Roads

The spring tournament in Informatics is approaching. Pavkata is going to drive his students to the tournament with his car. The road network consists of N cities connected with N-1 segments. Segment i connects cities i and $i + 1$.

Every road segment is associated with a positive integer w_i meaning that a vehicle with weight more than w_i cannot pass this road. Since Pavkata's students are wondering how much luggage they can borrow, he decided to research the possible itineraries.

Apart from the mainstream roads, Pavkata knows how to get to every city using some alternative roads. This means that he can choose the start city of the journey. In order to make things more interesting, the road controllers decided to change the constraints for the roads.

Just like that, Pavkata came up with a nice task to test his students before the competition: you are given information about the allowed weights on the roads. Q queries follow, each one is of 2 types: 1) the maximum allowed weight of a vehicle on road p_i becomes d_i ; 2) If the car starts the journey from city q_i and weighs k_i, how many cities in total can be visited, abiding by the current road constraints.

Input

The first line of the file **roads.in** contains two integers N and Q. The second line of the file contains N-1 numbers – $a_1, a_2, \dots a_{n-1}$, describing the maximum allowed weights on the roads. Q lines follow, describing the queries. They are 2 types:

- 1 p_i d_i – road with index p_i changes its maximum allowed weight to d_i
- 2 q_i k_i – starting the journey from city q_i, weighing k_i, how many cities in total can be visited following the current constraints

Output

For each query of type 2 print 1 number in the file **roads.out** – the number of cities.

Constraints

$1 \leq N, Q \leq 10^5$

$1 \leq p_i \leq N - 1$

$1 \leq q_i \leq N$

$1 \leq a_i, k_i, d_i \leq 10^9$

Roads

2024/2025 SEASON – ROUND 4

Time limit: 0.7 sec.

Memory limit: 256 MB

Sample test

Input (roads.in)	Output (roads.out)
10 10 4 5 1 7 9 10 3 6 5 2 2 3 1 3 8 2 2 3 2 4 6 2 7 6 1 6 3 2 7 6 2 4 5 1 7 7 2 9 1	3 10 5 5 1 5 10

Sample test explanation

After the second query the road network looks like this (on the right). If the journey starts at city 2, the car weighing 3, all 10 cities will be possible to be visited, since the maximum allowed weight for all roads is at least 3.

The following cities can be visited in the 4th query: 3, 4, 5, 6 and 7.