



# Slow Typing

In his quest to gain new knowledge, recently Pepe has learned a new language. This language has  $N \times M$  total characters. Now he wants to send a message to his friend in this language. But there is a problem - he is a very slow typer.

He starts out by placing **one finger from each hand** on **two different keys** in the **same row**. These are the **original positions** of his fingers. To type a key, he uses **any one finger** and, immediately after typing, returns it to its **original position**. It takes 1 second to move a finger by 1 row or 1 column. He wants to know the **minimum time** required to type the entire message, given the number of times each key must be pressed, assuming he types **optimally**.

Given an  $N \times M$  grid representing a keyboard where each cell value  $A_{i,j}$  represents the frequency of that key, find **any 2 cells in the same row** to place his fingers such that the **total typing time is minimized**.

Remember that after pressing a key once he returns that finger to its original point before typing another key, even if that key is the same as the previous one. He also does not use his two fingers at once.

## Input

- line 1:  $N \ M$
- line  $1 + i$  ( $1 \leq i \leq N$ ):  $M$  integers, representing the values of the cells  $A_{i,j}$ . Here  $A_{i,j}$  is the number of times the key at row  $i$  and column  $j$  needs to be pressed.

## Output

- line 1: The **minimum total typing time**.
- line 2: Two pairs  $r_1 \ c_1 \ r_2 \ c_2$  in the same line.  $(r_1, c_1)$  means the position of the first finger, and  $(r_2, c_2)$  means the position of the second.

## Constraints

- $N, M \leq 5000$
- $M \geq 2$
- $0 \leq A_{i,j} \leq 10^5$

## Subtasks

Subtask	Score	Additional constraints
1	7	$N = 1$
2	8	$N, M \leq 30$
3	25	$N, M \leq 500$
4	60	Original constraints

## Examples

### Example 1

```
3 3
1 1 1
1 100 1
1 1 1
```

The correct output is:

```
18
2 2 2 3
```

## Explanation

The total time is the sum of time for typing each key. For example, if 2 fingers are at (2, 2) and (2, 3): The closer finger to key (1, 1) is at (2, 2) (distance 2). So typing this key once and returning would take 4 seconds. The total time sums up to be 18, which is the minimum answer (output on line 1). But the chosen two positions may not be the only acceptable positions.