Problem J: Superpond

Filename: `superpond`
Time limit: `3 seconds`

After having run out of things to do this summer break, you lie down on your couch with your phone out, doom-scrolling until the sun sets – that is, until you come across a nostalgic Minecraft video! All of a sudden, you get the irresistible urge to play Minecraft and enter your standard two-week minecraft phase. You log on to your gaming platform of choice, launch minecraft, and start a brand new superflat world to mess around in.

From there, you decide to go around, destroying – but never building – random dirt blocks around the map to have some change in elevation. Formally, for each (x, y) coordinate in the superflat world, you select an integer, d ($0 \leq d \leq 4$)and break d blocks down from the surface. Note that you cannot break more than 4 blocks down, since you will reach bedrock at that point.

After having your fun, you eventually get the idea to make ponds from the holes you made to support some aquatic wildlife. Therefore, you want to fill every block you dug with water, so that the surface of every pond is level with the land. Unfortunately, this takes even more time and energy than destroying the blocks did, so after a bit of thinking, you decide to make a superpond (the pond with the greatest possible volume) to support as much wildlife as you can. As such, you must find the supercrevice (the most voluminous crevice) and fill it with water to the surface. Formally, two distinct coordinates (x_1, y_1) and (x_2, y_2) are in the same crevice if both of the following are true:

1. The Manhattan distance between the two coordinates is 1. Formally, $|x_1 - y_1| + |x_2 - y_2| = 1$.
2. The height of the top dirt block at both coordinates are each less than 4 (indicating that at least one block was broken downward from the surface at both of the coordinates).

Problem

Given a section of your superflat world in the form of a grid, as well as the height above bedrock for each coordinate, determine the volume of the superpond you will create.

Input

The first line of each test case contains a single integer, **c**, representing the number of superflat sections you are to process. The first line of each test case contains two integers **n** and **m**, representing the length and width of the superflat section, respectively.

There will be **n** lines that follow, each of which contains **m** space separated integers. The $\mathbf{j}^{\text{th}}$ integer on the $\mathbf{i}^{\text{th}}$ row is $\mathbf{h}_{i,j}$, representing the height of the blocks (or the number of dirt blocks that remain vertically stacked above bedrock) on coordinate (i, j). It is guaranteed that the blocks on all the coordinates just outside of the superflat section you are given will not have been destroyed, allowing for all possible ponds to be contained strictly within the superflat section that was given.

Output

For each test case, print out a single integer on its own line, representing the volume of the superpond for that segment.

Input Bounds and Corresponding Credit

100 Points
• $1 \leq \mathbf{c} \leq 50$ • $1 \leq \mathbf{n}, \mathbf{m} \leq 1000$ • $0 \leq \mathbf{h}_{i,j} \leq 4$

Samples

Input	Output
2 3 5 3 2 4 0 4 0 4 2 4 4 4 4 3 2 3 5 3 4 0 4 1 4 2 4 3 4 2 4 1 4 0 4	7 4