

## Problem C. Nasty Operations

Input file: *standard input*  
Output file: *standard output*  
Time limit: 1 second  
Memory limit: 1024 mebibytes

Svetozar has an array  $a$  of  $n$  integers. He came up with several operations on this array:

- 1: replace  $a$  with the array of bitwise exclusive ORs of the prefixes of array  $a$ .  
This means that the  $i$ -th element of the array after the operation will become equal to  $a_1 \oplus a_2 \oplus \dots \oplus a_i$ .
- 2: replace  $a$  with the array of bitwise exclusive ORs of the suffixes of array  $a$ .  
This means that the  $i$ -th element of the array after the operation will become equal to  $a_i \oplus a_{i+1} \oplus \dots \oplus a_n$ .
- -1: perform the inverse operation to operation 1.  
This means that the elements of the array will change in such a way that if operation 1 is applied to the array afterwards, the resulting array will be the same as the one before operation -1.
- -2: perform the inverse operation to operation 2.  
This means that the elements of the array will change in such a way that if operation 2 is applied to the array afterwards, the resulting array will be the same as the one before operation -2.

Svetozar has performed a number of operations and now asks you to check the correctness of his calculations. To simplify the verification, the first operation performed by Svetozar is always denoted by a positive number, and any two consecutive operations are denoted by numbers with different signs.

### Input

The first line contains a single integer  $T$  ( $1 \leq T \leq 10^5$ ), denoting the number of test cases.

Then  $T$  test case descriptions follow, each consisting of three lines.

The first line of a description contains two integers  $n$  and  $q$  ( $1 \leq n, q \leq 10^5$ ), denoting the size of the array and the number of operations, respectively.

The second line contains  $n$  integers  $a_1, a_2, \dots, a_n$  ( $0 \leq a_i \leq 10^9$ ), denoting the elements of the array.

The third line contains  $q$  integers  $op_1, op_2, \dots, op_q$  ( $-2 \leq op_i \leq 2$ ,  $op_i \neq 0$ ,  $op_1 > 0$ ,  $op_i \cdot op_{i+1} < 0$ ), denoting the operations in the order of their application.

It is guaranteed that the sum of  $n$  over all test cases does not exceed  $10^5$ , and the sum of  $q$  over all test cases does not exceed  $10^5$ .

### Output

For each test case, output  $n$  integers on a separate line: the array after applying all the operations.

## Example

standard input	standard output
3	0 1 3 7 15
5 1	25 2 20 23 998 244 353
0 1 2 4 8	4 7 2 1 14 7 14 6 4
1	
7 2	
25 2 20 23 998 244 353	
2 -2	
9 9	
9 9 8 2 4 4 3 5 3	
2 -1 2 -1 2 -1 2 -1 2	