

Problem J. Just Next !!!

Time limit	1297 ms
Mem limit	1572864 kB
Code length Limit	50000 B
OS	Linux

DevG likes too much fun to do with numbers. Once his friend Arya came and gave him a challenge, he gave DevG an array of digits which is forming a number currently (will be called as given number). DevG was challanged to find the just next greater number which can be formed using digits of given number. Now DevG needs your help to find that just next greater number and win the challenge.

Input

The first line have t number of test cases ($1 \leq t \leq 100$). In next $2*t$ lines for each test case first there is number n ($1 \leq n \leq 1000000$) which denotes the number of digits in given number and next line contains n digits of given number separated by space.

Output

Print the just next greater number if possible else print -1 in one line for each test case.

Note : There will be no test case which contains zero in starting digits of any given number.

Example

Input :

```
2
5
1 5 4 8 3
10
1 4 7 4 5 8 4 1 2 6
```

Output :

```
15834
1474584162
```