Problem G. Sprache

Input file:	`sprache.in`
Output file:	`sprache.out`
Time limit:	3.5 seconds
Memory limit:	256 mebibytes

You've decided to create a new language which will have very simple rules. Whenever we need a word for a new concept, we will just generate it randomly!

The language will use the same 26 letters English uses. Each letter is either a consonant or a vowel, but these are not necessarily the same as in English — the only thing you know is that at least one letter is a consonant, and at least one letter is a vowel.

When we need to generate a new word, we will pick the first letter uniformly randomly from all 26 letters. When picking each consecutive letter, we will discourage long sequences of vowels and long sequences of consonants. More specifically, if the last k letters have all been vowels, the relative probability to pick each vowel as the next letter will be $\left(\frac{1}{2}\right)^k$ of the relative probability to pick each consonant. The consonants have a more relaxed rule: if the last k letters have all been consonants, the relative probability to pick each consonant will be $\left(\frac{2}{3}\right)^k$ of the relative probability to pick each vowel.

For example, suppose letters `a`, `e`, `i`, `o`, `u` are vowels, and all remaining letters are consonants, and suppose we've already generated a word '`sprach`'. The last two letters are consonants, so consonants have a relative probability of $\frac{4}{9}$ compared to vowels. There are 21 consonants and 5 vowels, so the probability of picking each particular consonant as the next letter is $\frac{\frac{4}{9}}{21 \cdot \frac{4}{9} + 5} = \frac{4}{129}$, and the probability of picking each particular vowel as the next letter is $\frac{1}{21 \cdot \frac{4}{9} + 5} = \frac{9}{129}$.

Given a word in such language, determine which letters are vowels and which letters are consonants.

Input

The testcases for this problem are generated randomly. The first line of the input file contains one integer n, the number of words to determine the vowels and consonants for. In all inputs except the sample input $n = 100$.

The next n lines contain one word each. In all inputs except the sample input each word will have length 1000. Each word contains only lowercase English letters. Each word is generated randomly and independently according to the following procedure:

1. Pick which letters are vowels and which letters are consonants uniformly out of all $2^{26} - 2$ possible assignments with at least one vowel and at least one consonant.
2. Generate a word of length 1000 according to the algorithm described in the problem statement.

There are 10 non-sample inputs in this problem.

Output

Output n lines. For each of the input words, output one line with 26 letters. i-th letter of this line should be '`V`' if i-th letter of the English alphabet is a vowel for that word, and '`C`' if it's a consonant for that word.

Your answer will be considered correct if for at least 95 words out of 100 all 26 letter types will match the types used for generating the corresponding word. Any correctly formatted output will be accepted for the sample input.

Examples

sprache.in	sprache.out
2 just example	VCVCVCVCVCVCVCVCVCVCVCVCVC CCCCCCCCCCCCCCCCCCCCCCCCCV