Painter's Treasure

While exploring the school library, Kek has found a rather unusual painting. At first glance, the painting seemed pretty simple. But after a careful and thorough inspection, Kek found a reference to a valuable treasure in the painting. To locate the treasure, he has to solve a riddle.

Kek's school has N classrooms. Each classroom has a blackboard and a light bulb. Initially, all the blackboards have the number 0 written on it, and all the light bulbs are off. The classrooms are connected by $N-1$ doors. The ith door is between the $U[i]$th and the $V[i]$th classroom. Doors are in such a way that any classroom can be reached from any other classroom.

Now, back to the riddle. The riddle has Q instructions in order. Instructions are of the following two types:

1. Start from Ath classroom and go to Bth classroom. For each classroom on the path, add X to the blackboard's number if the light bulb is off, or subtract X from the blackboard's number if the light bulb is on, write down the number on the blackboard — overwriting the previous number; and toggle the light bulb.
2. Go to the Vth classroom and note down the number written on the blackboard.

To find the treasure, Kek needs answers for each instruction of the second type. Kek is weak in counting, so he needs your help.

Input

- line 1: $N\ Q$
- line $1+i$ ($1 \le i \le N-1$): $U[i]\ V[i]$
- line $N+i$ ($1 \le i \le Q$): The ith instruction, represented as either of the following:
  - $1\ A\ B\ X$
  - $2\ V$

Output

For each instruction of the second type, output the number written on the blackboard in a separate line.

Constraints

- $2 \leq N \leq 10^5$
- $1 \leq Q \leq 10^5$
- $1 \leq U[i], V[i] \leq N$ and $U[i] \neq V[i]$
- $1 \leq A, B \leq N$ and $A \neq B$
- $-10^9 \leq X \leq 10^9$
- $1 \leq V \leq N$
- There is at least one instruction of the second type.

Subtasks

Subtask	Score	Additional constraints
1	7	$N = 2$ and $Q \leq 3$
2	10	There exists a classroom with doors to every other classroom
3	18	$N, Q \leq 2000$ and $-10^6 \leq X \leq 10^6$
4	26	No classroom has more than two doors
5	39	No additional constraints.

Examples

Example 1

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

The correct output is:

```
3
1
2
```