

# Subtree Sum

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## Question

Consider a binary tree with  $n$  vertices. Each vertex is represented by an index and a value. The indices range from 0 to  $n - 1$ . The binary tree is represented in the form of a parent array  $p$  where  $p_i$  is the parent of the vertex with index  $i$ . The parent of the root node is -1. Find out the sum of values of the vertices in the subtree of the vertex, for every vertex.

## Input

- First line of input contains the number of nodes  $n$ .  $n \leq 10^5$
- The second line of input contains the parent array.  $-1 \leq p[i] \leq n - 1$
- The third line of input contains value array  $1 \leq \text{value}[i] \leq 10^9$

## Output

Output sum of values of vertices in the subtree of every node, separated by space.

## Note

### Input 1

```
5
-1 0 0 1 1
9 4 9 9 9
```

### Output 1

```
40 22 9 9 9
```

### Input 2

```
5
-1 0 1 2 3
2 4 5 4 3
```

### Output 2

```
18 16 12 7 3
```