Homework 3

100 Points

STACK and QUEUE ADT (TEMPLATES)

Project: Word-By-Word Palindromes. A word-by word palindrome is a string of words such that the words read the same forward and backward. For example, the quote "Did I say you never say "never say never"? You say I did." is a word-by-word palindrome. Write a program to test input strings and tell whether or not they are word-by word palindromes or not. Consider upper- and lowercase letters to be the same letter. Ignore spaces and punctuation. Since we are learning about stacks and queues, you will use stacks and queues to solve this problem.

Create an input file named **`test_word_plndrms.txt`** containing the text shown on the next page. Write word-by word palindromes to a file named **`word_plndrms.txt`**. As you are reading from file, display the string to the screen with a leading 1 if it is a palindrome, or a 0 if it is not. Use the format shown below. Notice the different levels of indentation.

```
1 Did I say you never say "never say never"? You say I did.
        0 Did I say you never say "never"?
        0 Are you glad you are king?
1 King, are you glad you are king?
1 Fall leaves after leaves fall.
```

Run the program once and save the output at the end of the source file as a comment. Compress the source and header files, input and output files (if any), and upload the compressed file: 22C_LastName_FirstName_H3.zip

See class examples in Stack and Queue Demo folders on Catalyst. In your program you will use the stack and queue template given in class. The stack template library is incomplete: you have to implement the **`getTop`** function that passes back the data at the top of the stack, without changing the stack, and the **`getCount`** function that returns the number of elements in the stack. (*Class templates are used to create generic classes and abstract types. They enable you to create one general version of a class without replicating code to handle multiple data types.)*

Grading:

Implement the **`getTop`** function	- 10
Implement the **`getCount`** function	- 10
Read strings from file	- 10
Check for palindromes using stack and queue functions	- 40
Write palindrome strings to file	- 10
Program structure (design)	- 20

The input file **`test_word_plndrms.txt`** contains the text shown below:

Did I say you never say "never say never"? You say I did.
Did I say you never say "never"?
Are you glad you are king?
King, are you glad you are king?
Fall leaves after leaves fall.
Says Mom, "What do you do?" – You do what Mom says.
Says Mom, "What do you do?" – You do what Mom does.
You know, I did little for you, for little did I know you.
You know, I did little for you, since little did I know you.
First Ladies rule the State.
Escher, drawing hands, drew hands drawing.
You can cage a swallow, can't you?
First Ladies rule the State, and state the rule: "ladies first".
Blessed are they that believe they are blessed.
You can cage a swallow, can't you, but you can't swallow a cage, can you?
Mind your own business: Own your mind.
Rode, and rode, and rode, and rode, and rode, and rode, and rode!
Clatter and hum and crunch, and crunch and hum and clatter.
Mind your own business.
All for one, and one for all!
Escher, drawing hands, drew hands drawing Escher.