

Pondo Subtree Add

time limit per test: 2 seconds (5 seconds for Python)
memory limit per test: 500 megabytes
input: standard input
output: standard output
points: 100 · problem code: pondosubadd

You are given a tree with n vertices, rooted at vertex 1. Each vertex i has an integer value a_i . You must process q queries of two types:

- `1 v x`: add x to the value of every vertex in the subtree of v (including v itself)
- `2 u`: output the current value of vertex u

Use the enter/exit Euler tour from Pondo Euler Tour. The subtree of v occupies the contiguous range $[\text{first}[v], \text{last}[v]]$ on that tour, so a subtree add is a range add and a vertex query is a point query at $\text{first}[u]$.

The Fenwick tree below supports range add and point query. `range_add(l, r, x)` adds x to every index in $[l, r]$ (inclusive, 0-indexed). `point(i)` returns the value at index i .

```
class Fenwick:
    def __init__(self, n):
        self.n = n
        self.bit = [0] * (n + 1)

    def add(self, i, delta):
        while i <= self.n:
            self.bit[i] += delta
            i += i & -i

    def prefix(self, i):
        s = 0
        while i > 0:
            s += self.bit[i]
            i -= i & -i
        return s

    def range_add(self, left, right, delta):
        self.add(left + 1, delta)
        self.add(right + 2, -delta)

    def point(self, i):
        return self.prefix(i + 1)
```

Input

The first line contains two integers n and q .

The second line contains n integers $a_1, a_2, \dots, a_n$, the initial values of the vertices.

Each of the next $n - 1$ lines contains two integers u and v , denoting an undirected edge between u and v .

Each of the next q lines describes a query and is one of the following:

- `1 v x`: add x to every vertex in the subtree of v
- `2 u`: query the value of vertex u

Vertices are numbered 1 through n . The edges form a tree.

Output

For each query of type `2`, print a line containing the current value of that vertex.

Constraints

- $1 \leq n, q \leq 10^5$
- $1 \leq u, v \leq n$
- $-10^9 \leq a_i, x \leq 10^9$

Example 1

Input

```
8 9
0 0 0 0 0 0 0 0
1 2
2 3
2 4
1 5
5 6
6 7
6 8
1 2 10
2 3
2 5
1 1 5
2 3
2 7
1 6 -3
2 7
2 1
```

Output

```
10
0
15
5
2
5
```

Explanation

The tree, rooted at 1, looks like this:



- Adding 10 to the subtree of 2 changes vertices 2, 3, 4.
- Vertex 3 is then 10, and vertex 5 is still 0.
- Adding 5 to the subtree of 1 changes every vertex.
- Vertex 3 becomes 15 and vertex 7 becomes 5.
- Adding -3 to the subtree of 6 changes vertices 6, 7, 8, so vertex 7 becomes 2.
- Vertex 1 is 5.

Example 2

Input

```
5 7
1 2 3 4 5
1 2
1 3
3 4
3 5
2 1
1 3 10
2 4
2 2
1 1 -1
2 5
2 1
```

Output

```
1
14
2
14
0
```