Problem G
The Only Mode

You are given an array of integers A of size N (indexed from 1 to N) where A_i is either 0, 1, 2, or 3.

A subarray $\langle l, r \rangle$ of A is defined as $[A_l, A_{l+1}, \cdots, A_r]$, and its size is $r - l + 1$.

A value x is the *only mode* of a subarray $\langle l, r \rangle$ if and only if x appears **strictly** more often than other values in subarray $\langle l, r \rangle$.

Your task in this problem is to find, for each $x \in \{0, 1, 2, 3\}$, the size of the longest subarray of A such that x is the only mode of that subarray, or determine if x cannot be the only mode in any subarray.

Input

Input begins with an integer N ($1 \leq N \leq 100\,000$) representing the size of array A. The next line contains N integers A_i ($A_i \in \{0, 1, 2, 3\}$).

Output

Output four space-separated integers in a single line. Each integer represents the answer where x is 0, 1, 2, and 3, respectively. For each value of x, if there exists a subarray such that x is the only mode in that subarray, then output the size of the longest subarray; otherwise, output 0.

Sample Input #1

```
7
1 2 2 0 3 0 3
```

Sample Output #1

```
4 1 5 3
```

Explanation for the sample input/output #1

- The longest subarray such that 0 is the only mode is $\langle 3, 6 \rangle$ of length 4, i.e. $[2, 0, 3, 0]$.
- The longest subarray such that 1 is the only mode is $\langle 1, 1 \rangle$ of length 1, i.e. $[1]$.
- The longest subarray such that 2 is the only mode is $\langle 1, 5 \rangle$ of length 5, i.e. $[1, 2, 2, 0, 3]$.
- The longest subarray such that 3 is the only mode is $\langle 5, 7 \rangle$ of length 3, i.e. $[3, 0, 3]$.

Sample Input #2

```
12
2 0 1 0 2 1 1 0 2 3 3 3
```

Sample Output #2

```
4 9 1 9
```

Explanation for the sample input/output #2

- The longest subarray such that 0 is the only mode is $\langle 1, 4\rangle$ or $\langle 2, 5\rangle$.
- The longest subarray such that 1 is the only mode is $\langle 3, 11\rangle$.
- The longest subarray such that 2 is the only mode is $\langle 1, 1\rangle$, $\langle 5, 5\rangle$, or $\langle 9, 9\rangle$.
- The longest subarray such that 3 is the only mode is $\langle 4, 12\rangle$.

Sample Input #3

```
2
0 2
```

Sample Output #3

```
1 0 1 0
```

Explanation for the sample input/output #3

The longest subarray such that 0 or 2 is the only mode contains only a single element by itself; on the other hand, there is no subarray such that 1 or 3 is the only mode.

Sample Input #4

```
12
3 0 2 2 1 0 2 1 3 3 2 3
```

Sample Output #4

```
1 5 11 8
```