UVa Online Judge

11108 Tautology

WFF'N PROOF is a logic game played with dice. Each die has six faces representing some subset of the possible symbols K, A, N, C, E, p, q, r, s, t. A Well-formed formula (WFF) is any string of these symbols obeying the following rules:

- p, q, r, s, and t are WFFs
- if w is a WFF, Nw is a WFF
- if w and x are WFFs, Kwx, Awx, Cwx, and Ewx are WFFs.

The meaning of a WFF is defined as follows:

- p, q, r, s, and t are logical variables that may take on the value 0 (false) or 1 (true).
- K, A, N, C, E mean *and, or, not, implies*, and *equals* as defined in the truth table below.

Definitions of K, A, N, C, and E						
w	x	Kwx	Awx	Nw	Cwx	Ewx
1	1	1	1	0	1	1
1	0	0	1	0	0	0
0	1	0	1	1	1	0
0	0	0	0	1	1	1

A *tautology* is a WFF that has value 1 (true) regardless of the values of its variables. For example, $ApNp$ is a tautology because it is true regardless of the value of p. On the other hand, $ApNq$ is not, because it has the value 0 for $p = 0, q = 1$.

You must determine whether or not a WFF is a tautology.

Input

Input consists of several test cases. Each test case is a single line containing a WFF with no more than 100 symbols. A line containing '`0`' follows the last case.

Output

For each test case, output a line containing '`tautology`' or '`not`' as appropriate.

Sample Input

```
ApNp
ApNq
0
```

Sample Output

```
tautology
not
```