G - One Time Swap 2

Editorial (/contests/abc431/tasks/abc431_g/editorial)

Time Limit: 2 sec / Memory Limit: 1024 MiB

Score : 575 points

Problem Statement

You are given an integer sequence $A = (A_1, A_2, \ldots, A_N)$ of length N.

For a pair of integers (l, r) $(1 \leq l < r \leq N)$, let $f(l, r)$ be the integer sequence obtained by swapping the l-th element and the r-th element of A.

Generate a sequence of integer sequences $B = (B_1, B_2, \ldots, B_{\frac{N(N-1)}{2}})$ of length $\frac{N(N-1)}{2}$ by the following procedure:

- Prepare an empty sequence $B = ()$.
- For each pair of integers (l, r) $(1 \leq l < r \leq N)$, add $f(l, r)$ to B.
- Sort B in lexicographical order of sequences.

You are given Q queries; process them in order. The i-th query is as follows:

- Given an integer k, find one pair of integers (l, r) $(1 \leq l < r \leq N)$ such that $B_k = f(l, r)$ and output it.

▶ What is lexicographical order of sequences?

Constraints

- $2 \leq N \leq 2 \times 10^5$
- $1 \leq Q \leq 2 \times 10^5$

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- $1 \leq A_i \leq N$
- $1 \leq k \leq \frac{N(N-1)}{2}$
- All input values are integers.

Input

The input is given from Standard Input in the following format:

$$
\begin{aligned}
&N \quad Q \\
&A_1 \quad A_2 \quad \dots \quad A_N \\
&\mathrm{query}_1 \\
&\mathrm{query}_2 \\
&\vdots \\
&\mathrm{query}_Q
\end{aligned}
$$

Each query is given in the following format:

$$k$$

Output

Output Q lines. The i-th line should contain the answer to the i-th query in the following format:

$$l \quad r$$

If there are multiple solutions, any of them will be considered correct.

Sample Input 1 Copy

Copy

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

Sample Output 1 Copy

Copy

```
2 3
2 4
1 2
```

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$f(1,2) = (2,1,1,2), f(1,3) = (1,2,1,2), f(1,4) = (2,2,1,1), f(2,3) = (1,1,2,2), f(2,4) = (1,2,1,2), f(3,4) = (1,2,2,1)$.

The sequence B obtained by sorting these six sequences in lexicographical order is $B = ((1,1,2,2), (1,2,1,2), (1,2,1,2), (1,2,2,1), (2,1,1,2), (2,2,1,1))$.

- For the 1-st query, the only (l,r) such that $B_1 = (1,1,2,2) = f(l,r)$ is $(l,r) = (2,3)$.
- For the 2-nd query, (l,r) such that $B_3 = (1,2,1,2) = f(l,r)$ are $(l,r) = (1,3), (2,4)$. In this case, either one will be considered correct.
- For the 3-rd query, the only (l,r) such that $B_5 = (2,1,1,2) = f(l,r)$ is $(l,r) = (1,2)$.

Sample Input 2

Copy

```
10 10
1 1 2 7 6 3 5 7 3 3
21
36
9
17
13
24
7
45
33
1
```

Sample Output 2

Copy

```
6 8
2 4
5 7
9 10
8 9
3 9
5 9
1 8
2 10
4 10
```

'#telegram)

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