

Sequence

SEASON 6 – ROUND FOUR – 300 points



We are given the following sequence of numbers:

$$a_n = a_{n-1} \oplus (a_{n-1} \bmod 10^{p_n}),$$

where the operator \oplus denotes addition without transfer. For instance, $1 \oplus 9 = 0$; $25 \oplus 26 = 41$; $320 \oplus 420 = 740$ (as a clarification we could mention that adjacent digits do not influence each other).

Given the number a_1 and the sequence $\{p_n\}$, $n \in [1, N]$, your program must process Q queries: output the i -th digit of a_j from right to left and swap the values of p_i and p_j .

Input

The first line of the input file `sequence.in` contains the integer a_1 . The second line specifies the number N . The third line contains N integers p_n . On the next line, the number Q is written. The last Q lines contain pairs of numbers i, j , satisfying the constraints $1 \leq j \leq N$, i is correctly defined.

Исход

In the output file `sequence.out` for each query write the found digit on a separate line.

Constraints

$$1 \leq N \leq 10^5$$

$$1 \leq Q \leq 10^4$$

$$0 \leq p_n \leq 10^6$$

a_1 has no more than $5 \cdot 10^5$ digits

Time limit: 2.5 sec

Memory limit: 256 MB

Example

Input (<code>sequence.in</code>)	Output (<code>sequence.out</code>)
123	2
5	4
2 3 1 2 3	6
4	1
1 3	
2 2	
2 5	
3 4	