

Problem L

Rescue Mission

Time limit: 4 seconds

The princess has been imprisoned in the bottom-right corner of a castle. The castle consists of $M \times N$ rooms laid out in a 2D grid. Mario was initially positioned in the top-left room and must fight his way through the castle to rescue the princess. In order to reach the princess as quickly as possible, Mario decides to move only rightward or downward in each step.

Mario has an initial health point represented by a positive integer. If at any point his health point drops to 0 or below, he dies immediately.

Some rooms are guarded by monsters, so Mario loses health (*negative integer*) upon entering these rooms; some rooms are either empty (*0's*) or contain magic mushrooms that increase Mario's health (*positive integers*); the other rooms are blocked that Mario couldn't pass through.

Please write a computer program to determine Mario's minimum initial health point so that he is able to rescue the princess. If Mario cannot complete the mission due to blocked rooms, return -1.

Note:

- Any room can contain monsters or mushrooms, even the first room Mario enters and the bottom-right room where the princess is imprisoned.

Technical Specification

1. Mario's health point is at most 10^9 .
2. $2 \leq M \leq 1000$, M is an integer.
3. $2 \leq N \leq 1000$, N is an integer.
4. Health points gained/lost from a room are integers.
5. If a room is blocked, Mario can't enter this room and the value of this room is -1001.
6. And if a room is not blocked, $-1000 \leq$ the value of this room ≤ 1000

Input File Format

The test data file contains many test cases. The first line gives you the number of test cases.

The second line contains two integers, indicating M , N of case 1 respectively.

For the next M lines, each line has N integers. Each integer represents a room in the castle and the health points should be gained/lost from this room. If the integer is -1001, it implies this room is blocked.

The next line contains two integers, indicating M , N of case 2 respectively, and so on.

Output Format

The output of each test case is either an positive integer or -1. Each output should be placed in a separate line.

Sample Input

```
2
2 2
-10 -1001
-1001 -10
3 3
-200 -300 -1001
-500 -1000 100
1000 -1001 -500
```

Output for the Sample Input

```
-1
1901
```