Road Closures

In the city of Surabaya, there are N junctions, numbered from 0 to $N-1$. These junctions are connected by $N-1$ bidirectional roads, numbered from 0 to $N-2$, such that there is a unique path between any pair of junctions through the roads. Road i ($0 \le i \le N-2$) connects junction $U[i]$ and $V[i]$.

To raise environmental awareness, Pak Dengklek, as the mayor of Surabaya, plans to hold a Car Free Day. To encourage the event, Pak Dengklek will organize road closures. Pak Dengklek will first choose a non-negative integer k, then close some of the roads such that each junction is directly connected to **at most** k roads that are not closed. The cost to close road i is $W[i]$.

Help Pak Dengklek to find the minimum total cost to close the roads for each possible non-negative integer k ($0 \le k \le N-1$).

Implementation Details

You should implement the following procedure:

```
int64[] minimum_closure_costs(int N, int[] U, int[] V, int[] W)
```

- N: the number of junctions in Surabaya.
- U and V: arrays of size $N-1$, where junctions $U[i]$ and $V[i]$ are connected by road i.
- W: an array of size $N-1$, where $W[i]$ is the cost to close road i.
- This procedure should return a single array of size N. For each k ($0 \le k \le N-1$), the k-th element is the minimum total cost to close the roads such that each junction is directly connected to at most k roads that are not closed.
- This procedure is called exactly once.

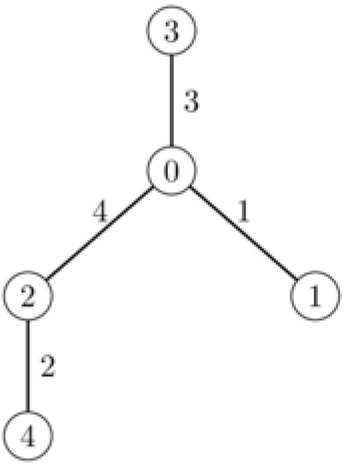
Examples

Example 1

Consider the following call:

```
minimum_closure_costs(5, [0, 0, 0, 2], [1, 2, 3, 4], [1, 4, 3, 2])
```

This means there is a total of 5 junctions and 4 roads connecting the junction pairs $(0, 1)$, $(0, 2)$, $(0, 3)$, and $(2, 4)$ with closure costs 1, 4, 3, and 2, respectively.



To obtain the minimum costs:

- if Pak Dengklek chose $k = 0$, then all roads should be closed with a total cost of $1 + 4 + 3 + 2 = 10$;
- if Pak Dengklek chose $k = 1$, then road 0 and road 1 should be closed with a total cost of $1 + 4 = 5$;
- if Pak Dengklek chose $k = 2$, then road 0 should be closed with a total cost of 1;
- if Pak Dengklek chose $k = 3$ or $k = 4$, then no roads need to be closed.

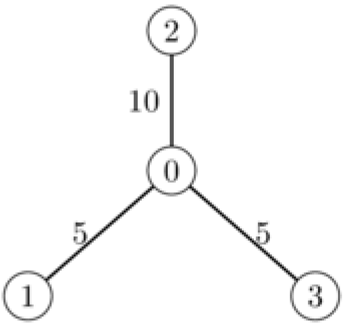
Therefore, the `minimum_closure_costs` procedure should return $[10, 5, 1, 0, 0]$.

Example 2

Consider the following call:

```
minimum_closure_costs(4, [0, 2, 0], [1, 0, 3], [5, 10, 5])
```

This means there is a total of 4 junctions and 3 roads connecting the junction pairs $(0, 1)$, $(2, 0)$, and $(0, 3)$ with the closure costs 5, 10, and 5 respectively.



To obtain the minimum costs:

- if Pak Dengklek chose $k = 0$, then all roads should be closed with a total cost of $5 + 10 + 5 = 20$;
- if Pak Dengklek chose $k = 1$, then road 0 and road 2 should be closed with a total cost of $5 + 5 = 10$;
- if Pak Dengklek chose $k = 2$, then either road 0 or road 2 should be closed with a total cost of 5;
- if Pak Dengklek chose $k = 3$, then no roads need to be closed.

Therefore, the `minimum_closure_costs` procedure should return $[20, 10, 5, 0]$.

Constraints

- $2 \le N \le 100\,000$
- $0 \le U[i], V[i] \le N - 1$ (for all $0 \le i \le N - 2$)
- It is possible to travel between any pair of junctions through the roads.
- $1 \le W[i] \le 10^9$ (for all $0 \le i \le N - 2$)

Subtasks

1. (5 points) $U[i] = 0$ (for all $0 \le i \le N - 2$)
2. (7 points) $U[i] = i$, $V[i] = i + 1$ (for all $0 \le i \le N - 2$)
3. (14 points) $N \le 200$
4. (10 points) $N \le 2000$
5. (17 points) $W[i] = 1$ (for all $0 \le i \le N - 2$)
6. (25 points) $W[i] \le 10$ (for all $0 \le i \le N - 2$)
7. (22 points) No additional constraints.

Sample Grader

The sample grader reads the input in the following format:

- line 1: N
- line $2 + i$ ($0 \le i \le N - 2$): $U[i]$ $V[i]$ $W[i]$

The sample grader prints a single line containing the array returned by `minimum_closure_costs`.