

COT 4210 Program #1: DFA Simulation

The Problem

Given a DFA, and several input strings to that DFA, determine whether or not each of the strings is in the language described by the DFA.

Input Format

The first line of the input will contain a single positive integer, n ($n \leq 10$), representing the number of DFAs that are going to be described in the file.

For each DFA, the first line will have three space-separated positive integers, s ($s \leq 1000$), representing the number of states, v ($v \leq 10$), representing the size of the input alphabet, and m ($m \leq 10$), the number of strings to test for membership in the language described by that DFA.

The states of the DFA will be 0 through $s-1$, and the input alphabet will be the first v lowercase letters. The second line will contain a positive integer, a ($a \leq s$), representing the number of accept states in the DFA. This will be followed by a space and a space separated integers in increasing order, representing the states of the DFA that are accept states. The next s lines will contain the transition function for the DFA with the j^{th} integer on the i^{th} line representing where to move in the DFA from state i when reading the j^{th} letter, where $0 \leq i < s$ and $0 \leq j < v$. The last m lines of each test case will contain the strings to test for acceptance in the DFA that was just described. Each of these m lines will have a single string of no more than 10,000 lowercase letters where each letter is one of the first v letters.

Output Format

For each input DFA, output a header as follows:

DFA #k:

where k represents the DFA number, starting at 1.

For each input string to test, write a single line of output. Write

`<s> is in L`

if the string `<s>` is in the language described by the DFA and write

`<s> is not in L`

If the string `<s>` is NOT in the language described by the DFA.

Put a blank line after the output for each DFA.

Sample Input

```
2
4 2 5
1 3
1 2
0 3
3 0
2 1
abba
ba
baa
baaabaab
babbbba
4 2 7
1 3
1 0
1 2
3 0
1 2
a
bababa
bababab
bbaaabb
abbabbbaba
abbababb
bab
```

Sample Output

```
DFA #1:
abba is not in L
ba is in L
baa is not in L
baaabaab is in L
babbbba is not in L

DFA #2:
a is not in L
bababa is in L
bababab is not in L
bbaaabb is not in L
abbabbbaba is in L
abbababb is not in L
bab is not in L
```

Implementation Restrictions

- 1) Write your program **in Java**.
- 2) Your program must read input from standard in and output to standard out.
- 3) Submit your source file, **dfa.java**, via WebCourses.