

Problem D - To the PC!

Over 300 hours passed in the blink of an eye, and finally you're ready to challenge Victory Road.

... Almost ready. You just need to withdraw HM04 Strength from the PC.

You boot up the PC, but it is blocked by a protection system that you set up a while ago to prevent accidentally releasing any more of your party. The protection system takes the form of a rectangular screen of size N pixels tall by M pixels wide. Each pixel is either white (0) or black (1). Touching each pixels switches it to the other color. When all the pixels are white (0), the protection system is disabled.

There is just one problem. You have fat fingers, and every time you touch somewhere on the screen, you end up toggling a rectangular region of size $r \times c$. Also, since touching anywhere outside the boundary of the screen causes you to log out, you want to make sure that the entire $r \times c$ region that you touch lies within the screen.

What's the minimum number of touches needed to unlock the protection?

Input

The first line contains the integer T , then T test cases follow.

Each test case starts with one line containing four integers N , M , r and c ($1 \leq r \leq n \leq 100$, $1 \leq c \leq m \leq 100$).

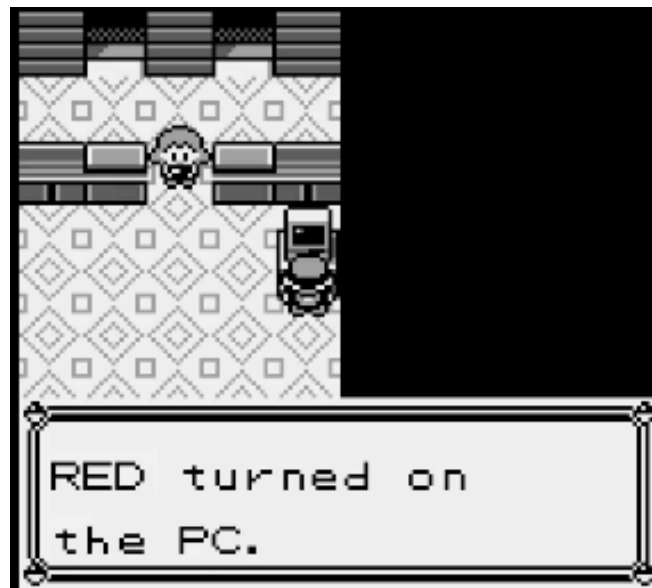
The following N lines each consists of M characters and describe one row of pixels of the screen (0 indicates white, 1 indicates black).

Output

For each test case, print the minimum number of operations needed to unlock the protection, or -1 if it is impossible.

Sample Input

```
3
3 3 1 1
010
101
010
4 3 2 1
011
110
011
110
3 4 2 2
0110
0111
0000
```



Sample Output

```
4
6
-1
```