# A. Puzzle From the Future

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

In the $2022$ year, Mike found two binary integers $a$ and $b$ of length $n$ (both of them are written only by digits $0$ and $1$) that can have leading zeroes. In order not to forget them, he wanted to construct integer $d$ in the following way:

- he creates an integer $c$ as a result of bitwise summing of $a$ and $b$ *without transferring carry*, so $c$ may have one or more $2$-s. For example, the result of bitwise summing of $0110$ and $1101$ is $1211$ or the sum of $011000$ and $011000$ is $022000$;
- after that Mike replaces equal consecutive digits in $c$ by one digit, thus getting $d$. In the cases above after this operation, $1211$ becomes $121$ and $022000$ becomes $020$ (so, $d$ won't have equal consecutive digits).

Unfortunately, Mike lost integer $a$ before he could calculate $d$ himself. Now, to cheer him up, you want to find **any binary** integer $a$ of length $n$ such that $d$ will be **maximum possible as integer**.

Maximum possible as integer means that $102 > 21$, $012 < 101$, $021 = 21$ and so on.

## Input

The first line contains a single integer $t$ ($1 \le t \le 1000$) — the number of test cases.

The first line of each test case contains the integer $n$ ($1 \le n \le 10^5$) — the length of $a$ and $b$.

The second line of each test case contains binary integer $b$ of length $n$. The integer $b$ consists only of digits $0$ and $1$.

It is guaranteed that the total sum of $n$ over all $t$ test cases doesn't exceed $10^5$.

## Output

For each test case output one **binary** integer $a$ of length $n$. Note, that $a$ or $b$ may have leading zeroes but must have the same length $n$.

### Example

**input** Copy

```
5
1
0
3
011
3
110
6
111000
6
001011
```

**output** Copy

```
1
110
100
101101
101110
```

## Note

In the first test case, $b = 0$ and choosing $a = 1$ gives $d = 1$ as a result.

In the second test case, $b = 011$ so:

- if you choose $a = 000$, $c$ will be equal to $011$, so $d = 01$;
- if you choose $a = 111$, $c$ will be equal to $122$, so $d = 12$;

- if you choose $a = 010$, you'll get $d = 021$.
- If you select $a = 110$, you'll get $d = 121$.

We can show that answer $a = 110$ is optimal and $d = 121$ is maximum possible.
In the third test case, $b = 110$. If you choose $a = 100$, you'll get $d = 210$ and it's the maximum possible $d$.

In the fourth test case, $b = 111000$. If you choose $a = 101101$, you'll get $d = 212101$ and it's maximum possible $d$.

In the fifth test case, $b = 001011$. If you choose $a = 101110$, you'll get $d = 102121$ and it's maximum possible $d$.