

Traveling in rocky mountain

You live in a very rocky place. Now you want to visit your friend. Being a student of computer science, you will obviously visit you friend in shortest path. But you have a problem, you are afraid of height. So you have decided to visit your friend in a path that minimizes the maximum height you have to travel. And you will use shortest of all such path.

The place you live can be modeled as a rectangular grid, with height of each point is known. It has r rows and c columns. The upper left point has coordinate $(0, 0)$ and lower right point has coordinate $(r - 1, c - 1)$.

Now you are given hight of each point of the gird. You live in (a, b) and your friend lives in (c, d) . Find out the minimum value maximum height on your path and length of shortest such path. From a position (x, y) you can move to $(x + 1, y)$, $(x - 1, y)$, $(x, y + 1)$ and $(x, y - 1)$ and you can never step outside the grid.

For example consider following scenario, where $r = 4$ and $c = 5$.

8	6	9	2	10
5	11	10	12	6
15	5	9	7	5
7	5	8	1	2

Now if you live in $(0, 0)$ and your friend lives in $(3, 0)$, then minimum value of maximum height is 10. Of various such path, the one with shortest length is $(0, 0)$, $(0, 1)$, $(0, 2)$, $(1, 2)$, $(2, 2)$, $(3, 2)$, $(3, 1)$ and $(3, 0)$. Its length is 7. But if you live in $(2, 3)$ then height is 8, and length is 4.

Input

The input consists of several test cases. Each test case begins with two integers, $r \leq 100$ and $c \leq 100$. This is followed by r lines. Each line contains c integers separated by spaces. The j th entry of i th line is the height of (i, j) . All this numbers are positive and less than or equal to 10^9 . Next two lines consists your and your friends coordinate respectively. Each case is followed by empty line. Both of this point are in grid.

The input is terminated by two zero on a line by itself.

Output Specification

For each of the cases in the input file, print one line which contains two numbers, the minimum height that you have to travel, and the length of shortest such path, separated by space.

Sample Input

```
4 5
8 6 9 2 10
5 11 10 12 6
15 5 9 7 5
7 5 8 1 2
0 0
3 0
```

```
4 5
8 6 9 2 10
5 11 10 12 6
15 5 9 7 5
7 5 8 1 2
2 3
3 0
```

```
4 5
8 6 9 2 10
5 11 10 12 6
15 5 9 7 5
7 5 8 1 2
2 2
3 0
```

```
0 0
```

Sample Output

```
10 7
8 4
9 3
```

Remarks

Algorithm Use binary search on answer and use bfs to find reachability of destination and length of shortest path given a maximum height. Expected time complexity is $O(r \times c \log(10^9))$.

Input Output Explanation In the sample input given, there are three cases. The cases are separated with new line. However, the last line of input is 0 0. Obviously, you should not process this as a case, rather just exit from your program. So your code should take input of cases in a loop and process them. The first two sample are the example described. It is required to follow the input output format exactly. Otherwise you will not get the mark of passing the judge data.

```
while(scanf("%d%d",&r,&c)==2)
{
    if(an==0) break;

    // some initialization here...

    //taken input

    // .... process and print output
}
```

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