Wonderful Interval 2

Youngwoo has arrays A and B of length N consisting of integers. For all integers $0 \leq i \leq N-1$, $A[i] \leq B[i]$ is satisfied.

An interval $[l, r]$ satisfying all the following conditions is defined as a *wonderful interval*:

- l, r are integers
- $0 \leq l \leq r \leq N-1$
- It is possible to make $[A[l], \cdots, A[r]]$ become $[B[l], \cdots, B[r]]$ by repeating the following operation on the array $[A[l], \cdots, A[r]]$.
  - Let the current array be $X = [X[0], X[1], \cdots, X[r-l]]$.
  - Choose **two distinct** integers $0 \leq i, j \leq r-l$ such that $X[i] = X[j]$, and increment $X[i]$ by 1.

Youngwoo wonders which intervals are wonderful intervals.

Specifically, Youngwoo's curiosity consists of Q queries numbered from 0 to $Q-1$, which are represented by arrays L and R of length Q consisting of integers.

Query j asks whether the interval $[L[j], R[j]]$ is a wonderful interval. ($0 \leq j \leq Q-1$)

You must write a program that answers Youngwoo's queries.

Implementation Details

You must implement the following function.

```
vector<int> array_operation(vector<int> A, vector<int> B, vector<int> L,
vector<int> R)
```

- A, B: Integer arrays of size N.
- L, R: Integer arrays of size Q.
- This function should return an integer array S of size Q. $S[j]$ should be 1 if $[L[j], R[j]]$ is a wonderful interval, and 0 otherwise. ($0 \leq j \leq Q-1$)
- This function is called exactly once.

Input/output functions must not be executed in any part of the submitted source code.

Constraints

- $1 \leq N, Q \leq 250\,000$
- For all i, $1 \leq A[i] \leq B[i] \leq 10^9$ ($0 \leq i \leq N-1$)
- For all j, $0 \leq L[j] \leq R[j] \leq N-1$ ($0 \leq j \leq Q-1$)

Subtasks

No.	Points	Constraints
1	9	$N, Q \leq 100; B[i] \leq 100\ (0 \leq i \leq N-1)$
2	7	$N, Q \leq 2\,000; A[i] = 1\ (0 \leq i \leq N-1)$
3	16	$A[i] = 1\ (0 \leq i \leq N-1)$
4	10	$N, Q \leq 2\,000$
5	4	$B[i] \leq 2\ (0 \leq i \leq N-1)$
6	13	$B[i] \leq 100\ (0 \leq i \leq N-1)$
7	31	$B[i] \leq 250\,000\ (0 \leq i \leq N-1)$
8	10	No additional constraints.

Examples

Example 1

Consider the following call:

```
array_operation([2, 1, 1, 2], [2, 1, 3, 3], [0, 0, 1], [1, 3, 3])
```

- $[0, 1]$ is a wonderful interval. This is because the two arrays $[A[0], A[1]]$ and $[B[0], B[1]]$ are equal.
- $[0, 3]$ is a wonderful interval. This is because it is possible to make $[2, 1, 1, 2]$ become $[2, 1, 3, 3]$ by performing the following operations.
  - Choose $i = 3$, $j = 0$ and perform the operation. The array becomes $[2, 1, 1, 3]$ after the operation.
  - Choose $i = 2$, $j = 1$ and perform the operation. The array becomes $[2, 1, 2, 3]$ after the operation.
  - Choose $i = 2$, $j = 0$ and perform the operation. The array becomes $[2, 1, 3, 3]$ after the operation.
- $[1, 3]$ is not a wonderful interval. It can be proven that it is impossible to make $[1, 1, 2]$ become $[1, 3, 3]$ no matter how operations are performed.

Therefore, the function should return $[1, 1, 0]$.

Example 2

Consider the following call:

```
array_operation([1, 2, 1, 2, 1], [2, 3, 1, 4, 2], [0, 0, 1, 1, 2], [2, 4, 3,
4, 3])
```

Among all intervals, the wonderful intervals are $[0, 2]$, $[0, 3]$, $[0, 4]$, $[1, 4]$, $[2, 2]$. Therefore, the function should return $[1, 1, 0, 1, 0]$.

Sample Grader

The input format of the sample grader is as follows:

- line 1: $N\ Q$
- For all $0 \leq i \leq N-1$:
  - line $2+i$: $A[i]\ B[i]$
- For all $0 \leq i \leq Q-1$:
  - line $2+N+i$: $L[i]\ R[i]$

The sample grader prints the answer in the following format:

- line 1: Return value of `array_operation`