C. Binary String Reconstruction

time limit per test

2 seconds

memory limit per test

256 megabytes

input

standard input

output

standard output

Consider the following process. You have a binary string (a string where each character is either 0 or 1) ww of length nn and an integer xx. You build a new binary string ss consisting of nn characters. The ii-th character of ss is chosen as follows:

* if the character wi−xwi−x exists and is equal to 1, then sisi is 1 (formally, if i>xi>x and wi−x=wi−x= 1, then si=si= 1);
* if the character wi+xwi+x exists and is equal to 1, then sisi is 1 (formally, if i+x≤ni+x≤n and wi+x=wi+x= 1, then si=si= 1);
* if both of the aforementioned conditions are false, then sisi is 0.

You are given the integer xx and the resulting string ss. Reconstruct the original string ww.

**Input**

The first line contains one integer tt (1≤t≤10001≤t≤1000) — the number of test cases.

Each test case consists of two lines. The first line contains the resulting string ss (2≤|s|≤1052≤|s|≤105, each character of ss is either 0 or 1). The second line contains one integer xx (1≤x≤|s|−11≤x≤|s|−1).

The total length of all strings ss in the input does not exceed 105105.

**Output**

For each test case, print the answer on a separate line as follows:

* if no string ww can produce the string ss at the end of the process, print −1−1;
* otherwise, print the binary string ww consisting of |s||s| characters. If there are multiple answers, print any of them.

**Example**

**input**

**Copy**

3

101110

2

01

1

110

1

**output**

**Copy**

111011

10

-1

At first, let's replace all elements of string ww by 1.

Now, let's consider all indices ii such that si=0si=0. If si=0si=0, then wi−xwi−x must be equal to 0 (if it exists) and wi+xwi+x must be equal to 0 (if it exists), so let's replace all such elements by 0.

And after let's perform the process described in statement on string ww. If we get the string ss, then we can print ww as the answer, otherwise the answer is −1−1.