EE 2331 Data Structures and Algorithms, Semester B, 2008/09

Tutorial 6: Recognizing Palindromes

Week 6 (25th February, 2010)

The tasks of tutorial exercises are divided into three levels. Level 1 is the basic tasks. You should have enough knowledge to complete them after attending the lecture. Level 2 is the advanced tasks. You should able to tackle them after revision. Level 3 is the challenge tasks which may be out of the syllabus and is optional to answer. I expect you to complete at least task A in the tutorial.

Outcomes of this tutorial

1. Able to operate stacks
2. Able to operate queues
3. Able to use a stack and a queue to detect palindromes

A palindrome is a string that spells the same forward and backward. An example of palindrome string is "Never odd or even". Please note that the letters are case insensitive. Spaces and punctuations are generally ignored when determining a palindrome string.

In this tutorial, the structure and operations of stack and queue have been defined and given to you already. In your function, you should only call stack's and queue's operations (e.g. init(), destroy(), push(), pop(), enqueue(), dequeue(), etc) instead of accessing the members of stack and queue directly. **Your function should still run smoothly if the implementation of stack and queue has been changed from linked list to array.**

The string is stored in a text file with the following format:

Row	Content	Remark
1st	*Never odd, or even.*	The input string *s*

Task A (Level 1): Recognizing Simple Palindromes

Implement the C function isPalindrome(char *s) that accepts a pointer *s* to a character array and returns 1 if the given string is palindrome, otherwise returns 0. In your function, you should only use a stack and a queue to determine whether the input string is palindrome or not.

Expected Output:

```
Enter the file name for testing: test1.txt
The string is: neveroddoreven
Palindrome? Yes
```

```
Enter the file name for testing: test2.txt
The string is: this is not palindromes
Palindrome? No
```

Task B (Level 2): Case Insensitive Palindromes

Modify your function to support case insensitive palindromes.

Expected Output:

```
Enter the file name for testing: test3.txt
The string is: NeverOddOrEven
Palindrome? Yes
```

Task C (Level 2): Spaces and Punctuations

Modify your function to support palindromes with spaces and punctuations.

Expected Output:

```
Enter the file name for testing: test4.txt
The string is: Never odd, or even.
Palindrome? Yes
```