Travel on the Grid

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	1024 megabytes

You are given a grid of a size $N \times M$. You need to travel from cell $(1, 1)$ to (N, M). You can travel to any of the 8 adjacent cells from your position. There are mines in some cells. When any mine explodes, it can kill anyone standing on its cell or anyone standing on the 4 other adjacent cells of the mine (top, bottom, left, right). Stepping into any of these five cells will trigger the mine and it explodes.

You can build and use as many diffusers as you need to avoid the mines. Also, you can use a single diffuser as many times as you need. You need to place the diffuser directly on the cell where a mine is located to neutralize it. Once neutralized, the mine poses no further threat and it will **never explode in the future**. Building a diffuser and reusing a diffuser both have its own cost.

At any time, while in a safe cell (one without a non-diffused mine and not within the blast area of any adjacent non-diffused mines), you can build a diffuser and place that in any of the 8 adjacent cells from your current position.

In order to reuse a diffuser, you will need to travel to the cell where it is located. Then you can take the diffuser and travel with it. When you are traveling with a diffuser, you will not be able to build a new one or pick up another diffuser. At any time, you can deploy a carried diffuser in any of the 8 adjacent cells of your current position if that cell contains a mine. You can't drop a diffuser in a cell if it doesn't have any mines. Each time you reuse the diffuser, there is a fixed cost associated with it. Additionally, each cell on the grid has its own specific cost when you move from that cell to an adjacent one while carrying the diffuser. However, placing a diffuser in a neighboring cell doesn't incur the individual cell cost of carrying the diffuser. Therefore, the total cost of transporting and deploying the diffuser will be the sum of this fixed cost and the individual cell costs incurred during travel.

Now you need to find the cheapest way to reach the cell (N, M). It is guaranteed that no mine in the grid will attack cell $(1, 1)$. Also, **no single cell will be attacked by two different mines**.

Input

The first line will contain a single integer $T(1 \leq T)$. First line of each test case will contain four integers $N, M(2 \leq N, M \leq 1000, N \cdot M \leq 10^5), X(1 \leq X \leq 10^9)$ and $Y(1 \leq Y \leq 10^9)$. Here N and M represent the dimension of the grid $(N \times M)$ while X is the cost for building a diffuser and Y is the fixed cost for reusing a diffuser. The following N lines will contain a string, each of them will be of length M. Each character of the strings will be either '.' (ASCII code 46) or '#' (ASCII code 35). The character '.' denotes a safe cell and the character '#' denotes the cell has a mine on it. Following these, there will be N additional lines. Each line will contain M integers, $V_{ij}(0 \leq V_{ij} \leq 10^9)$ where each V_{ij} represents the associated cost of cell (i, j) for moving to an adjacent cell while carrying a diffuser.

It is guaranteed that the sum of $N \cdot M$ is at most 10^5 across all tests.

Output

For each test case, print the cheapest cost to reach (N, M) from $(1, 1)$ in a single line.

Example

standard input	standard output
2 3 4 10 5 .... .#.. ...# 0 0 0 0 0 1 2 3 0 0 0 0 3 4 10 10 ..#. .... #..# 0 0 1 0 0 0 0 0 1 0 0 0	16 20

Note

Explanation of the example

For the first test case, we start at cell $(1, 1)$ and perform the following steps.

- We build a diffuser (cost 10), place it on cell $(2, 2)$ and neutralize the mine.
- We move to cell $(2, 2)$ and pick up the diffuser (no cost).
- While carrying the diffuser we move to cell $(2, 3)$ (cost 1).
- We place the diffuser on cell $(3, 4)$ to reuse it (cost 5) and neutralize the mine.
- Finally we move to $(3, 4)$ and reach our destination.

Overall cost is $(10 + 1 + 5) = 16$.

For the second test case, we perform the following steps.

- We move to $(2, 2)$.
- We build a diffuser (cost 10), place it on cell $(1, 3)$ and neutralize the mine.
- We move to cell $(2, 3)$.
- We build a diffuser (cost 10), place it on cell $(3, 4)$ and neutralize the mine.
- Finally we move to $(3, 4)$ and reach our destination.

Overall cost is $(10 + 10) = 20$. If we wanted to reuse the diffuser, the cost would have been at least 21 as we would need to travel at least one cell carrying it.