



Problem F

Best Product

Let A be an array of N integers which elements are only -2 , -1 , 1 , and 2 .

Let $\text{prod}(A, s, t)$ for the array A and indexes s and t ($s \leq t$) be the product of all integers in array A from index s up to index t ; in other words, $\text{prod}(A, s, t) = A_s \times A_{s+1} \times \dots \times A_{t-1} \times A_t$.

The value M is the **maximum subarray product** of array A on a range $[L, R]$ if and only if

- there exists s and t such that $L \leq s \leq t \leq R$ and $\text{prod}(A, s, t) = M$, and
- there is no s and t such that $L \leq s \leq t \leq R$ and $\text{prod}(A, s, t) > M$.

Given an array A and Q queries of $[L, R]$, your task is to find the maximum subarray product for each query.

You are guaranteed that the integers -2 and 2 altogether will appear in array A no more than 60 times.

Input

Input begins with two integers N Q ($1 \leq N, Q \leq 100\,000$) representing the array size and the number of queries, respectively. The next line contains N integers A_i ($A_i \in \{-2, -1, 1, 2\}$) representing the array. You are guaranteed that the integers -2 and 2 altogether will appear in the given array no more than 60 times. The next Q lines, each contains two integer L R ($1 \leq L \leq R \leq N$) representing the range in which you should find the maximum subarray product.

Output

For each query, output in a line an integer representing the maximum subarray product on the given range.



Sample Input #1

```
6 6
-2 1 2 -1 -2 -2
4 5
5 6
3 5
3 6
1 2
1 1
```

Sample Output #1

```
2
4
4
4
1
-2
```

Explanation for the sample input/output #1

The following is how we can obtain the maximum subarray product for each query.

- 1st query: $\text{prod}(A, 4, 5) = -1 \times -2 = 2$.
- 2nd query: $\text{prod}(A, 5, 6) = -2 \times -2 = 4$.
- 3rd query: $\text{prod}(A, 3, 5) = 2 \times -1 \times -2 = 4$.
- 4th query: $\text{prod}(A, 3, 5) = 2 \times -1 \times -2 = 4$.
- 5th query: $\text{prod}(A, 2, 2) = 1$.
- 6th query: $\text{prod}(A, 1, 1) = -2$.