R Programming Lab

1. Write a R program to create a sequence of numbers from 20 to 50 and find the mean of numbers from 20 to 60 and sum of numbers from 51 to 91.

```
print("Sequence of numbers from 20 to 40:")
print(seq(20,40))
print("Mean of numbers from 20 to 60:")
print(mean(20:60))
print("Sum of numbers from 51 to 91:")
print(sum(51:91))
```

2. Write a R program to create three vectors to store numeric data, character data and logical data. Display the content of the vectors and their type.

```
a = c(1, 2, 5, 3, 4, 0, -1, -3)
b = c("Red", "Green", "White")
c = c(TRUE, TRUE, TRUE, FALSE, TRUE, FALSE)
print(a)
print(typeof(a))
print(b)
print(typeof(b))
print(c)
print(typeof(c))
```

3. Write a R program to perform matrix computations.

```
# Matrix Computations in R
# Define two matrices
matrix1 <- matrix(c(1, 2, 3, 4), nrow = 2, ncol = 2)
matrix2 <- matrix(c(5, 6, 7, 8), nrow = 2, ncol = 2)
# Display the matrices
```

```
print("Matrix 1:")
print(matrix1)
print("Matrix 2:")
print(matrix2)
# Matrix Addition
addition_result <- matrix1 + matrix2
print("Matrix Addition Result:")
print(addition_result)
# Matrix Multiplication
multiplication_result <- matrix1 %*% matrix2
print("Matrix Multiplication Result:")
print(multiplication_result)
# Matrix Inversion
# Note: Inversion is only possible for square matrices with a non-zero determinant
if (det(matrix1) != 0) {
inverse_matrix1 <- solve(matrix1)
print("Inverse of Matrix 1:")
print(inverse_matrix1)
} else {
print("Matrix 1 is not invertible.")
}
```

4. Write a R program to manipulate the elements in the list.

```
thislist <- list("apple", "banana", "cherry", "mango", "jackfruit")
print(thislist)
print("Access the list elements")
x=thislist[1:3]
print(x)
print("Update the list elements")

x=thislist[1] <- "blueberry"
print(x)
print(thislist)
print("length of the list")
x=length(thislist)
print(x)
print("add items in the list")
x=append(thislist, "orange")
print(x)
print("Check the item exist in the list")
x="apple" %in% thislist
print(x)
print("remove the item from the list")
x = thislist[5]=NULL
print(x)
print(thislist)
```

5. Write a R program to create a data frames which contain details of 5 employees and display the details.

```
Employees = data.frame(Name=c("Ram","Rani","Rithvikk", "Sabi","Neethu"),
Gender=c("M","F","M","M","F"),
Age=c(23,22,25,26,32),
Designation=c("Clerk","Manager","Exective","CEO","ASSISTANT"),
Employee_id=c("E11","E12","E13","E14","E15")
)
print("Details of the employees:")
print(Employees)
```

6. Write a R Program to implement the control statements

```
{# Use ifelse to check if each element is positive, negative, or zero
numbers <- c(10, -5, 0, 8, -3)
result <- ifelse(numbers > 0, "Positive", ifelse(numbers < 0, "Negative", "Zero"))
# Print the original vector and the result
cat("Original numbers:", numbers, "\n")
cat("Result:", result, "\n")
}
{# Calculate the factorial of a number using a while loop
number <- 5
factorial_result <- 1
cat("\nCalculating the factorial of", number, "using a while loop:\n")
while (number > 0) {
  factorial_result <- factorial_result * number
  number <- number - 1
}
cat("Factorial:", factorial_result, "\n")
}
{ # Use a for loop to calculate the sum
numbers <- c(5, 10, 15, 20, 25)
sum_result <- 0
for (num in numbers) {
  sum_result <- sum_result + num
}
# Print the original vector and the sum
cat("Original numbers:", numbers, "\n")
cat("Sum of numbers:", sum_result, "\n")
}
```

7. Write a R program to create pie chart and bar chart of five subjects marks.

```
# Data for the subjects and their scores
```

```
subjects <- c("Math", "Science", "English", "History", "Art")
scores <- c(85, 90, 78, 88, 92)

# Plotting the pie chart
pie(
  scores,
  labels = subjects,
  main = "Score Distribution (Pie Chart)",
  col = rainbow(length(scores))
)

Plotting the bar chart
barplot(
  scores,
 names.arg = subjects,
  main = "Score Distribution (Bar Chart)",
 col = "skyblue",
 ylim = c(0, 100),
  ylab = "Scores"
)
```

8. Write a R program to implement different string manipulation functions.

```
{# Sample string
my_string <- "Welcome! Computer Technology"
# 1. Convert to lowercase
lowercase_string <- tolower(my_string)
cat("1. Convert to lowercase:\n", lowercase_string, "\n\n")
# 2. Convert to uppercase
uppercase_string <- toupper(my_string)
cat("2. Convert to uppercase:\n", uppercase_string, "\n\n")
# 3. Count the number of characters
char_count <- nchar(my_string)
cat("3. Number of characters:", char_count, "\n\n")
# 4. Extract substring
substring <- substr(my_string, start = 10, stop = 28)
cat("4. Extract substring (from position 10 to 28):\n", substring, "\n\n")
# 5. Replace a substring
new_string <- gsub("Computer", "Information", my_string)
cat("5. Replace 'computer' with 'information':\n", new_string, "\n\n")

# 6. Split the string into words
words <- strsplit(my_string, " ")[[1]]
cat("6. Split the string into words:\n", words, "\n\n")
# 7. Concatenate strings
string1 <- "CT"
string2 <- "IT"
concatenated_string <- paste(string1, string2)
cat("7. Concatenate strings:\n", concatenated_string, "\n")
}
```

9. Write a R program to read a csv file and analyze the data in the file.

```
# Read the CSV file
data <- read.csv("data.csv")
print(data)
# Analyze the data
# Get the mean of the first column
mean(data$Age)
# Get the median of the second column
median(data$Age)
# Get the standard deviation of the third column
sd(data$Height)
# Create a histogram of the fourth column
hist(data$Height)
# Create a scatter plot of the fifth and sixth columns
#plot(data$column5, data$column6)
```

```
# Print the results
print("Mean of the Age: ")
print(mean(data$Age))
print("Median of the Age: ")
print(median(data$Age))
print("Standard Deviation of the Height: ")
print(sd(data$Height))
print("Histogram of Height")
print(hist(data$Height))
```

10. Write a R program to create a dataset and do statistical analysis on the data.

```
# Generate a sample dataset
set.seed(123)  # Set seed for reproducibility
n <- 100  # Number of observations
# Creating variables
age <- rnorm(n, mean = 30, sd = 5)
height <- rnorm(n, mean = 160, sd = 10)
gender <- sample(c("Male", "Female"), n, replace = TRUE)
income <- rpois(n, lambda = 50000)
# Combine variables into a data frame
my_data <- data.frame(Age = age, Height = height, Gender = gender, Income = income)
# Display the first few rows of the dataset
head(my_data)
# Display summary statistics
summary(my_data)
# Correlation matrix
cor_matrix <- cor(my_data[, c("Age", "Height", "Income")])
print("Correlation Matrix:")
print(cor_matrix)
# Create a simple linear regression model (e.g., predicting income based on age)
model <- lm(Income ~ Age, data = my_data)
summary(model)
```