Problem A: Range Updates, Element Queries

You are given a list L of N integers. You must perform updates and queries on this list. Updates consist of the integers l, r, and v, and will increment the values in the range [l, r] by v. Each query consists of the integer i, where the value of the i-th element must be printed. After being given the list, you will have to perform Q queries, U updates, and F further queries.

Input Bounds:

$N < 10^7$

$U < 10^7$

$Q < 10^7$

Input Format:

The first line will contain the integer N, Q, U, F - The size of L, the number of initial queries, the number of updates, and the number of queries after the updates.

The next line will contain N space-separated values - The i-th value represents the i-th integer in L

The next line will contain the integer U - The number of updates

The next U lines will contain three space-separated values - The l, r, v values for the corresponding update

The next line will contain the value Q - The number of queries

The next Q lines will contain an integer - The i value for the corresponding query

Output Format:

Print the result of the i-th query on the i-th line of your output. End each line in a newline character, including the last line.

Sample Input:

5 3 3 3

1 3 7 1 4

0

2

3

0 4 100

0 0 3

3 4 -50

0

2

4

Sample Output:

1

7

1

104

107

54

Problem B: LCA Queries

You are given a tree of N nodes. You are also given Q queries, where you will have to return the lowest common ancestor of two nodes. The lowest common ancestor of two nodes is the lowest (furthest from root) node that is the parent of both nodes.

Input Format:

The first line will contain the integers N, E - The number of nodes in the tree, labeled as 1, 2, 3, ... N, and the number of edges in the tree

The next E lines will contain two integers a, b - node a is a parent of node b

The next line will contain the integer Q - the number of queries

The next Q lines will contain the integers p, q - The i-th line will contain the i-th query, where you must find the lowest common ancestor of nodes p and q

Output Format:

Print the result of the i-th query on the i-th line of your output. End each line in a newline character, including the last line.

Sample Input:

```
5 4
0 1
0 2
2 3
2 4
3
3 4
1 3
2 4
```

Sample Output:

```
2
0
2
```

Problem C: Matrix Elements

You are given a list L of N 3x3 matrices. You must perform Q queries on this list. Each query consists of the integers l, r, which must print the product of the matrices in the range [l, r].

Input Bounds:

N < 10^7

Q < 10^7

Input Format:

The first line will contain the integer N - The number of matrices in the list

The next N lines will contain 9 integers - The values in the matrix from left-to-right and top-to-bottom

The next line will contain the integer Q - The number of queries

The next Q lines will contain the two integers - The l, r values for the i-th query

Output Format:

The i-th line will contain the result of the i-th query, where the matrices will be printed from left-to-right and top-to-bottom.

Sample Input:

3

1 2 3 3 2 1 3 2 1

1 3 1 3 2 9 0 2 8

8 4 2 9 4 2 8 2 1

3

0 2

1 2

0 0

Sample Output:

517 166 83 439 154 77 439 154 77

43 18 9 114 38 19 82 24 12

1 2 3 3 2 1 3 2 1