thanks for scrolling all the way down till here! 😊