C

Lord Matrix

Time Limit	5 seconds
Memory Limit	256 MB

One faithful day, Peter, who is both a mathematician and an anthropologist, discovers an ancient tomb owned by a god named Lord Matrix. He has been searching for the lost tomb for several years now. The problem, though, is that the gate of the tomb requires him to solve a matrix puzzle quickly. Fortunately, all the instructions of the puzzle are fully written in a language that Peter can decipher and understand. The puzzle is as follows:

Given a number matrix of size **R** × **C** (**R** rows and **C** columns, with the top-left and bottom-right corners at **(1, 1)** and **(R, C)**) and a sequence of **Q** operations on the matrix, you shall execute the operations in order. There are five types of operations as follows:

- **0 r**: (**1 ≤ r ≤ R**) you shall shout at the gate (i.e., print) the sum of the current numbers in the row number **r** (from the top).
- **1 c**: (**1 ≤ c ≤ C**) you shall shout at the gate (i.e., print) the sum of the current numbers in the column number **c** (from the left).
- **2** r_1 c_1 r_2 c_2 **h w**: (**1 ≤** r_1**,** r_2**, h ≤ R**; **1 ≤** c_1**,** c_2**, w ≤ C**) you shall swap the two submatrices **[**r_1**,** r_1**+h-1] × [**c_1**,** c_1**+w-1]** and **[**r_2**,** r_2**+h-1] × [**c_2**,** c_2**+w-1]** number by number. Moreover, both submatrices will lie entirely within the given matrix, and there exists a column or row separating the submatrices.
- **3 r c s**: (**1 ≤ r ≤ R**; **1 ≤ c ≤ C**; **2 ≤ s ≤ min(R-r+1, C-c+1)**) you shall rotate the numbers within the submatrix **[r, r+s-1] × [c, c+s-1]** by 90 degrees clockwise.
- **4 r c h w**: (**1 ≤ r ≤ R**; **1 ≤ c ≤ C**; **1 ≤ h ≤ R-r+1**; **2 ≤ c ≤ C-c+1**) you shall flip the numbers in the submatrix **[r, r+h-1] × [c, c+w-1]** horizontally, that is, reverse the numbers in each row of the submatrix.

After all **Q** operations have been performed, you shall also determine the final configuration of the matrix.

Since the number of operations can be large, Peter needs your help in order to solve the gate puzzle. Since Peter knows the ancient language well, you don't have to worry about the language, as he will take care of the rest by himself.

INPUT

The first line of the input contains one integer **T** (**1 ≤ T ≤ 5**) denoting the number of tests in the input file. Then **T** tests follow on separate lines, where the format of each test is as follows:

The first line of each test contains three space-separated integers **R, C, Q** (**2 ≤ R, C ≤ 2,000**; **1 ≤ Q ≤ 1,000**) which denote the matrix size and the number of operations in the sequence. Note that for at least one of the tests, it is known that **R, C ≤ 5**.

Then **R** lines follow. Each line contains a string of **C** single-digit numbers (**0 ≤ number ≤ 9**) denoting the initial matrix, starting at the top-left corner. The numbers in each row are already concatenated into one digit-string.

Then **Q** lines follow, each line containing one of the five operations described above.

OUTPUT

The output contains **T** sets, each containing **M + R** lines, where **M** is the number of operations of types **0** and **1**, and **R** is the number of rows. In the first **M** lines, each contains one number, the row/column sum Peter should shout at the gate. Then **R** lines follow: the final matrix in the same format as the input.

The output for each test should be put on separate lines but without an empty line between tests.

EXAMPLE

Sample Input	Sample Output
1 2 5 5 01234 56789 4 1 2 2 3 3 1 4 2 0 1 2 1 1 2 4 1 2 1 5	12 4 94261 58703

Example explanation

In the example, the five operations transform and query the matrix as follows (changes are underlined):

```
(4 1 2 2 3)
  03214
  58769
 (3 1 4 2)
  03261
  58794
(0 1) -> 0+3+2+6+1 = 12
 (2 1 1 2 4 1 2)
  94261
  58703
(1 5) -> 1+3 = 4
```