Anubhav likes playing with the character strings. Today he came with a new encoding to encode string with the following rules.

All characters of the string are separated with a comma(,) character except

1. If same character repeats n times, print character * n. (ex: aaaa becomes a*4)
2. If consecutive characters are subsequent, print from_char-to_char (ex: abcd becomes a-d)
3. If a character falls in both rule 1 and 2, apply rule 1 on it. (ex: abccc becomes a-b,c*3)
4. z and a are not consecutive (ex: xyzab becomes x-z, a-b)

Please help Anubhav to encode the strings

Input
First line of input contains a single integer T denoting the number of tests.
Next T lines contain a string containing smallcase latin characters (a-z)

Output
For each test case, print the encoded line as per above rules.
Make sure to print 1 answer per line. You should print output on stdout stream. Stderr would be ignored and you can use it for local debugging as per your need. Don't print anything other than the required answer on stdout.

Constraint
$1 \le T \le 10$
$1 \le$ Length of each string $\le 10,000$ (10^4)

Example

Input:
4
a
hoge
aaaabcdepqrrraa
abcdez

Output:
a
h,o,g,e
a*4,b-e,p-q,r*3,a*2
a-e,z