Depth of Interval

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	1024 megabytes

You are given a positive integer N and a permutation $P = (P_1, P_2, \ldots, P_N)$ of $(1, 2, \ldots, N)$.

For an integer pair (L, R), we define the value $f(L, R)$ recursively as follows.

- If $1 \leq L < R \leq N$: Let integers a and b be such that, among $P_L, P_{L+1}, \ldots, P_R$, the smallest element and the second smallest element are P_a and P_b, respectively. Then we define

$$f(L, R) = f(\min(a, b) + 1, \max(a, b) - 1) + 1.$$

- Otherwise, we define $f(L, R) = 0$.

For each $k = 1, 2, \ldots, N$, find the number of integer pairs (L, R) such that $f(L, R) = k$.

Input

The input is given in the following format:

N
$P_1\ P_2\ \cdots\ P_N$

- All input values are integers.
- $2 \leq N \leq 3 \times 10^5$
- $(P_1, P_2, \ldots, P_N)$ is a permutation of $(1, 2, \ldots, N)$

Output

Print N lines. For each $k = 1, 2, \ldots, N$, print the number of integer pairs (L, R) satisfying $f(L, R) = k$ on the k-th line.

Examples

standard input	standard output
7 2 6 5 1 4 7 3	14 7 0 0 0 0 0
5 1 2 3 4 5	10 0 0 0 0
9 8 6 2 4 9 7 3 5 1	25 8 3 0 0 0 0 0 0

Note

In the first example, the value $f(1,7)$ is computed as follows. Among $P_1, P_2, \ldots, P_7$, the smallest element and the second smallest element are P_4 and P_1, respectively. Thus, $f(1,7) = f(2,3) + 1$.

Next, among P_2, P_3, the smallest element and the second smallest element are P_3 and P_2, respectively, so $f(2,3) = f(3,2) + 1$.

Since $f(3,2) = 0$, we have $f(2,3) = 1$, and therefore $f(1,7) = 2$.