Swap Counter

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

For a permutation $(Q_1, Q_2, \ldots, Q_M)$ of $(1, 2, \ldots, M)$, we define a sequence $f(Q)$ of length $M-1$ as follows:

- Initialize a sequence X of length $M-1$ as $X = (0, 0, \ldots, 0)$.
- Perform the following operation $M-1$ times:
  - for $i = 1, 2, \ldots, M-1$, do the following:
    - if $Q_i > Q_{i+1}$, swap Q_i and Q_{i+1}, and add 1 to X_i.
    - if $Q_i < Q_{i+1}$, do nothing.
- The final sequence X is defined as $f(Q)$.

You are given a sequence $B = (B_1, B_2, \ldots, B_{N-1})$ of length $N-1$. Determine whether there exists a permutation P of $(1, 2, \ldots, N)$ such that $f(P) = B$. If such a permutation exists, find the lexicographically smallest one.

You have T test cases; solve each of them.

Input

The input is given from Standard Input in the following format:

T
case_1
case_2
$\vdots$
case_T

Each test case is given in the following format:

N
$B_1\ B_2\ \ldots\ B_{N-1}$

- $1 \le T \le 1.5 \times 10^5$
- $2 \le N \le 3 \times 10^5$
- $0 \le B_i \le N-1$ $(i = 1, 2, \ldots, N-1)$
- The sum of N over all test cases does not exceed 3×10^5.
- All input values are integers.

Output

Output T lines. On the i-th line, print the answer for the i-th test case.

If there are no permutations satisfying the conditions, print `-1`. Otherwise, print the lexicographically smallest permutation satisfying the conditions.

Example

standard input	standard output
3 4 2 1 1 5 2 0 2 4 6 2 3 2 1 1	3 2 4 1 -1 3 5 4 2 6 1

Note

In the first test case, when $P = (3, 2, 4, 1)$, $f(P)$ is calculated as follows:

- At first, $X = (0, 0, 0)$.
- The first operation is performed as follows:
  - Since $P_1 > P_2$, swap P_1 and P_2, and add 1 to X_1.
    - As a result, $X = (1, 0, 0)$ and $P = (2, 3, 4, 1)$.
  - Since $P_2 < P_3$, do nothing.
  - Since $P_3 > P_4$, swap P_3 and P_4, and add 1 to X_3.
    - As a result, $X = (1, 0, 1)$ and $P = (2, 3, 1, 4)$.
- The second operation is performed as follows:
  - Since $P_1 < P_2$, do nothing.
  - Since $P_2 > P_3$, swap P_2 and P_3, and add 1 to X_2.
    - As a result, $X = (1, 1, 1)$ and $P = (2, 1, 3, 4)$.
  - Since $P_3 < P_4$, do nothing.
- The third operation is performed as follows:
  - Since $P_1 > P_2$, swap P_1 and P_2, and add 1 to X_1.
    - As a result, $X = (2, 1, 1)$ and $P = (1, 2, 3, 4)$.
  - Since $P_2 < P_3$, do nothing.
  - Since $P_3 < P_4$, do nothing.

Thus, $f(P) = (2, 1, 1)$. In particular, this P is the lexicographically smallest P that satisfies $f(P) = B$.

In the second test case, there are no permutations P such that $f(P) = (2, 0, 2, 4)$.