

Dubravka the chemist examines DNA molecules in her laboratory. Each DNA molecule is represented with a series of characters, where each character is from the set  $\{‘A’, ‘C’, ‘G’, ‘T’\}$ . Therefore, ‘A’, ‘ATG’ and ‘GTA’ are series of characters which represent different DNA molecules.

Dubravka can perform the following *mutations* (alterations) in any part of the DNA molecule:

- $A \leftrightarrow TC$  (therefore, the character ‘A’ can be replaced with ‘TC’ and vice versa)
- $C \leftrightarrow AG$
- $G \leftrightarrow CT$
- $T \leftrightarrow GA$

Dubravka tends to take a certain molecule and alter it by successively applying these mutations. This results in a different molecule, for example:

$$AA \rightarrow TCA \rightarrow TAGA \rightarrow TAT.$$

Dubravka currently has  $N$  molecules in her laboratory. Write a programme that will, for each pair of given molecules, determine whether it is possible to end up with the second molecule when starting from the first molecule by applying the mentioned mutations.

### INPUT DATA

The first line of input contains the integer  $N$  ( $2 \leq N \leq 100$ ), the number of molecules. The molecules are marked with numbers from 1 to  $N$ .

Each of the following  $N$  lines contains molecules – series of characters where each character is an uppercase letter ‘A’, ‘C’, ‘G’ or ‘T’. Each series of characters consists of at least one and at most 50 000 characters.

### OUTPUT DATA

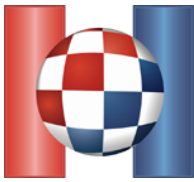
Output exactly  $N$  characters in each of  $N$  lines. The  $j$ -th character in the  $i$ -th line should be ‘1’ if it’s possible to get molecule  $j$  from the molecule  $i$ , otherwise it should be ‘0’. You mustn’t print spaces between individual characters in the same line.

### SCORING

Each of the following points describes a test data worth 10 points.

- $N \leq 5$ , the molecules are not longer than 4 characters.
- The molecules consist of exactly 2 characters.
- The molecules consist of exactly 3 characters.
- The molecules consist of exactly 4 characters.
- The molecules consist of exactly 5 characters.
- The molecules consist of exactly 6 characters.

Apart from test data mentioned here, there is additional test data (in total worth 40 points) for which no additional limitations apply.



**SAMPLE TESTS**

<b>input</b> 4 A C G T	<b>input</b> 4 AA TAT C CGTAC	<b>input</b> 4 AAA CCC TATA CACA
<b>output</b> 1000 0100 0010 0001	<b>output</b> 1100 1100 0011 0011	<b>output</b> 1111 1111 1111 1111