CSE 241   Assignment #8 - Executing Programs   Spring 2014

Due date: Jun 3 (Tue.) - 20:00

Description

A certain computer has ten registers and 1,000 words of RAM. Each register or RAM location holds a three-digit integer between 0 and 999. Instructions are encoded as three-digit integers and stored in RAM. The encodings are as follows:

100	means *halt*
2dn	means *set register d to n* (between 0 and 9)
3dn	means *add n to register d*
4dn	means *multiply register d by n*
5ds	means *set register d to the value of register s*
6ds	means *add the value of register s to register d*
7ds	means *multiply register d by the value of register s*
8da	means *set register d to the value in RAM whose address is in register a*
9sa	means *set the value in RAM whose address is in register a to the value of register s*
0ds	means *goto the location in register d unless register s contains 0*

All registers initially contain 000. The initial content of the RAM is read from standard input. The first instruction to be executed is at RAM address 0. All results are reduced modulo 1,000.

Input

The input begins with a single positive integer on a line by itself indicating the number of cases, each described as below. This is followed by a blank line, and there will be a blank line between each two consecutive inputs.

Each input case consists of up to 1,000 three-digit unsigned integers, representing the contents of consecutive RAM locations starting at 0. Unspecified RAM locations are initialized to 000.

Output

The output of each test case is a single integer: the number of instructions executed up to and including the halt instruction. You may assume that the program does halt. Separate the output of two consecutive cases by a blank line.

Sample Input

```
1

299
492
495
399
492
495
399
283
279
689
078
100
000
000
```

Sample Output

```
16
```

Submitting Your Code and Report

Your file name must be "Computer.java", and it is the only file you should submit. Please do not submit the executable file of your program. Turn in your project using the "oopsubmit" command as follows:

```
$ oopsubmit assign8 Computer.java
```

Late submissions will lose 20 points per day.

If you do not follow this submission guideline, you will lose 10 points out of 100.

You should also submit a hard copy of your code to TA. Your report must have a cover page with your student ID and name. In the report, your code must be well commented to explain your algorithm. Also, the sample input and the output of your program must be included in the report.