B. Making Towers

1 second, 256 megabytes

You have a sequence of n colored blocks. The color of the i-th block is c_i, an integer between 1 and n.

You will place the blocks down in sequence on an infinite coordinate grid in the following way.

1. Initially, you place block 1 at $(0, 0)$.
2. For $2 \leq i \leq n$, if the $(i-1)$-th block is placed at position (x, y), then the i-th block can be placed at one of positions $(x+1, y)$, $(x-1, y)$, $(x, y+1)$ (**but not at position** $(x, y-1)$), as long no previous block was placed at that position.

A *tower* is formed by s blocks such that they are placed at positions $(x, y), (x, y+1), \ldots, (x, y+s-1)$ for some position (x, y) and integer s. The *size* of the tower is s, the number of blocks in it. A *tower of color* r is a tower such that all blocks in it have the color r.

For each color r from 1 to n, solve the following problem **independently**:

- Find the maximum size of a tower of color r that you can form by placing down the blocks according to the rules.

Input

The first line contains a single integer t ($1 \leq t \leq 10^4$) — the number of test cases.

The first line of each test case contains a single integer n ($1 \leq n \leq 10^5$).

The second line of each test case contains n integers $c_1, c_2, \ldots, c_n$ ($1 \leq c_i \leq n$).

It is guaranteed that the sum of n over all test cases does not exceed $2 \cdot 10^5$.

Output

For each test case, output n integers. The r-th of them should be the maximum size of an tower of color r you can form by following the given rules. If you cannot form any tower of color r, the r-th integer should be 0.

input

```
6
7
1 2 3 1 2 3 1
6
4 2 2 2 4 4
1
1
5
5 4 5 3 5
6
3 3 3 1 3 3
8
1 2 3 4 4 3 2 1
```

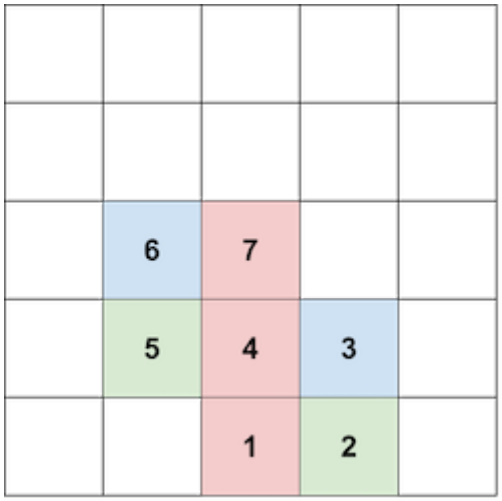
output

```
3 2 2 0 0 0 0
0 3 0 2 0 0
1
0 0 1 1 1
1 0 4 0 0 0
2 2 2 2 0 0 0 0
```

In the first test case, one of the possible ways to form a tower of color 1 and size 3 is:

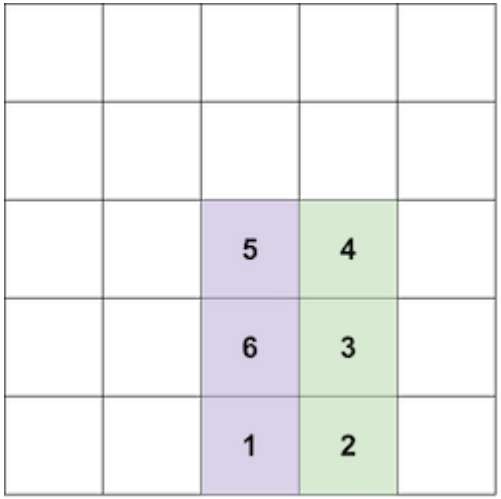
- place block 1 at position $(0, 0)$;
- place block 2 to the right of block 1, at position $(1, 0)$;
- place block 3 above block 2, at position $(1, 1)$;

- place block 4 to the left of block 3, at position $(0, 1)$;
- place block 5 to the left of block 4, at position $(-1, 1)$;
- place block 6 above block 5, at position $(-1, 2)$;
- place block 7 to the right of block 6, at position $(0, 2)$.



The blocks at positions $(0, 0)$, $(0, 1)$, and $(0, 2)$ all have color 1, forming an tower of size 3.

In the second test case, note that the following placement is **not valid**, since you are not allowed to place block 6 under block 5:



It can be shown that it is impossible to form a tower of color 4 and size 3.