Multidimensional Arrays – Lab

This document defines the exercises for the "C++ Advanced" course @ Software University. Please submit your solutions (source code) to all below-described problems in Judge.

Write C++ code for solving the tasks on the following pages.

Code should compile under the C++03 or the C++11 standard.

1. Sum Matrix Columns

Write a program that **read a matrix** from the console and prints the sum for each column. On the first line, you will get matrix **rows**. On the next **rows** lines, you will get elements for each column separated with a space.

Examples

Input	Output
3 6 7 1 3 3 2 1 1 3 9 8 5 6 4 6 7 9 1 0	12 10 19 20 8 7
3 3 1 2 3 4 5 6 7 8 9	12 15 18

2. Primary Diagonal

Write a program that finds the **sum of the matrix primary diagonal**.

	0	1	2
0	11	2	4
1	4	5	6
2	10	8	-12

primary diagonal
sum = 11 + 5 -12 = 4

Input

- On the **first line**, you are given the integer **N** – the size of the square matrix.
- The next **N lines** hold the values for **every row** – **N** numbers separated by a space.

Examples

Input	Output
3	4

11 2 4 4 5 6 10 8 -12	
3 1 2 3 4 5 6 7 8 9	15

3. Symbol in Matrix

Write a program that reads **N**, a number representing **rows** and **cols** of a **matrix**. On the next **N** lines, you will receive rows of the matrix. Each row consists of ASCII characters. After that, you will receive a symbol. Find the **first occurrence** of that symbol in the matrix and print its position in the format: "**`({row}, {col})`**". If there is no such symbol print an error message: "**`{symbol} does not occur in the matrix`** ".

Examples

Input	Output
3 ABC DEF X!@ !	(2, 1)
4 asdd xczc qwee qefw 4	4 does not occur in the matrix

4. Diagonal Difference

Write a program that finds the **difference between the sums of the square matrix diagonals** (absolute value).

	0	1	2
0	11	2	4
1	4	5	6
2	10	8	-12

primary diagonal
sum = 11 + 5 -12 = 4

	0	1	2
0	11	2	4
1	4	5	6
2	10	8	-12

secondary diagonal
sum = 4 + 5 + 10 = 19

Input

- On the **first line**, you are given the integer **N** – the size of the square matrix.
- The next **N lines** hold the values for **every row** – **N** numbers separated by a space.

Output

- Print **the absolute** difference between **the sums** of the primary and the secondary diagonal.

Examples

Input	Output	Comments
3 11 2 4 4 5 6 10 8 -12	15	**Primary diagonal:** sum = 11 + 5 + (-12) = 4 **Secondary diagonal:** sum = 4 + 5 + 10 = 19 **Difference:** |4 - 19| = 15