Xortree2 (xortree2)

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1.5 seconds
Memory limit:	64 megabytes

You are given a tree with N nodes. Each edge has a weight w_i. The difference of two nodes u and v is the binary XOR of the weights on the simple path that connects them. More formally, if the simple path between u and v consists of the edges $e_1, e_2, \ldots, e_l$, then their difference is defined as $w_{e_1} \oplus w_{e_2} \oplus \cdots \oplus w_{e_l}$.

Let I be the set of interesting nodes (I is initially empty). You have to perform Q operations on this set: in one operation, a node is either added or removed from I. After each operation, you have to print the maximum difference between two distinct interesting nodes (if $|I| \leq 1$, you must print 0).

Input

The first line contains two integers, N ($1 \leq N \leq 50\ 000$) and Q ($1 \leq Q \leq 50\ 000$). The i-th of the following $N-1$ lines contains three integers u_i, v_i ($1 \leq u_i, v_i \leq N$ for each $i = 1 \ldots N-1$.) and w_i ($0 \leq w_i \leq 10^9$ for each $i = 1 \ldots N-1$), corresponding to an edge of weight w_i between nodes u_i and v_i.

Each of the next Q lines contains a single integer p_i ($1 \leq p_i \leq N$ for each $i = 1 \ldots Q$). If $p_i \notin I$, then node p_i gets added to I, otherwise it gets deleted from I.

For tests worth 11: $N, Q \leq 100$.

For tests worth 13: $w_i \in \{0, 1\}$ for each $i = 1 \ldots N-1$.

For tests worth 17: $N, Q \leq 1000$.

For tests worth 59: No additional limitations.

Output

You need to print Q lines. The i-th line must contain a single integer, the maximum difference between two interesting nodes after the i-th operation.

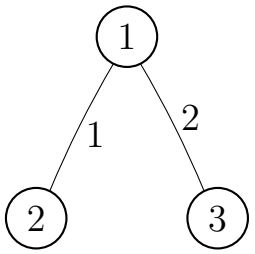
Examples

standard input	standard output
3 4 1 2 1 1 3 2 1 2 3 2	0 1 3 2
5 5 1 2 3 1 3 1 3 4 4 3 5 1 3 1 4 3 2	0 1 5 5 6

Note

In the **first sample case**, the set of interesting nodes and the interesting pair with the maximum difference after each operation:

No. of operation	Set of interesting nodes	Pair with maximum difference
1	$\{1\}$	No pairs
2	$\{1, 2\}$	$(1, 2)$
3	$\{1, 2, 3\}$	$(2, 3)$
4	$\{1, 3\}$	$(1, 3)$



In the **second sample case**, the set of interesting nodes and the interesting pair with the maximum difference after each operation:

No. of operation	Set of interesting nodes	Pair with maximum difference
1	$\{1\}$	No pairs
2	$\{1, 3\}$	$(1, 3)$
3	$\{1, 3, 4\}$	$(1, 4)$
4	$\{1, 4\}$	$(1, 4)$
5	$\{1, 2, 4\}$	$(2, 4)$