Break the Matrix

Warning!!! Read Moodle's A2 PDF for a more complete description. The below description might be incomplete.

Rajesh is a math freak and loves to play with matrices in his spare time. Seeing the enthusiasm,his teacher gave him a series of problems on matrices. But the problems were too difficult for Rajesh and he needs help from you to solve them.

Your task is to help him in implementing the following requirements:

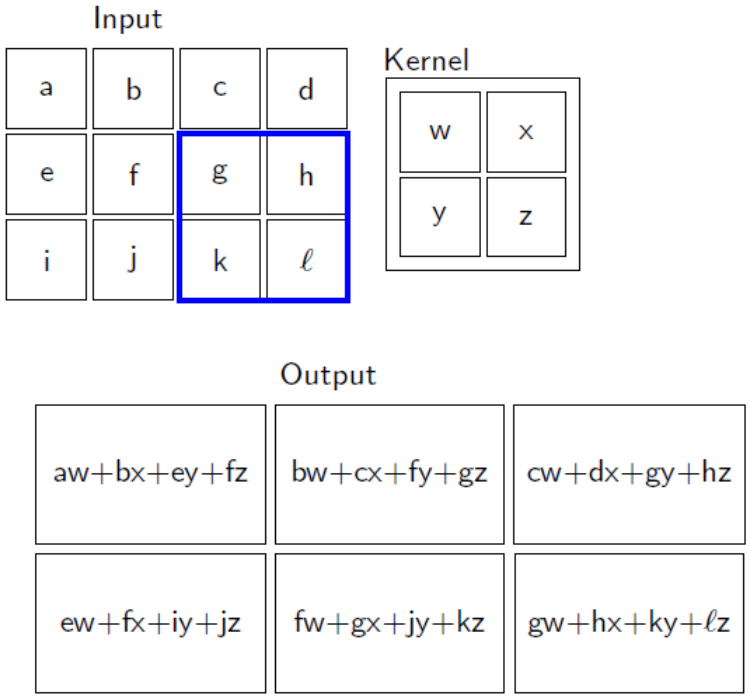
1) Create a matrix class which holds the matrix elements in a 2-D array and should include implementation of the operations listed below using operator overloading on matrices

2) Special addition(SPC) should be overloaded using '+' which can be defined on two given matrices with the same number of rows, i.e., (r X c1) and (r X c2). The output matrix after per-forming special addition should be having same number of rows as the initial matrices with the number of columns as c1(if c1<=c2) or vice-versa. Each row of the final matrix has elements from the corresponding rows of original matrices in descending order of their absolute values.In case of same magnitude but different sign, choose the the positive element.

3) Overload the operator '\&' on a single matrix which finds the maximum sum 'S'(MSM) that can be obtained from a matrix A, where S is defined as the $\sum_{i=1}^{N} A_i$ subject to the constraint $A_i < A_{i+1}$ where A_i is the element from i^{th} row of matrix A. If the constraint cannot be satisfied for any 1 of the rows, output "NO" which means the operation is not possible.

4) Overload the operator '-' for convolution(CONV) operation which can be defined for two given matrices(base matrix and kernel matrix), we get the third matrix by doing a series of element wise multiplication, followed by a summation over a square window. Example at the end will make this clear.

5) Overload the operator '*' on a single matrix which performs a special kind of rotation(ROT).Given a matrix and an integer 'k', perform circular shift of elements along the boundary k times to generate the resultant matrix



Input Format

N

OPERATION1

Dimension of matrix (r c)

Followed by r*c elements

OPERATION2

Dimension of base matrix (r c)

Followed by r*c elements

Dimension of kernel (p q)

Followed by p*q elements

Constraints

- $1 \leq N \leq 10$
- $1 \leq (r, c) \leq 10$
- $INTEGERMIN \leq A_i \leq INTEGERMAX$
- N - No. of Queries (operations)
- (r,c) - row and column of a matrix
- A_i - Matrix element

Output Format

an Integer or "NO" (operation1)

resultant matrix after convolution (operation2)

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Sample Input

```
2
MSM
2 2
1 2
3 5
CONV
3 3
1 2 3
4 5 6
7 8 9
2 2
1 2
3 4
```

Sample Output

```
7
37 47
67 77
```

Explanation

MSM & CONV as in PDF