CS1020E Lab 08
Deadline: 16th October 2014 (23:59)

Stack or Queue ?

Problem Description
Professor X gives you a mysterious data structure containing integers. The data structure supports the following operations:

- `push`: Insert an element into the data structure.
- `pop`: Take out an element from the data structure.
- `reverse`: Reverse the elements inside.

Given the list of operations and their return values, Professor X asks you to guess the data structure. He also gives you a hint: it could be a stack or a queue only.

In this exercise, you are required to write a program to read in the input, process them, and display the finding about the data structures.

Input
There will be **several test cases in this problem**. Each test case contains N (1 <= N <= 20), the number of operations. The first line of a test case contains N. The next N lines are the list of operations and their return values.

- `push M`
  Push the integer M into the data structure.
- `pop M`
  Pop an element from the data structure and you get the integer M.
- `reverse`
  Reverse the elements inside the data structure.

The end of the last test case will be **terminated by EOF**.

Output
For each test case, output one of the followings in a single line:

- `stack`: It is definitely a stack.
- `queue`: It is definitely a queue.
- `stack or queue`: It can be either a stack or a queue.
- `impossible`: Professor X wants to trick you, it can neither be a stack nor a queue!

Sample Input

```
4
push 1
push 2
pop 2
pop 1
5
push 1
push 2
reverse
pop 2
pop 1
2
push 1
pop 1
2
push 1
pop 2
```

Sample Output

```
stack
queue
stack or queue
impossible
```

Explanation

For Test Case #1, every time you pop an element the last element inserted will be returned (Last-In First-Out), hence it is a stack.

For Test Case #2, every time you pop an element you get the oldest element (First-In First-Out), so it is a queue. Also notice that the order of the elements in the data structure is reversed in this case.

In Test Case #3, only 1 element is inserted into the data structure. Hence it is ambiguous; stack and queue are possible in this case.

For the last test case, the integer 1 is inserted, but when you try to remove an element it returns the integer 2. Clearly this is not possible.

Tips:

- **Only use stack and queue**. NOT Array NOT Vector NOT LinkedList, etc…
- You **don't need** to create your own stack or queue. You can **use STL stack and queue**
- Create and test your code with **more than 1 set of test cases**. If you only use the sample test case in the question, marks will be deducted.

- Always **remember** to include **testharness.txt**, **name and matric no**.
- Take note of **indentation**. Many students ignore that.

Program Submission
Submit your solution as a file named **Lab08g<LabGroupNo><MatricNo>.zip** into the right folder.

Any question? Feel free to post it in the forum. Happy coding ☺