Problem 4

Virtual Computing

6 Points

Program Name: computer.cpp **Input File: computer.dat**

Write a virtual computer that runs programs written in a simple programming language.

Input Description

Input to this problem will consist of a (non-empty) series of up to 100 data sets. Each data set will be formatted according to the following description, and there will be **no blank lines** separating data sets.

A single data set has up to 1000 lines, each of the format "<*Line Number*> <*Instruction*>" where:

Line Number : (1 ≤ Line Number ≤ 1000) is an integer indicating the line number for the following *Instruction*. Within a given data set, *Line Number*s are unique, and *Line Number*s always increase from one line to the next.

Instruction : One of the following:

"LOAD *X value*" – Set variable *X*'s value to *value*

"ADD *X value*" – Increase variable *X*'s value by *value*

"PRINT *X*" – Display the value of variable *X* to standard output followed by a newline.

"IF *X* == *value* GOTO *line*" – If the value of variable *X* equals *value* continue execution at the instruction with *Line Number* equal to *line*, otherwise execution moves to the next instruction as usual.

"END" – The last instruction in every data set (which will only appear once).

Note:

- *X* is a non-empty character string of up to 10 characters representing a variable name
- *value* is an integer (0 ≤ *value* ≤ 1000)
- *line* is a valid *Line Number* from the current data set
- Assume that every variable has an initial value of 0 that is reset at the beginning of each data set.

Output Description

For each data set, there will be at least one line of output. The first line of output for each data set will read, "START *N*" where *N* is an integer identifying which data set is being processed. *N* will be 1 for the first data set and increment by one for each additional data set. Also output will be the results from all of the PRINT *X* statements executed by the virtual computer.

Sample Input

```
1 LOAD var 1
10 PRINT var
11 END
5 END
19 PRINT noinit
20 LOAD noinit 10
21 PRINT noinit
30 LOAD x 5
35 LOAD y 1
40 ADD x 5
45 ADD y 1
50 IF y == 5 GOTO 70
60 IF z == 0 GOTO 40
70 PRINT x
80 END
```

Sample Output

```
START 1
1
START 2
START 3
0
10
25
```