code jam
System.out.println("hello, world!");

Practice Mode

Round 1B 2009

Contest Analysis

Questions asked 2

- Submissions

Decision Tree

10pt	Not attempted **1512/1752 users** correct (86%)
11pt	Not attempted **1266/1544 users** correct (82%)

The Next Number

9pt	Not attempted **2559/3329 users** correct (77%)
26pt	Not attempted **1890/2557 users** correct (74%)

Square Math

12pt	Not attempted **157/422 users** correct (37%)
32pt	Not attempted **69/168 users** correct (41%)

- Top Scores

ACRush	100
ftc	100
bmerry	100
andrewzta	100
ipknHama	100
halyavin	100
mystic	100
Yarin	100
Khuc.Anh.Tuan	100
dgozman	100

Problem C. Square Math

This contest is open for practice. You can try every problem as many times as you like, though we won't keep track of which problems you solve. Read the Quick-Start Guide to get started.

Small input 12 points	Solve C-small
Large input 32 points	Solve C-large

Problem

Say we have a square that has **W** cells on each side and, therefore, $\mathbf{W}^2$ cells total. Let's go further and fill each cell with one of the following:

- A digit from 0 to 9;
- The addition sign (+);
- The subtraction sign (-).

If, finally, we add a constraint that no 2 digits are horizontally or vertically adjacent and no 2 operators (+ or -) are horizontally or vertically adjacent, then our square can be called an "arithmetic square".

Square Math is the name of a puzzle where, given an arithmetic square, we start from any numeric cell and move either horizontally or vertically a cell at a time, finally ending in a numerical cell. The mathematical expression we get from the traversal is evaluated to get a single value. For example:

```
2+3
+4-
1+0
```

The above is a valid arithmetic square of size **W** = 3. If we start from "2", move horizontally right, then vertically down, we'll get "2+4", which gives a value of "6". If we further move horizontally right, then vertically up, we'll get "2+4-3", which is equal to "3".

In Square Math, there is no limit to how many times you can use a particular cell. It is perfectly legal to move from a cell to its neighbor, then back to the original cell. Given an arithmetic square and a list of queries, your task is to find a Square Math expression which evaluates to each query.

Input

The first line of input contains a single integer, **T**. **T** test cases follow. The first line of each test case contains 2 integers, **W** and **Q**. **W** lines follow, each containing **W** characters, representing the arithmetic square. Don't worry, all arithmetic squares in the input are well-formed. The following line contains a space separated list of **Q** integers, representing the values which need to be computed by using Square Math (the queries). You can assume that all given values will have at least one possible Square Math solution.

Output

For each test case, begin output with "Case #**X**:" on a line by itself, where **X** is the test case number, starting from 1. Then, for each query within the test case, print the Square Math expression which evaluates to the query on a line by itself.

In the case where there are multiple possible Square Math expressions, print the one that is shortest. If there is still a tie, print the lexicographically smallest expression. Remember that '+' is lexicographically smaller than '-'.

Limits

$1 \le \mathbf{T} \le 60$

Small dataset

$2 \le \mathbf{W} \le 10$
$1 \le \mathbf{Q} \le 20$
1 ≤ each query ≤ 50

Large dataset

$2 \le \mathbf{W} \le 20$
$1 \le \mathbf{Q} \le 50$
1 ≤ each query ≤ 250

Sample

Input	Output
2 5 3 2+1-2 +3-4+ 5+2+1 -4-0- 9+5+1 20 30 40 3 2 2+1 +4+ 5+1 2 20	Case #1: 1+5+5+9 3+4+5+9+9 4+9+9+9+9 Case #2: 2 5+5+5+5