

Mario and Princess Peach

Limits: 2s, 512 MB

The world of Mario can be imagined as 2D grid of row **N** and column **M** containing a total of **N×M** cell. Mario starts from top-leftmost cell and Princess Peach is located at bottom-rightmost cell.

In each step, Mario can jump *at most* **P** cell right or *at most* **P** cell down, where **P** is the power of the cell Mario is located. Obviously Mario cannot go beyond the grid. Each cell has **V** points located in it. When Mario steps on a cell he gets the points located in that cell (if **V** is negative **|V|** points is deducted). As you are a programmer, you want to find out what can be the maximum collected points in a given grid if player plays in an optimal way.

Input

The first line contains the number of test cases, **T** ($T \leq 20$). Then **T** cases follow. Each of the test case contains **N**, **M** ($1 \leq N, M \leq 1000$) in the first line. Then **N×M** numbers follow showing the power of each cell ($|V| \leq 100$). After that another **N×M** numbers follow showing the points of that cell.

Limits:

T ≤ 20; 1 ≤ N, M ≤ 1000; 1 ≤ P ≤ 1000; |V| ≤ 100

Output

For each test case print a line "Case x: y" where **x** is the case number and **y** is the maximum points Mario can get while rescuing Princess Peach

Samples

Input	Output
2	Case 1: 12
3 3	Case 2: 11
3 3 2	
2 3 2	
1 1 2	
3 -10 6	
-1 2 -8	
4 3 2	
3 3	
3 3 2	
2 3 2	
1 1 2	
3 -5 7	
-1 2 -3	
2 4 1	

Huge input file, avoid slower input methods.