

White Falcon just solved the data structure problem below using heavy-light decomposition. Can you help her find a new solution that doesn't require implementing any fancy techniques?

There are **2** types of query operations that can be performed on a tree:

- 1 u x : Assign x as the value of node u .
- 2 u v : Print the sum of the node values in the unique path from node u to node v .

Given a tree with N nodes where each node's value is initially **0**, execute Q queries.

Author

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Difficulty

Hard

Max Score

100

Submitted By

3009

NEED HELP?

Input Format

The first line contains **2** space-separated integers, N and Q , respectively.

The $N - 1$ subsequent lines each contain **2** space-separated integers describing an undirected edge in the tree.

Each of the Q subsequent lines contains a query you must execute.

Constraints

- $1 \leq N, Q \leq 10^5$
- $1 \leq x \leq 1000$
- It is guaranteed that the input describes a connected tree with N nodes.
- Nodes are enumerated with **0**-based indexing.

Output Format

For each type-**2** query, print its integer result on a new line.

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Sample Input

```
3 3
0 1
1 2
1 0 1
1 1 2
2 0 2
```

Sample Output

```
3
```

Explanation

Initial Input

n_1

0

n_0

0

n_2

0

Query: 1 0 1

n_1

0

n_0

1

n_2

0

Query: 1 1 2

n_1

2

n_0

1

n_2

0

Query: 2 0 2

n_1

2

n_0

1

n_2

0

After the first **2** queries, the value of node $n_0 = 1$ and the value of node $n_1 = 2$. The third query requires us to print the sum of the node values in the path from nodes **0** to **2**, which is $1 + 2 + 0 = 3$. Thus, we print **3** on a new line.