B. Producing Snow

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

Alice likes snow a lot! Unfortunately, this year's winter is already over, and she can't expect to have any more of it. Bob has thus bought her a gift — a large snow maker. He plans to make some amount of snow every day. On day i he will make a pile of snow of volume V_i and put it in her garden.

Each day, every pile will shrink a little due to melting. More precisely, when the temperature on a given day is T_i, each pile will reduce its volume by T_i. If this would reduce the volume of a pile to or below zero, it disappears forever.
All snow piles are independent of each other.

Note that the pile made on day i already loses part of its volume on the same day. In an extreme case, this may mean that there are no piles left at the end of a particular day.

You are given the initial pile sizes and the temperature on each day. Determine the total volume of snow melted on each day.

Input

The first line contains a single integer N ($1 \le N \le 10^5$) — the number of days.

The second line contains N integers $V_1, V_2, ..., V_N$ ($0 \le V_i \le 10^9$), where V_i is the initial size of a snow pile made on the day i.

The third line contains N integers $T_1, T_2, ..., T_N$ ($0 \le T_i \le 10^9$), where T_i is the temperature on the day i.

Output

Output a single line with N integers, where the i-th integer represents the total volume of snow melted on day i.

Examples

input
3 10 10 5 5 7 2

output
5 12 4

input
5 30 25 20 15 10 9 10 12 4 13

output
9 20 35 11 25

Note

In the first sample, Bob first makes a snow pile of volume 10, which melts to the size of 5 on the same day. On the second day, he makes another pile of size 10. Since it is a bit warmer than the day before, the first pile disappears completely while the second pile shrinks to 3. At the end of the second day, he has only a single pile of size 3. On the third day he makes a smaller pile than usual, but as the temperature dropped too, both piles survive till the end of the day.