Program 8

library(ggplot2)

# Task i: Create two matrices of the same dimension (A & B) matrix\_A <- matrix(1:9, nrow = 3, ncol = 3)

matrix\_B <- matrix(9:1, nrow = 3, ncol = 3)

# Task ii: Add the two matrices and display the result matrix\_sum <- matrix\_A + matrix\_B

cat("Matrix Sum:\n", matrix\_sum, "\n\n")

# Task iii: Scale a matrix by multiplying with a scalar and display result scalar <- 2

scaled\_matrix <- matrix\_A \* scalar cat("Scaled Matrix:\n", scaled\_matrix, "\n\n")

# Task iv: Find the transpose of the matrix and display transpose\_matrix\_A <- t(matrix\_A)

cat("Transpose of Matrix A:\n", transpose\_matrix\_A, "\n\n")

# Task v: Hadamard product (Element-wise product) of the two matrices hadamard\_product <- matrix\_A \* matrix\_B

cat("Hadamard Product:\n", hadamard\_product, "\n\n")

# Task vi: Matrix multiplication matrix\_multiply <- matrix\_A %\*% matrix\_B

cat("Matrix Multiplication:\n", matrix\_multiply, "\n\n")

# Task vii: Generate statistics - Sum, mean, and standard deviation of elements of A sum\_A <- sum(matrix\_A)

mean\_A <- mean(matrix\_A) sd\_A <- sd(matrix\_A)

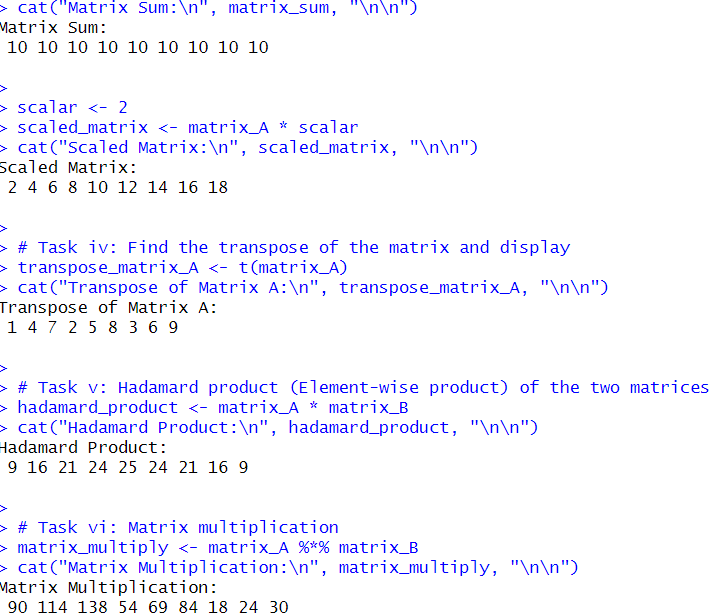
cat("Statistics of Matrix A:\n") cat("Sum:", sum\_A, "\n")

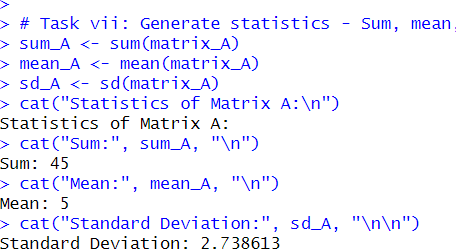
cat("Mean:", mean\_A, "\n") cat("Standard Deviation:", sd\_A, "\n\n")

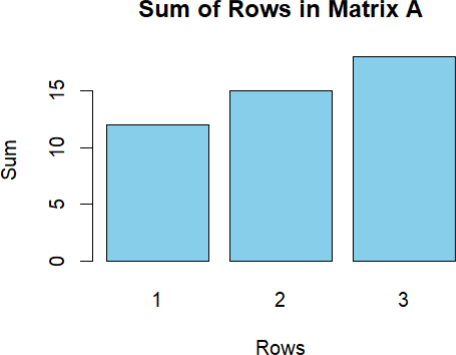
# Task viii: Plot a heatmap of matrix A

heatmap(matrix\_A, main = "Heatmap of Matrix A", xlab = "Columns", ylab = "Rows")

# Task ix: Plot the bar plot to compare sums of the rows of matrix A row\_sums <- rowSums(matrix\_A)

barplot(row\_sums, names.arg = 1:nrow(matrix\_A), col = "skyblue", main = "Sum of Rows in Matrix A", xlab = "Rows", ylab = "Sum")





**Modified Code:-**

**col\_sums <- colSums(matrix\_B)**

**barplot(col\_sums, names.arg = 1:ncol(matrix\_B), col = "salmon", main = "Sum of Columns in Matrix B", xlab = "Columns", ylab = "Sum")**

**Modified output sum of columns:-**

