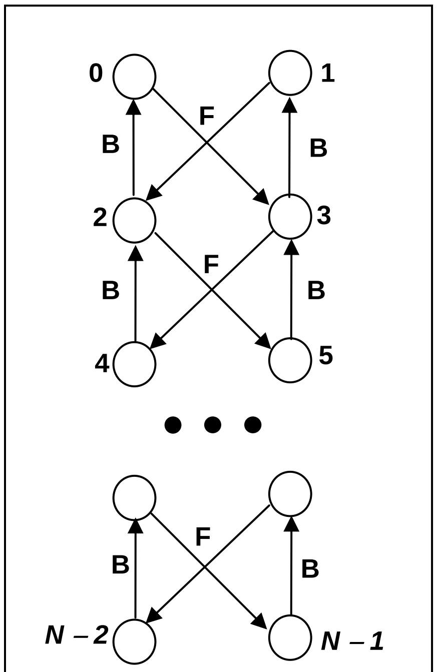
Southeastern European Regional Programming Contest
Bucharest, Romania
October 17, 2009

Problem B
Hard-working Student

Input File: B.IN
Output File: standard output
Program Source File: B.C, B.CPP, B.JAVA



Figure

Billy is a hard-working student. He is fond of computers and intends to learn as much as possible. Now he studies graph theory, and must write a program to build the graph which is shown on the Figure.

The vertices of the graph are labeled sequentially with integer keys starting from `0` to *N* − 1 `(N≤10000)`. There are two types of edges: backward edges – labeled with **B** in the Figure (for example from node `4` to node `2`, or from node `3` to node `1`), and forward edges, labeled with **F** in the Figure (for example from node `1` to node `2` or from node `0` to node `3`). Billy's program starts with an initial graph that contains the vertices `0`, `1`, `2`, `3`, and must continue to build the graph based on a sequence of commands written in a text file. A command has the following specification:

index0 string_of_characters index1

where *index0* and *index1* are the keys of vertices, and *string_of_characters* is a sequence of actions **executed from right to left**. An action is represented by one of the following characters:

Character	**Action**
f	Follow the Forward edge if it does exist or creates it and the corresponding vertex from an argument node
b	Follow the backward edge if it does exist or creates it and corresponding vertex, starting from an argument node
k	Prints the key of the argument node
<	v[index0] = argument node
=	Prints '=' if v[index0] == node or '#' otherwise

where ***v*** is the array of the nodes of the graph. The argument of the first operation is the node v[index1]. The result of the operations f and b is a node that represents the argument for all the other operations. The operations < and = are the leftmost specified. For example, for the command **`4 <kff 0`** the actions are:

```
index0 = 4, index1 = 0
x = f(v[0])          // forward to node 3, x = 3
y = f(x)             // forward  creates node (4), y = 4
k(y)                 // prints the key (4)
V[4] = y             // put node (4) in array v
```

A node is put in the array `v` only by the command `<`. Initially the array contains the nodes with keys `0`, `1`, `2`, `3`, `v[0]=0, v[1]=1,v[2]=2and v[3]=3`.The program input is from a text file. The file contains the sequence of commands. Each print must be to the standard output from the beginning of a line. There are no empty lines in between. White spaces can occur freely in the input. The input data terminate with an end of file.

An input/output sample is in the table bellow.

Input	Output
4 <kf 3 **0 =bb 4** **7 <ff 3**	**4** **=**