Project Euler #89: Roman numerals

The values of Roman Numeral symbols in decimal are the following:

```
I-1
V-5
X-10
L-50
C-100
D-500
M-1000
```

In general, a roman number is written in descending order of symbols which are to be added.

For example, \$14\$ is written as \$XIV\$ as \$X\$ and \$V\$ are to be added and \$I\$ is subtracted from \$V\$. One does not write 14 as IVX or 15 as VX. This is because, appearance of a symbol with lesser value before another symbol implies subtraction.

Rules for subtraction:

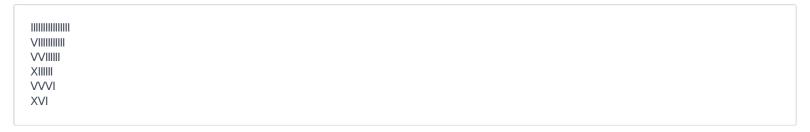
- 1. I can only be subtracted from V and X.
- 2. X can only be subtracted from L and C.
- 3. C can only be subtracted from D and M.
- 4. V, L, D and M can't be subtracted from any symbol.
- 5. At most one symbol can be subtracted from another symbol.

For example, \$999\$ would be written as CMXCIX and not IM.

One last rule to be kept in mind while writing Roman Numerals is that except M, no numeral appears more than 3 times in a row and none of V, L, D appear even twice in a row. Hence 9 is IX and not VIIII.

In this task, you'll be given symbols in descending order which represent a number. You have to output a valid roman numeral representation of that number by following the above rules.

For example, the following represent all of the legitimate ways of writing the number sixteen:



The last example being considered the most efficient, as it uses the least number of numerals.

Input Format

First line contains a single integer \$T\$ denoting the number of test-cases. \$T\$ lines follow, each contains a string representing a number.

Output Format

Output \$T\$ lines, \$i^{th}\$ line should contain the correct roman number representation of the \$i^{th}\$

string in the input.

Constraints:

\$1\le T\le 1000\$ \$1\le Length\ of\ each\ string\ in\ the\ input\le 1000\$

Sample Input

```
5
IIIII
VVVVVVVVV
MMMMMMMMMMMMMIIII
LLLXXXXX
CCXX
```

Sample Output

```
V
XLV
MMMMMMMMMMMMIV
CC
CCXX
```

Explanation

- 1. More than 3 symbols can't appear in a row.
- 2. V can't be subtracted from anything.
- 3. More than 3 M can appear in a row.
- 4. Converting all X to L makes LLLL which is not valid since V, L, D can not appear more than once in a row.
- 5. This is an example of a correct representation.