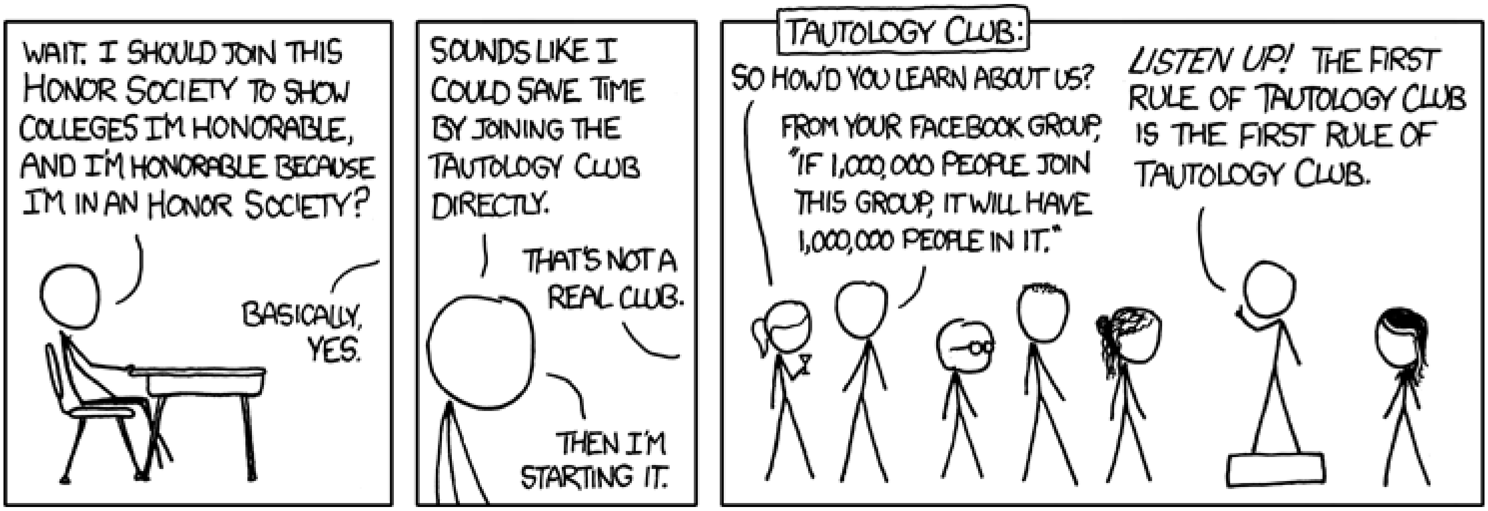
DWITE '11 R3 #5 - Tautology

Time limit: 1.0s **Memory limit:** 64M

DWITE, December 2011, Problem 5



We define a propositional formula as follows:

- $\{a, b, \ldots, j\}$ are atomic propositions, representing either true or false.
- If A and B are propositional formulae, then so are:
  - $A \wedge B$ — $\wedge$ is boolean "and"
  - $A \vee B$ — $\vee$ is boolean "or"
  - $\neg A$ — $\neg$ is boolean "not"

For example, $((a \vee b) \wedge (\neg c \vee a))$ is a propositional formula. A **tautology** is a propositional formula that equates to **true** for **all possible** value assignments to the atomic propositions. Our previous example $((a \vee b) \wedge (\neg c \vee a))$ is not a tautology because for the assignments $a = \text{false}$, $b = \text{false}$ and $c = \text{true}$, the formula evaluates to a false. However $(a \vee \neg a)$ is a tautology because no matter what the atomic proposition is this equates to true; `(true or not-true) == true`, `(false or not-false) == true`.

The input will contain 5 test cases, each three lines (not more than 255 characters) with a propositional formula per line.

The output will contain 5 lines of output, each three characters long. `Y` for **tautology**, `N` for **not tautology**.

Sample Input

```
((a v b) ^ (~c v a))
(a v ~a)
~(a ^ ~a)
a
~b
((a ^ b) v ~(c ^ ~c))
```

Note that `~` is used for $\neg$, `^` for $\wedge$, and `v` for $\vee$.

Sample Output

```
NYY
NNY
```

Problem Resource: DWITE