Sharmeen and the Lost Array

Sharmeen loves array very much. Many days ago she wrote an array (of n elements and the index of this array is 1 based) in her notebook, but unfortunately she lost the notebook. She want to restore the array. The only clue she know that is if in any position(i) of the array (1<= i < n), the element in this position is greater than, equal or less than the next position(i+1) element.

Can you help her to restore the array?

Input

In the first line given an integer t (1 <= t <= 100), which is the number of test cases.

For each test case,

In the first line there will be given a positive integer n (1 <= n <= 10^5) which is the size of the lost array. In the next line there will be n - 1 intergers X_i(0 <= X_i <= 2).

If, $X_i = 0$, then i^{th} element is equal to $(i+1)^{th}$ element of the lost array.

If, $X_i = 1$, then i^{th} element is less than $(i+1)^{th}$ element of the lost array.

If, $X_i = 2$, then i^{th} element is greater than $(i+1)^{th}$ element of the lost array.

Output

For each test case you have to output the lost array in one line. If multiple solution exist then you have to print the **lexicographically smallest** one. Elements of the lost array must be **greater than zero(0).**

For better understanding see the sample input output.

Example

Input:
1
5
1 2 0 1

Output:
1 2 1 1 2