Max Twice Subsequences

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	1024 megabytes

You are given a sequence of positive integers $A = (A_1, A_2, \ldots, A_N)$ of length N.

Answer Q queries. In the i-th query, integers L_i, R_i are given. Let $B = (A_{L_i}, A_{L_i+1}, \ldots, A_{R_i})$. For this sequence B, solve the following problem and output the answer.

You are given a sequence of positive integers $B = (B_1, B_2, \ldots, B_{|B|})$. A positive integer sequence $C = (C_1, C_2, \ldots, C_k)$ is called a **good sequence** if it appears at least twice as a non-empty subsequence of B. Formally, this means that there exist a positive integer k and two sequences of indices $(i_1, i_2, \ldots, i_k)$ and $(j_1, j_2, \ldots, j_k)$ such that all of the following conditions hold:

- $1 \leq i_1 < i_2 < \cdots < i_k \leq |B|$
- $1 \leq j_1 < j_2 < \cdots < j_k \leq |B|$
- For all $p = 1, 2, \ldots, k$, we have $B_{i_p} = B_{j_p} = C_p$
- There exists at least one p $(1 \leq p \leq k)$ such that $i_p \neq j_p$

Determine whether a good sequence exists. If it exists, output the **rolling hash** of the lexicographically largest good sequence. Otherwise, output -1.

The **rolling hash** of a positive integer sequence $a = (a_1, a_2, \ldots, a_n)$ is defined as $\left(\sum_{i=1}^{n} a_i 3^{i-1}\right) \bmod 998244353$.

Input

The input is given in the following format:

N Q
A_1 A_2 $\ldots$ A_N
L_1 R_1
L_2 R_2
$\vdots$
L_Q R_Q

- All input values are integers.
- $1 \leq N, Q \leq 3 \times 10^5$
- $1 \leq A_i \leq N$ $(1 \leq i \leq N)$
- $1 \leq L_i \leq R_i \leq N$ $(1 \leq i \leq Q)$

Output

Print Q lines. For each $i = 1, 2, \ldots, Q$, output the answer for the sequence $B = (A_{L_i}, A_{L_i+1}, \ldots, A_{R_i})$.

Examples

standard input	standard output
5 4 3 2 1 2 3 1 5 1 3 2 4 2 5	36 -1 2 11
5 1 3 2 1 4 1 1 5	18
10 10 1 4 5 2 5 3 4 2 5 4 1 10 1 9 2 10 1 8 2 9 3 10 1 7 2 8 3 9 4 10	56 20 56 35 20 56 17 35 20 17

Note

In the first sample, the behavior is as follows.

- For the first query, $B = (3, 2, 1, 2, 3)$. Among all non-empty subsequences that appear at least twice, the lexicographically largest one is $(3, 2, 3)$. Two valid index sequences that produce this subsequence are $(1, 2, 5)$ and $(1, 4, 5)$.
- For the second query, $B = (3, 2, 1)$. There is no non-empty subsequence that appears at least twice.
- For the third query, $B = (2, 1, 2)$. Among all non-empty subsequences that appear at least twice, the lexicographically largest one is (2).
- For the fourth query, $B = (2, 1, 2, 3)$. Among all non-empty subsequences that appear at least twice, the lexicographically largest one is $(2, 3)$.