Day 13

Lab Assignments

1. WAP to read a matrix and find the sum of the elements of that matrix.
   Input: Enter the row and column size of the matrix: 3 4
   Enter the elements of the matrix of order 3×4:
   2 4 5 7
   1 3 2 1
   4 3 8 9
   Output: Sum of the elements of the matrix: 49
2. WAP to add two matrices and display it.
   Input 1: Enter the row and column size of matrix 1: 3 2
   Enter the row and column size of matrix 2: 3 2
   Enter the elements of matrix 1:
   2 4
   1 3
   4 3
   Enter the elements of matrix 2:
   1 2
   3 2
   2 3

   Output 1:
   Matrix 1:
   2 4
   1 3
   4 3
   Matrix 2:
   1 2
   3 2
   2 3
   Sum of Matrix 1 and Matrix 2:
   3 6
   4 5
   6 6
   Input 2: Enter the row and column size of matrix 1: 3 4
   Enter the row and column size of the matrix 2: 3 2
   Output 2: Matrix are not compatible for addition.
3. WAP to multiply two matrices and display it.
   Input 1: Enter the row and column size of matrix 1: 3 3
   Enter the row and column size of matrix 2: 3 2
   Enter the elements of matrix 1:
   2 4 2
   1 3 1
   4 3 1
   Enter the elements of matrix 2:
   1 2
   3 2
   2 3
   Output 1:
   Matrix 1:

2 4 2
1 3 1
4 3 1

Matrix 2:

1 2
3 2
2 3

Product of Matrix 1 and Matrix 2:

18 18
12 11
15 17

Input 2: Enter the row and column size of matrix 1: 3 4
Enter the row and column size of the matrix 2: 3 2

Output 2: Matrix are not compatible for multiplication.

4. WAP to find out the transpose of a given matrix.

Input: Enter the row and column size of matrix: 3 3
Enter the elements of matrix:

2 4 2
1 3 1
4 3 1

Output:

Original Matrix:

2 4 2
1 3 1
4 3 1

Transpose of the given Matrix:

2 1 4
4 3 3
2 1 1

5. WAP to find the sum of elements of upper triangular.

Input: Enter the row or column size of a square matrix: 3
Enter the elements of matrix:

2 4 2
1 3 1
4 3 1

Output:

Matrix:

2 4 2
1 3 1
4 3 1

Sum of elements of upper triangular matrix: 13

6. WAP to find the sum of rows and columns of a matrix.

Input: Enter the row and column size of the matrix: 3 3
Enter the elements of matrix:

2 4 2
1 3 1
4 3 1

Output:

ROW SUM
2 4 2 | 8

	1	3	1	5
	4	3	1	8
COL SUM	7	10	4	

Home Assignments

1. WAP to find the Trace (sum of the diagonal element) of a given n×n matrix.

   Input: Enter the row or column size of a square matrix: 3
   Enter the elements of matrix:
   2 4 2
   1 3 1
   4 3 1

   Output:
   Matrix:
   2 4 2
   1 3 1
   4 3 1
   Sum of the diagonal elements: 6

2. WAP to print the elements of upper triangular matrix.

   Input: Enter the row or column size of a square matrix: 3
   Enter the elements of matrix:
   2 4 2
   1 3 1
   4 3 1

   Output:
   Matrix:
   2 4 2
   1 3 1
   4 3 1
   Upper Triangular Matrix:
   2 4 2
   3 1
   1

3. WAP to check whether a matrix is identity matrix or not.

   Input 1: Enter the row and column size of the matrix: 3 3
   Enter the elements of the matrix:
   1 0 0
   0 1 0
   0 0 1

   Output 1: Given matrix is an Identity Matrix.

   Input 2: Enter the row and column size of the matrix: 3 3
   Enter the elements of the matrix:
   1 0 1
   0 1 2
   0 0 1

   Output 2: Given matrix is not an Identity Matrix.

4. WAP to find out the count of even and odd numbers in a matrix.

Input: Enter the row and column size of the matrix: 3 3
Enter the elements of the matrix:
1 0 10
4 1 2
5 8 1

Output:
Matrix:
1 0 10
4 1 2
5 8 1
Number of even elements: 4
Number of odd elements: 5

5. WAP to test whether a square matrix is symmetrical or not. A matrix is symmetrical if it is same as its transpose.

Input 1: Enter the row / column size of the matrix: 3
Enter the elements of the matrix:
1 0 5
0 1 2
5 2 1

Output 1:
Given Matrix:
1 0 5
0 1 2
5 2 1
Matrix is Symmetrical

Input 1: Enter the row / column size of the matrix: 3
Enter the elements of the matrix:
1 0 10
4 1 2
5 8 1

Output 2:
Given Matrix:
1 0 10
4 1 2
5 8 1
Matrix is not Symmetrical

6. WAP read a matrix and determine whether it is a sparse matrix or not. A martix which has more zero elements than non-zero elements is known as a sparse matrix.

Input 1: Enter the row and column size of the matrix: 3 3
Enter the elements of the matrix:
0 2 0
0 0 4
5 0 0

Output 1:
Given Matrix:
1 0 10
4 1 2
5 8 1

It is a Sparse Matrix.

Input 2: Enter the row and column size of the matrix: 4 4

Enter the elements of the matrix:

0 2 0 5
0 0 4 6
5 7 0 8

Output 2:

Given Matrix:

0 2 0 5
0 0 4 6
5 7 0 8

It is not a Sparse Matrix.

Book Exercises

1. WAP that fills a five-by-five matrix as follows: [Page No: 255, Exercise 8.8]
   - Upper left triangle with +1s
   - Lower right triangle with −1s
   - Right to left diagonal with zeros

   Output:
   0 1 1 1 1
   -1 0 1 1 1
   -1 -1 0 1 1
   -1 -1 -1 0 1
   -1 -1 -1 -1 0
2. The annual examination results of 100 students are tabulated as follows: [Page No: 255, Exercise 8.5]

Roll No	Subject 1	Subject 2	Subject 3

   Write a program to read the data and determine the following:
   (a) Total marks obtained by each student
   (b) The highest marks in each subject and the Roll No. of the students who secured it.
   (c) The student who obtained the highest total marks.