Algorithms

CMPT 435

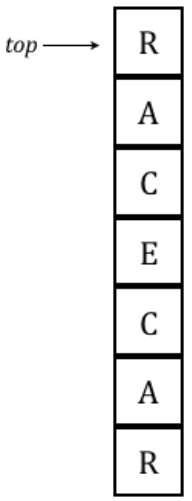
Assignment 1 - 100 points

Goals

- to program a few elementary data structures so we can experiment with them later on.

Requirements and Notes

- Develop a singly linked list. [20 points]
- Using your linked list, develop a stack. You must implement it yourself; you may not use any built-in features of the language or its libraries. [20 points]
- Using your linked list, develop a queue. You must implement it yourself; you may not use any built-in features of the language or its libraries. [20 points]



Stack

- Download the the text file `magicitems.txt` from our web site. [30 points]
- Read it line by line into array.
- Check each element of the array to see if it's a palindrome. (Ignore spaces and capitalization.) Print it if so.
  - To check whether or not a given string is a palindrome, take it character by character and push each on a stack and enqueue each on a queue. When every character is on a stack and in a queue, pop the stack and dequeue the queue one character at a time. If they always match, then the string is a palindrome. (There are other ways to check for palindromes. I don't care. Do it this way.)
- Create a LaTeX document that includes code listings (with line numbers) for your stack, queue, and main program. **Explain how each works**, referencing line numbers in the listings to be really clear. [10 points]

Your code must …

- separate structure from presentation.
- be professionally formatted yet uniquely yours (show some personality) [−∞ if not]
- use and demonstrate best practices.
- make me proud to be your teacher.

Resources

- Linked lists are described in our text in chapter 10.2, starting on page EC.
- Stacks and queues are described in our text in the beginning of chapter 10, starting on page 1110 1000.

Hints

Make sure that I have approved of your programming language (the one about which you wrote a limerick in Assignment 0) before you begin.

Submitting Your Work

Make **many** commits to GitHub. I do not want to see one massive "everything" commit when I review your code. (It's −∞ if you do that.) Commit early and often. And make sure your commit messages are descriptive, informative, and — if possible — entertaining.

Be sure that you make your final commit for this assignment on or before the due date. (See our syllabus for those details.)