# Task Specijacija

You are given a positive integer n and a sequence  $a_1, a_2, \ldots, a_n$  of positive integers, such that  $\frac{i(i-1)}{2} < a_i \leq \frac{i(i+1)}{2}$ .

The sequence parameterizes a tree with  $\frac{(n+1)(n+2)}{2}$  vertices, consisting of n+1 levels with  $1, 2, \ldots, n+1$  vertices, in the following way:



The tree parameterized by a = (1, 2, 6).

The *i*-th level contains vertices  $\frac{i(i-1)}{2} + 1, \ldots, \frac{i(i+1)}{2}$ . The vertex  $a_i$  has two children, and the rest of the vertices on the level have one child each.

We want to answer q queries of the form "what is the largest common ancestor of x and y", i.e. the vertex with the largest label which is an ancestor of both x and y.

### Input

The first line contains integers n, q and  $t \ (1 \le n, q \le 200\ 000, t \in \{0, 1\})$ , the number of parameters, the number of queries, and a value which will be used to determine the labels of vertices in the queries.

The second line contains a sequence of n integers  $a_i \left(\frac{i(i-1)}{2} < a_i \le \frac{i(i+1)}{2}\right)$  which parameterize the tree.

The *i*-th of the following q lines contains two integers  $\tilde{x}_i$  and  $\tilde{y}_i$   $(1 \leq \tilde{x}_i, \tilde{y}_i \leq \frac{(n+1)(n+2)}{2})$  which will be used to determine the labels of vertices in the queries.

Let  $z_i$  be the answer to the *i*-th query, and let  $z_0 = 0$ . The labels in the *i*-th query  $x_i$  and  $y_i$  are:

$$x_{i} = \left( (\tilde{x}_{i} - 1 + t \cdot z_{i-1}) \mod \frac{(n+1)(n+2)}{2} \right) + 1,$$
  
$$y_{i} = \left( (\tilde{y}_{i} - 1 + t \cdot z_{i-1}) \mod \frac{(n+1)(n+2)}{2} \right) + 1,$$

where mod is the remainder of integer divison.

*Remark:* Note that if t = 0, it holds  $x_i = \tilde{x}_i$  and  $y_i = \tilde{y}_i$ , so all queries are known from input. If t = 1, the queries are not known in advance, but are determined using answers to previous queries.

#### Output

Output q lines. In the *i*-th line, output the largest common ancestor of  $x_i$  and  $y_i$ .



### Scoring

Subtask	Points	Constraints
1	10	q = 1, t = 0
2	10	$n\leq 1000,t=0$
3	30	t = 0
4	60	t = 1

## Examples

input	input
3 5 0	3 5 1
1 2 6	1 2 6
7 10	7 10
8 5	85
6 2	62
9 10	9 10
2 3	2 3
output	output
1	1
5	6
1	2
6	1
1	1

#### Clarification of the examples:

The tree from both examples is shown on the figure in the statement.

Labels of verticies in queries in the second example are:

 $\begin{array}{l} x_1=7, \ y_1=10, \\ x_2=9, \ y_2=6, \\ x_3=2, \ y_3=8, \\ x_4=1, \ y_4=2, \\ x_5=3, \ y_5=4. \end{array}$