Interval Query

Time Limit: 1 Second
Memory Limit: 2048 MB

If you have seen the easy version of this problem in this class before, the only difference between the two versions is that we removed the constraint $\forall i \in \{2, \ldots, m\}, l_{i-1} \leq l_i$ and $r_{i-1} \leq r_i$.

You are asked to solve a classic problem: given an array $a_1, \ldots, a_n$ of n elements and m intervals $(l_1, r_1), \ldots, (l_m, r_m)$ $(\forall i \in \{1, \ldots, m\}, l_i \leq r_i)$. For each interval (l_i, r_i), find the maximum element of $a_{l_i}, \ldots, a_{r_i}$.

Input

The first line contains two integers n and m ($1 \leq n \leq 10^5$, $1 \leq m \leq 5 \times 10^6$) - the number of elements in the array and the number of intervals.

The second line contains n integers $a_1, \ldots a_n$ ($1 \leq a_i \leq 10^9$) - the elements in the array.

The next line describes the first query l_1, r_1 ($1 \leq l_1 \leq r_1 \leq n$), and a seed s ($1 \leq s \leq n$). Since the number of queries could be very large, you are asked to get the following query by $l_{i+1} = (l_i + s) \mod n + 1$ and $r_{i+1} = (r_i + s) \mod n + 1$. If the resulting l_{i+1} is greater than r_{i+1}, swap the values of l_{i+1} and r_{i+1}.

Output

Output a single integer denoting the sum of the maximum elements in each interval.

Sample Inputs

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

Sample Outputs

```
13
```

Note

The queries are:

- 1 3
- 3 5
- 2 5