For the assignment, the program should read from STDIN (scanf in C, cin in C++, raw_input()/input() in Python, System.in in Java etc), and print to STDOUT (printf, cout, print(), System.out). We'd suggest the input/output format as below:

INVOCATION FORMAT

1. The program will be invoked using two parameters. The first parameter is the algorithm name: "e", "p", "r", "l" (all lower case). The second parameter is the number of samples required for the algorithm. **Number of samples for "e" (enumeration would be zero -- it does not matter).** Please look at example invocation few sections below.

INPUT FORMAT

1. The first line will contain two numbers N and M separated by a single space character. N represents the number of evidences, and M represents the number of queries. After this line, M lines will appear followed by N lines.
2. Each of the next N lines will appear as two characters separated by a space. First character represents the node name in uppercase -- one of "A", "B", "E", "J" or "M". The second character represents either the truth value -- one of "t" or "f".
3. Each of the next M lines will appear as a single character. This character would represent the node name being queried.
4. <No further inputs>

OUTPUT FORMAT

1. There should be M lines of output. Each line should have two parts separated by a space character. First part is the node name (single uppercase letter) and the second part is the probability **that the node has the value TRUE** in floating point format.
2. Please do not output anything other than M lines. Please stick to the format. Extraneous output would interfere with running and evaluating the program. Please **do not** use print statements such as "Enter value of M", "Enter first evidence", "Enter second evidence", "Enter query" etc. You may add them during the development/debugging phase, but please remove them before final submission. There's a tiny script at the end of the document that helps you validate your IO format.

Examples

I/O format example of the example in the assignment:

Example #1

INVOCATION OF PROGRAM:

$ python my_program.py e 0

INPUT

```
2 1
A t
B f
```

J

OUTPUT

J 0.9

Example #2

INVOCATION OF PROGRAM:
$ java my_class r 100

INPUT
```
2 2
E t
J f
M
A
```

OUTPUT
```
M 0.08
A 0.96
```

I wrote a tiny script that executes a sample program and says whether the format of output is valid or not. I'd suggest using this script to check validity before submitting.

Process to validate:

1. Grab the script from: https://github.iu.edu/gist/srriyer/030b6631fcb56e0512a9 and save it as "validate.py" somewhere on your machine.
2. Edit line number 13 and put in the exact command that runs your program. Use absolute paths (although you could use relative paths)
3. From a terminal, execute this file as a python script:
   $ python validate.py
4. If the above execution does not throw any error, then the program is probably producing output is correct format.