Bit Switch Cipher

Description

IT security is increasingly becoming one of the hottest IT topics worldwide. Protecting information safely is a goal of many companies and startups. Your company was asked to provide a prototype encryption program for a special type of cipher, bit switch cipher.

Bit switch cipher takes a number on an input and outputs an encoded number. In between, it switches the values of bits for each other. For each bit on position **x (0 <= x < N)** it computes a new position **y=f(x)**. Value of bit **x** in the original number is a value of a bit **y** in the output number.

Your task is with a given function **y=f(x)** to encode and output all the numbers you receive in the input.

Input

First line of input contains positive integer **T**, the number of test cases. **T** test cases will follow.

First line of each test case contains **L** distinct integers, two consecutive integers being separated by a single space, and each of these integers being between or equal to **0** and **L-1**. **x**-th number in this numbers sequence describes the output of a function **y=f(x)**. *You are basically given an exact output values for a function **f(x)** for every possible parameter value.*

Second line of each test case contains number **K**, size of the list of numbers to be encoded.

Next **K** lines contain K numbers to be encoded, one number per line. Each of these numbers is guaranteed to be an integer between or equal to **0** and **(2^L)-1**.

Output

For each of numbers to be encoded, you are asked to output the encoded number, one number per line.

Sample input

```
2
4 3 6 1 0 5 2
5
61
7
124
81
50
1 3 2 0
3
7
13
1
```

Sample output

```
115
88
103
21
41
14
7
2
```