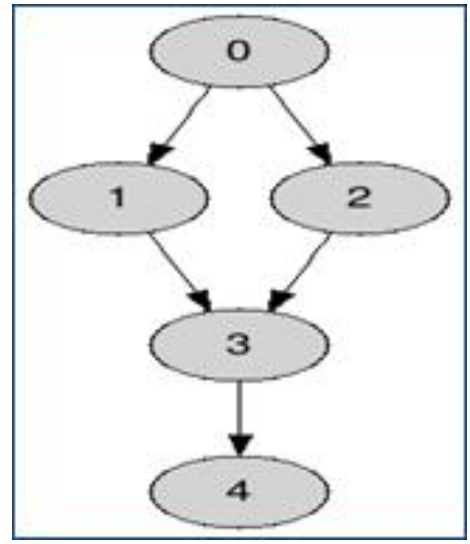
In graph theory, a node X dominates a node Y if every path from the predefined start node to Y must go through X. If Y is not reachable from the start node then node Y does not have any dominator. By definition, every node reachable from the start node dominates itself. In this problem, you will be given a directed graph and you have to find the dominators of every node where the 0-th node is the start node.

As an example, for the graph shown right, 3 dominates 4 since all the paths from 0 to 4 must pass through 3. 1 doesn't dominate 3 since there is a path 0-2-3 that doesn't include 1.



Input

The first line of input will contain T (≤ 100) denoting the number of cases.

Each case starts with an integer N ($0 < N < 100$) that represents the number of nodes in the graph. The next N lines contain N integers each. If the j-th (0 based) integer of i-th (0 based) line is '`1`', it means that there is an edge from node i to node j and similarly a '`0`' means there is no edge.

Output

For each case, output the case number first. Then output $2N + 1$ lines that summarizes the dominator relationship between every pair of nodes. If node A dominates node B, output '`Y`' in cell (A, B), otherwise output '`N`'. Cell (A, B) means cell at A-th row and B-th column. Surround the output with '`|`', '`+`' and '`-`' to make it more legible. Look at the samples for exact format.

Sample Input

```
2
5
0 1 1 0 0
0 0 0 1 0
0 0 0 1 0
0 0 0 0 1
0 0 0 0 0
1
1
```

Sample Output

```
Case 1:
+---------+
|Y|Y|Y|Y|Y|
+---------+
|N|Y|N|N|N|
+---------+
|N|N|Y|N|N|
+---------+
|N|N|N|Y|Y|
+---------+
|N|N|N|N|Y|
+---------+
Case 2:
+-+
|Y|
+-+
```