

**ITA0480-STATISTICS WITH R PROGRAMMING FOR HEALTHCARE APPLICATIONS**

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| **S.No** | **TEST 1** | **MARKS** | **COs** | **BT LEVEL** |
| 1 | Two atomic vectors in R, vector1 and vector2 are generated with the following values:  Write R code to perform the following operations:  a) Calculate the Element-Wise Sum  b) Calculate the Element-Wise Difference  c) Calculate the Element-Wise Product  d ) Calculate the Element-Wise Division.  e) Calculate the Mean | 10 | C01 | BL3 |
| 2 | Imagine you are working on a project where you need to analyze students' performance in multiple subjects. Your dataset is currently in the form of individual vectors for each subject. Apply your knowledge of matrices in R to combine these vectors into a matrix named "student\_scores." Also, calculate and display the average score for each student. Use R code to create the "student\_scores" matrix and calculate the average score for each student. | 5 | C01 | BL3 |
| 3 | consider the following 3-dimensional array in R as **myarray <- array(1:24, dim = c(4, 3, 2))**  a) Determine the value of the element located at the 2nd row, 3rd column, and 1st matrix of my array.  b) Access the element located in the 4th row, 1st column, and 2nd matrix.  c) Compute the sum of all elements in the 1st matrix. | 10 | C02 | BL3 |

2. # Creating vectors for each subject

math\_scores <- c(85, 90, 78, 92, 88)

science\_scores <- c(80, 85, 88, 90, 86)

english\_scores <- c(90, 88, 85, 93, 91)

history\_scores <- c(88, 92, 80, 86, 90)

# Combining these vectors into a matrix

student\_scores <- cbind(math\_scores, science\_scores, english\_scores, history\_scores)

# Naming the rows for clarity (assuming we have 5 students)

rownames(student\_scores) <- c("Student1", "Student2", "Student3", "Student4", "Student5")

# Display the matrix

print("Student Scores Matrix:")

print(student\_scores)

# Calculating the average score for each student

average\_scores <- rowMeans(student\_scores)

# Display the average scores

print("Average Scores for Each Student:")

print(average\_scores)

output:

[1] "Student Scores Matrix:"

math\_scores science\_scores english\_scores history\_scores

Student1 85 80 90 88

Student2 90 85 88 92

Student3 78 88 85 80

Student4 92 90 93 86

Student5 88 86 91 90

[1] "Average Scores for Each Student:"

Student1 Student2 Student3 Student4 Student5

85.75 88.75 82.75 90.25 88.75

3. myarray <- array(1:24, dim = c(4, 3, 2))

# Access the element at 2nd row, 3rd column, 1st matrix

element\_a <- myarray[2, 3, 1]

print("Value at 2nd row, 3rd column, 1st matrix:")

print(element\_a)

# Access the element at 4th row, 1st column, 2nd matrix

element\_b <- myarray[4, 1, 2]

print("Value at 4th row, 1st column, 2nd matrix:")

print(element\_b)

# Sum all elements in the 1st matrix

sum\_first\_matrix <- sum(myarray[, , 1])

print("Sum of all elements in the 1st matrix:")

print(sum\_first\_matrix)

output

[1] "Value at 2nd row, 3rd column, 1st matrix:"

[1] 6

[1] "Value at 4th row, 1st column, 2nd matrix:"

[1] 17

[1] "Sum of all elements in the 1st matrix:"

[1] 78

# Define the two atomic vectors

vector1 <- c(10, 20, 30, 40, 50)

vector2 <- c(5, 15, 25, 35, 45)

**a) Element-Wise Sum**

sum\_result <- vector1 + vector2

cat("Element-Wise Sum:\n", sum\_result, "\n\n")

**b) Element-Wise Difference**

difference\_result <- vector1 - vector2

Answer:

# Define the two atomic vectors

vector1 <- c(10, 20, 30, 40, 50)

vector2 <- c(5, 15, 25, 35, 45)

**a) Element-Wise Sum**

sum\_result <- vector1 + vector2

cat("Element-Wise Sum:\n", sum\_result, "\n\n")

**b) Element-Wise Difference**

difference\_result <- vector1 - vector2

cat("Element-Wise Difference:\n", difference\_result, "\n\n")

**c) Element-Wise Product**

product\_result <- vector1 \* vector2

cat("Element-Wise Product:\n", product\_result, "\n\n")

**d) Element-Wise Division**

division\_result <- vector1 / vector2

cat("Element-Wise Division:\n", division\_result, "\n\n")

**e) Mean of each vector**

mean\_vector1 <- mean(vector1)

mean\_vector2 <- mean(vector2)

cat("Mean of vector1:", mean\_vector1, "\n")

cat("Mean of vector2:", mean\_vector2, "\n")

OUTPUT

a)Element-Wise Sum:

15 35 55 75 95

b)Element-Wise Difference:

5 5 5 5 5

(c)Element-Wise Product:

50 300 750 1400 2250

(d)Element-Wise Division:

2.0 1.333333 1.2 1.142857 1.111111

(e) Mean of vector1: 30

Mean of vector2: 25