DreamGrid has n classmates numbered from 1 to n. Some of them are boys and the others are girls. Each classmate has some gems, and more specifically, the i-th classmate has i gems.

DreamGrid would like to divide the classmates into four groups G_1, G_2, G_3 and G_4 such that:

- Each classmate belongs to exactly one group.
- Both G_1 and G_2 consist only of girls. Both G_3 and G_4 consist only of boys.
- The total number of gems in G_1 and G_3 is equal to the total number of gems in G_2 and G_4.

Your task is to help DreamGrid group his classmates so that the above conditions are satisfied. Note that you are allowed to leave some groups empty.

Input

There are multiple test cases. The first line of input is an integer T indicating the number of test cases. For each test case:

The first line contains an integer n ($1 \leq n \leq 10^5$) -- the number of classmates.

The second line contains a string s ($|s| = n$) consisting of 0 and 1. Let s_i be the i-th character in the string s. If $s_i = 1$, the i-th classmate is a boy; If $s_i = 0$, the i-th classmate is a girl.

It is guaranteed that the sum of all n does not exceed 10^6.

Output

For each test case, output a string consists only of {1, 2, 3, 4}. The i-th character in the string denotes the group which the i-th classmate belongs to. If there are multiple valid answers, you can print any of them; If there is no valid answer, output "-1" (without quotes) instead.

Sample Input

```
5
1
1
2
10
3
101
4
0000
7
1101001
```

Sample Output

```
-1
-1
314
1221
3413214
```

```
11366
45619
```

```
2018 if winter comes can spring be far behind
15 zhejiang provincial collegiate programming contest
3 bbbbb bcd
3 a aa
```