Morning Show

All boring tree-shaped lands are alike, while all exciting tree-shaped lands are exciting in their own special ways. What makes Treeland more exciting than the other tree-shaped lands are the raddest radio hosts in the local area: Root and Leaf. Every morning on FM 32.33 (repeating of course), Root and Leaf of The Full Depth Morning Show serve up the hottest celebrity gossip and traffic updates.

The region of Treeland is made of n cities, connected by $n-1$ toll roads such that between every pair of cities there is exactly one simple path. The i-th road connects cities u_i and v_i, and has a toll of w_i.

To reward their loyal listeners, The Full Depth Morning Show is giving away a number of travel packages! Root and Leaf will choose $n-1$ lucky residents from the city that sends them the most fan mail. Each of those residents then gets a distinct ticket to a different city in Treeland.

Each city in Treeland has its own tax on gifts and prizes: t_i. Let $d_{u,v}$ be the sum of the tolls on each road on the only simple path from city u to v. The cost one has to pay for gifting a trip to someone from city u to city v is calculated as $(t_u + t_v)d_{u,v}$.

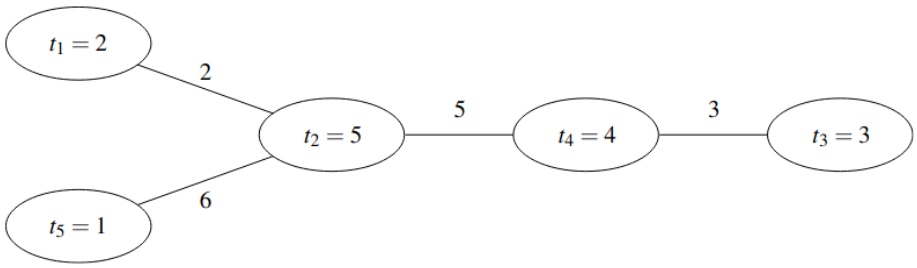

Figure 1: The map of Treeland corresponding to Example 1.

The shock jocks haven't quite thought through how much their prize is worth. They need to prepare a report to the radio executives, to summarize the expected costs. For each city that could win the prize, what is the total cost of purchasing all the tickets?

Input

The first line of input is a single integer n ($1 \leq n \leq 100\,000$).

The next line has n space-separated integers t_i ($1 \leq t_i \leq 1\,000$), the tax in each city.

The following $n-1$ lines each have 3 integers, u_i, v_i, w_i, meaning the i-th road connects cities u_i and v_i ($1 \leq u_i, v_i \leq n$), with a toll of w_i ($1 \leq w_i \leq 1\,000$).

Output

Output n lines. On the i-th line, output a single integer: the cost of purchasing all tickets if city i wins the contest.

Examples

input	output
5 2 5 3 4 1 1 2 2 2 4 5 4 3 3 5 2 6	130 159 191 163 171
6 4 3 3 4 3 3 1 3 2 2 1 1 1 4 6 4 5 6 6 4 2	209 206 232 209 336 232