BEAUTIFUL BINARY STRING

A beautiful binary string S is the string that satisfies both of the following conditions:

- Each character in S is either '0' or '1'.
- Whenever S is split into two nonempty substrings, the left substring is always lexicographically less than the right substring.

For example, S = "00101" is a beautiful binary string because we have:

- S = "0" + "0101" and "0" < "0101"
- S = "00" + "101" and "00" < "101"
- S = "001" + "01" and "001" < "01"
- S = "0010" + "1" and "0010" < "1"

You are given a string S that is guaranteed to be a beautiful binary string. Let N be the length of S. Consider the lexicographically sorted list of all beautiful binary strings of length N. Compute and return the string that comes immediately after S in this list. If S happens to be the last string in the list, return an empty string instead.

Input

The first line of the input contains one integer q ($1 \le q \le 100$) — the number of test cases.

The following q lines contain test cases, one per line. Each test case is given as a string of length N ($1 \le N \le 50$).

Output

For each test case print the answer for it in one line.

Examples

Standard Input	Standard Output
6 00101 0010111 000010001001011 0 01 01101111011110111	00111 0011011 000010001001101 1 01101111011111111