Tutorial Sheet : 2-D Array

Q1. **Write a program in C++ to find transpose of a given matrix.**
Sample Input :
3 3
1 5 7
2 4 6
9 3 8
Sample Output :
1 2 9
5 4 3
7 6 8

Q2. **Write a program in C++ to find whether given matrix is magic matrix or not.(Magic matrix is a square matrix of size n ,which contains elements from 1 to n^2. And sum of each row ,each column and both diagonals of matrix is equal.)**
Sample Input :
3
2 7 6
9 5 1
4 3 8
Sample Output :
Magic Matrix

Q3. **Write a program in C++ to find the column that contains maximum number of 1s in a binary matrix (a matrix that contains either 0 or 1).**
Sample Input :
3 3
1 0 1
1 1 0
1 0 1
Sample Output :
1

Q4. **Write a program in C++ to find the column having maximum sum in a matrix.**
Sample Input :
3 3
1 2 3
4 5 6
7 8 9
Sample Output :
3

Q5. **Write a program in C++ to find largest element from each row and column.**
Sample Input :
2 3
1 2 5
3 4 6
Sample Output :
5 6
3 4 6
Output Description :
First line contains the largest elements from each row.
Second line contains the largest elements from each column.

Q6. **Write a program in C++ to find largest group of 1's in a row of a matrix whose elements are either 0 or 1.**
Sample Input :
3 3
1 0 1
1 1 0
0 0 1
Sample Output :
2

Q7. **Write a program in C++ to find the index of row representing the minimum and maximum number in binary form.**
Sample Input :
3 3
1 1 1
1 0 1
0 0 0
Sample Output :
2
0
Output Description :
First line represent the index of row representing minimum value and second line represent the index of row representing maximum value.

Q8. **Write a program in C++ to find the elements that are greater than the 4 neighbours in a matrix.**

Sample Input :

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

Sample Output :

6
9

Assumption:

Boundary elements of the matrix need not be considered as doesn't have 4 neighbours.

Q9. **Write a program in C++ to find the sum of two square matrices entered by the user.**

Sample Input :

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

Sample Output :

10 10 10
10 10 10
10 10 10

Q10. **Write a program in C++ to find the product of two square matrices entered by the user.**

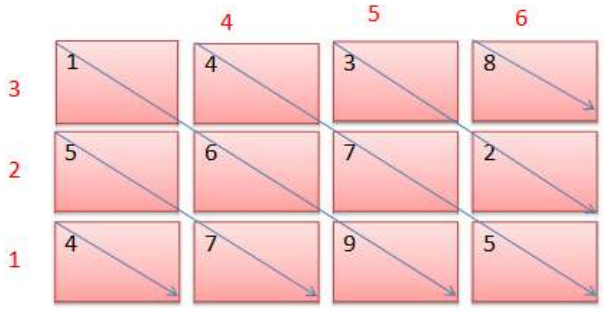
Sample Input :

3 3
3 3
1 2 3
4 5 6
7 8 9
1 0 0
0 1 0
0 0 1

Sample Output :

1 2 3
4 5 6
7 8 9

Q11. **Write a program in C++ to find the k^{th} diagonal of a matrix**



For example the elements of 3-diagonal are : 1, 6, 9
And elements of 5-diagonal are: 3, 2

Sample Input :

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

Sample Output :

4 8

Q 12. **Study how to allocate a 2D array dynamically and try it.**

Q 13. **Study about different methods of passing a 2D-array to a function and try them.**
