

Zero Query

[English](#)

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Given an array having **N** elements, each element is either **-1** or **1**.

You have **M** queries, each query has two numbers **L** and **R**, you have to answer the length of the longest subarray in range **L** to **R** (inclusive) that its sum is equal to **0**.

Input

The first line contains two numbers **N** and **M** ($1 \leq N, M \leq 50000$) - the number of elements and the number of queries.

The second line contains **N** numbers - the elements of the array, each element is either **-1** or **1**.

In the next **M** lines, each line contains two numbers **L** and **R** ($1 \leq L \leq R \leq N$).

Output

For each query, print the length of the longest subarray that satisfies the query in one line. If there isn't any such subarray, print **0**.

Note

Subarray in an array is like substring in a string, i.e. subarray should contain contiguous elements.

Example

Input:

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

Output:

```
0
2
4
6
```