Meow-tain View (Hard version)

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

This is the hard version of the problem. The only difference is that in this version $N \leq 2 \cdot 10^5$.

There are N mountains in UM Moon, arranged in a row labelled from 1 to N. Each mountain has a distinct height, H_i, from 1 to N.

Red Mooncat would like to know the number of mountains that he can view at each mountain's peak. V_i represents the number of mountains that he can view from the i^{th} mountain. **At i^{th} mountain, Red Mooncat could only view j^{th} mountain if and only if there is no greater height of mountain than j^{th} mountain exists between i^{th} mountain and j^{th} mountain exclusively.**

Red Mooncat can always view the i^{th} mountain itself when he is viewing from the i^{th} mountain.

Image source: https://mooncatrescue.com/

Input

The first line contains a single integer, N ($1 \leq N \leq 2 \cdot 10^5$) — the number of mountains in UM Moon.

The second line contains N space-separated integers, $H_1, H_2, H_3, ..., H_N$ ($1 \leq H_i \leq N$), where H_i denotes the height of i^{th} mountain.

Output

Output N integers, $V_1, V_2, V_3, ..., V_N$, where V_i denotes the number of mountains that Red Mooncat can view at i^{th} mountain's peak.

Example

standard input	standard output
5 3 2 4 1 5	4 4 5 3 3

Note

View from the 1^{st} mountain & 2^{nd} mountain: Red Mooncat can all the mountains except the 4^{th} mountain (blocked by the 3^{rd} mountain).

View from the 3^{rd} mountain: Red Mooncat can view all the mountains.

View from the 4^{th} mountain & 5^{th} mountain: Red Mooncat can view the 3^{rd} mountain, 4^{th} mountain, and 5^{th} mountain because the first 2 mountains were blocked by the 3^{rd} mountain.

Note that Red Mooncat could view the 5^{th} mountain from the 2^{nd} mountain but could not view the 2^{nd} mountain from the 5^{th} mountain because the 3^{rd} mountain has blocked it.