

Basic Experiments

Aim: a) Study R and R studio installation.

b) Simple Scripts in R.

Tools: R and R studio.

Theory: The R language is most commonly used for data analysis and statistical computing. It's also an effective tool for machine learning algorithms. R is especially relevant for data science professionals due to its data cleaning, importing, and visualization capabilities.

a) Steps for installing R and R studio:

- Search rstudio download on chrome.
- Then click on RStudio Desktop of <https://posit.co>
- Then scroll down and you will see Download and Install R and Download RStudio Desktop for Windows.
- From there you can download both the application.
- Remember to download R-4.4.2 for Windows.
- After downloading both the application then install it.
- While installing R click on No(accept defaults) at Startup options then install it.
- For installing RStudio you don't require any permission, you have to only

install it.

b) Simple Scripts in R.

Code:

- 1] R Program Using For Loop to Calculate the Sum of Cubes of Odd Numbers (1 to 15).

```
> sum_cubes <- 0
> for (i in seq(1, 15, by = 2)) {
+   sum_cubes <- sum_cubes + i^3
+ }
> print(sum_cubes)
[1] 8128
```

- 2] R Program Using If-Else Statement to Check Positive or Negative Number.

```
> num <- 16
> if (num > 0) {
+   print("Positive")
+ } else if (num == 0) {
+   print("Zero")
+ } else {
+   print("Negative")
+ }
[1] "Positive"
```

- 3] R Program Using While Loop to Print Fibonacci Sequence.

```
> n1 <- 0
> n2 <- 1
> count <- 1
> while (count <= 5) {
+   print(n1)
+   next_num <- n1 + n2
+   n1 <- n2
+   n2 <- next_num
+   count <- count + 1
+ }
[1] 0
[1] 1
[1] 1
[1] 2
[1] 3
```

- 4] R Program Using For Loop to Calculate Factorial of a Number.

```
> num <- 10
> factorial <- 1
>
> for (i in 1:num) {
+   factorial <- factorial * i
+ }
> print(factorial)
[1] 3628800
```

- 5] R Program Using If-Else

Statement to Check Leap Year.

```
> year <- 2025
> if (year %% 4 == 0){
+   print("Leap Year")
+ } else{
+   print("Not a Leap Year")
+ }
[1] "Not a Leap Year"
```

- 6] R Program Using While Loop to Count Down from 10 to 1.

```
> num <- 10
> while (num >= 1) {
+   print(num)
+   num <- num - 1
+ }
[1] 10
[1] 9
[1] 8
[1] 7
[1] 6
[1] 5
[1] 4
[1] 3
[1] 2
[1] 1
```

7] R Program Using For Loop to Print Multiplication Table of 7.

```
> num <- 7
>
> for (i in 1:10) {
+   print(paste(num, "*", i, "=", num * i))
+ }
[1] "7 * 1 = 7"
[1] "7 * 2 = 14"
[1] "7 * 3 = 21"
[1] "7 * 4 = 28"
[1] "7 * 5 = 35"
[1] "7 * 6 = 42"
[1] "7 * 7 = 49"
[1] "7 * 8 = 56"
[1] "7 * 9 = 63"
[1] "7 * 10 = 70"
```

8] R Program Using If-Else Statement to Check Divisibility by Both 4 and 5.

```
> num <- 16
>
> if (num %% 4 == 0 && num %% 5 == 0) {
+   print("Divisible by both 4 and 5")
+ } else {
+   print("Not divisible by both 4 and 5")
+ }
[1] "Not divisible by both 4 and 5"
```

9] R Program Using While Loop to Sum Numbers from 1 to 100.

```
> sum_numbers <- 0
> num <- 1
>
> while (num <= 100) {
+   sum_numbers <- sum_numbers + num
+   num <- num + 1
+ }
>
> print(sum_numbers)
[1] 5050
```

10] Write an R function to calculate the difference and remainder when dividing two numbers.

```
> calc_diff_remainder <- function(a, b) {
+   diff <- a - b
+   remainder <- a %% b
+   return(list(diff = diff, remainder = remainder))
+ }
>
> result <- calc_diff_remainder(2005, 16)
>
> print(paste("Difference: ", result$diff))
[1] "Difference: 1989"
> print(paste("Remainder: ", result$remainder))
[1] "Remainder: 5"
```

11] Write an R program to check which of three numbers is the smallest.

```
> num1 <- 16
> num2 <- 2
> num3 <- 2005
>
> if (num1 < num2 && num1 < num3) {
+   print(paste(num1, "is the smallest"))
+ } else if (num2 < num1 && num2 < num3) {
+   print(paste(num2, "is the smallest"))
+ } else {
+   print(paste(num3, "is the smallest"))
+ }
[1] "2 is the smallest"
```

12] Write an R function to find the area of a rectangle.

```
> calc_area <- function(length, width) {
+   area <- length * width
+   return(area)
+ }
>
> area_result <- calc_area(16, 2)
>
> print(paste("The area of the rectangle is:", area_result))
[1] "The area of the rectangle is: 32"
```

13] Write an R function to calculate the power of a number.

```
> calc_power <- function(base, exponent) {  
+   result <- base^exponent  
+   return(result)  
+ }  
>  
> power_result <- calc_power(16, 2)  
>  
> print(paste("The result of 16 raised to the power of 2 is:", power_result))  
[1] "The result of 16 raised to the power of 2 is: 256"
```

14] Write an R program to find the average of three numbers.

```
> num1 <- 16  
> num2 <- 2  
> num3 <- 2005  
>  
> average <- (num1 + num2 + num3) / 3  
>  
> print(average)  
[1] 674.3333
```

For Faculty Use

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Marks Obtained				