

Spreadsheet

Source: <http://acm.tju.edu.cn/toj/showp1751.html>

You are to write a program emulating a very simple spreadsheet application. It works with a table with 9 rows, from "1" to "9", and 26 columns, from "A" to "Z". Table cells are referenced by names composed of column and row codes, ex. "B1", "S8".

Each cell contains an expression up to 255 characters long. Expressions use integer constants, cell references, parenthesis, operators "+", "-", "*", and "/" (whole division). For example: 567, E8/2, (3+B3)*(C4-1) are all valid expressions. All operators are whole, all constants are guaranteed to be non-negative and less than 1000000 (one million). Division by zero yields zero. All operations are to be performed modulo 1000000.

If the value of the cell referenced by some expression is not defined, it is presumed to be 0 (zero). The situation when two or more cells are mutually dependent on each other is considered a special case of "circular reference".

Input

First input line contains number of test cases. Each test case begins with a line containing the number N of expressions, followed by N lines containing the expressions. All expressions are in format < Cell reference > = < expression >. Each cell is defined by at most one expression.

Output

Output file must contain a single line per test case, with either the value of the cell "A1", or number 1000000 (one million) if the value of A1 cannot be computed due to a circular reference.

Sample Input

```
1
4
A1=B1+C5
B1=20
C5 =B1 /D7-E1*E1
E1=(3+1)*2
```

Sample Output

```
999956
```