

Day 17

Lab Assignments

1. Write a C program to determine the sum of elements of a 2-D array using a function twoDArraySum.

Input: Enter the row and column size of the 2-D array: 3 4

Enter the elements of the 2-D array:

1	2	0	2
0	0	4	1
5	7	0	3

Output: Sum of the elements of the 2-D array = 25

2. Write a C program to find the trace (sum of main diagonal elements) of a matrix of size $n \times n$ using a function sumDiagonal.

Input: Enter the row (or column) size of the matrix: 3

Enter the elements of the matrix:

1	2	0
0	2	4
5	7	3

Output: Trace of the matrix = 6

3. Write a C program to find the sum of two matrices using a function. The function should receive three matrices as arguments and should find the sum of the first two and store it in the third matrix. In the main function print all three matrices.

Input: 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:

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

4. Write a C program to check a square matrix is symmetric or not using a function checkSymmetric. The function should return 1 or 0 depending on the matrix is symmetric or not.

Input 1: Enter the row (or column) size of the matrix: 3

Enter the elements of the matrix:

1	2	5
2	2	7
5	7	3

Output 1: The matrix is symmetric.

Input 2: Enter the row (or column) size of the matrix: 3

Enter the elements of the matrix:

1	0	5
2	2	3
5	7	3

Output 2: The matrix is not symmetric.

5. Write C program to check a square matrix is unit matrix or not using a function checkUnit. The function should return 1 or 0 depending on the matrix is unitary or not. In a unit matrix all its diagonal elements are 1 and all other elements are zero.

Input 1: Enter the row (or column) size of the matrix: 3

Enter the elements of the matrix:

1	0	0
0	1	0
0	0	1

Output 1: Entered matrix is an unit matrix.

Input 2: Enter the row (or column) size of the matrix: 3

Enter the elements of the matrix:

1	2	0
1	1	0
0	7	1

Output 2: Entered matrix is not an unit matrix.

6. Write a C program to check whether two matrices are equal or not using a function isEqual. The function should take two matrices and return 1 if they are element-wise equal else it should return 0.

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

Enter the row and column size of matrix 2: 3 3

Enter the elements of matrix 1:

0	2	0
0	0	4
5	7	0

Enter the elements of matrix 2:

0	2	0
0	0	4
5	7	0

Output 1: Both the matrices are equal.

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

Enter the row and column size of matrix 2: 3 3

Enter the elements of matrix 1:

0	2	0
6	5	4
5	7	9

Enter the elements of matrix 2:

0	2	0
0	0	4
5	7	0

Output 2: The matrices are not equal.

Home Assignments

1. Write a C program to multiply two 2-D arrays using a function. The function should receive three 2-D arrays as arguments and should find the product of the first two and store it in the third array. In the main function print all three 2-D arrays.

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

2. Write a C program to print the transpose of a 2-D array using a function printTranspose.

Input: Enter the row (or column) size of the matrix: 3
Enter the elements of the matrix:
1 2 0
1 1 0
0 7 1

Output: Original Matrix:

1 2 0
1 1 0
0 7 1
Transpose of the Matrix:
1 1 0
2 1 7
0 0 1

3. Write a C program to check a square matrix is upper-triangular or not using a function checkUpperTriangular. The function should return 1 or 0 depending on the matrix is upper-triangular or not.

Input 1: Enter the row (or column) size of the matrix: 3
Enter the elements of the matrix:

```

1    2    3
0    1    4
0    0    7

```

Output 1: The matrix is upper-triangular.

Input 2: Enter the row (or column) size of the matrix: 3
Enter the elements of the matrix:

```

1    2    3
5    1    4
8    0    7

```

Output 2: The matrix is not upper-triangular.

4. Write a C program to perform Scalar matrix multiplication using a function scalarMul.

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

```

3    2    1
6    5    4
5    7    9

```

Enter the scalar value: 5

Output: Matrix M=

```

3    2    1
6    5    4
5    7    9

```

5M=

```

15   10   5
30   25   20
25   35   45

```

5. Write a C program to find the difference of sum of the elements of major and minor diagonals of a matrix using a function diffDiagonal.

Input: Enter the row (or column) size of the matrix: 3
Enter the elements of the matrix:

```

8    2    3
5    1    4
8    0    7

```

Output: Difference of sum of the elements of major and minor diagonals = 4

6. Write a C program to print the position and values of all the saddle points of a matrix using a function printSaddle. An element of a matrix is called as a saddle point if it is maximum of its row and minimum of its column.

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

```

2    4    6    7
1    3    5    8
4    3    2    1

```

Output:

	2	4	6	7		SP
	1	9	5	1		7
	4	3	2	8		9

SP	1	3	2	1		8