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

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

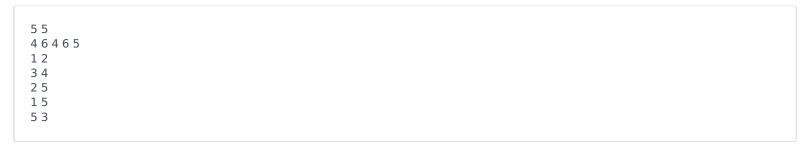
Input Format

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.

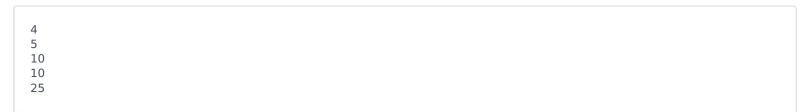
Output Format

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

Sample Input



Sample Output



Explanation

In the given test case,

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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.
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- 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.