CS0445 – Data Structures

Section 1200

Fall 2017

Lab 6 Recursion - I

Goal

In this lab you will design and implement recursive algorithms. The primary focus in this lab will be algorithms that make a single recursive call.

Resources

- Chapter 7: Recursion

Java Files

- *`RecursiveStringReplace.java`*
- *`TestReplace.java`*

The goal is to complete a recursive method that will replace all occurrences of a given character with another character.

Compile and run the `main` method in `TestReplace`.

Checkpoint: The program will run and get a null pointer exception.

Refer to the string replace recursive design from the pre-lab exercises and complete the method `replace()` in *`RecursiveStringReplace.java`*..

Final Checkpoint: Compile and run TestReplace. All tests should pass.

Post-Lab Follow-Ups

1. Develop a recursive algorithm for computing the product of a sequence of odd values. (Eg. ProdOdd(11) = 1*3*5*7*9*11.) Use that method to develop a recursive algorithm for factorial that splits the problem into a product of even values and a product of odd values.

2. Develop a recursive algorithm that given a and n, computes the sum
   $S = 1 + a + a^2 + ... + a^n$

3. Develop a recursive algorithm similar to string replace which works in place on an array of characters.

4. Develop a recursive algorithm for computing the second most significant bit of a number n.

5. Develop a recursive algorithm for computing the result of removing the second most significant bit from a number n.