Minimum Connected Component

Problem Statement

You are given N nodes. Nodes are numbered as $1,\ 2,\ 3, \ldots,\ N$. The weight of i^{th} node is W_i. Initially, none of the nodes are connected by edges. You are given Q queries where each query is an Update-type query.

Each query contains two integers U and V. On executing a query, you have to add an edge between the nodes U and V. After the update you have to find the connected component that has *minimum total weight*. The total weight of a connected component is defined as the sum of weights of all the nodes in the connected component.

Constraints

- $1 \leq N \leq 2 \times 10^5$
- $1 \leq Q \leq 3 \times 10^5$
- $1 \leq W_i \leq 10^3$
- $1 \leq U,V \leq N$
- $U \neq V$

Input Format

First line contains two space separated integers N and Q. Second line contains N space separated integers, i^{th} integers denotes the value of W_i. Each of the next Q line contains two space separated integers U and V.

Output Format

Print the *minimum total weight* after each query in separate lines.

Sample Input

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

Sample Output

```
4
5
10
10
25
```

Explanation

In the given test case,

weight of node 1 is 4,
weight of node 2 is 6,
weight of node 3 is 4,
weight of node 4 is 6, and
weight of node 5 is 5.

1. connected components are {1, 2}, {3}, {4} and {5}. Minimum total weight is for {3} = 4.
2. connected components are {1, 2}, {3, 4} and {5}. Minimum total weight is for {5} = 5.
3. connected components are {1, 2, 5} and {3, 4}. Minimum total weight is for {3, 4} = $4 + 6 = 10$.
4. connected components are {1, 2, 5} and {3, 4}. Minimum total weight is for {3, 4} = $4 + 6 = 10$.
5. there is one connected component {1, 2, 3, 4, 5}. Minimum total weight is for {1, 2, 3, 4, 5} = $4 + 6 + 4 + 6 + 5 = 25$.