CS 445 Lab 9: Divide & Conquer

Introduction

In this lab, you will work through two divide & conquer recursive methods. The primary goal is to practice devising a recursive solution to a problem, and then implementing that solution in code. Recall the general steps to devising a recursive solution:

1. **Identify the subproblems:** What smaller (yet structurally identical) subproblems will be used to solve the original problem? In divide & conquer, these must be fractional in size, relative to the original problem.

2. **Identify how answers are composed:** Once the solutions to the subproblems are in hand, how can they be combined to get an answer to the original problem?

3. **Identify the base cases:** What are the smallest problems that must be solved directly, without recursion?

4. **Verify termination:** Ensure your solution will not cause infinite recursion.

Exercise

After the TA's lesson, write the following two methods inside of a class `cs445.lab9.Lab9`. Note that you completed similar (nonD&C) methods in Lab 6.

```
/**
 * Reverses the order of the objects in an array, using
 * divide and conquer recursion
 */
static void reverse(T[] a)

/**
 * Replaces each instance of character before with
 * character after within str, and returns the resulting
 * string (using divide and conquer recursion)
```

```
    */
    static String replace(String str, char before, char after)
```

Be sure to test that these methods work as expected! You are provided with class cs445.lab9.Testers that calls each of the above on a few instances, but you should convince yourself that they work in all scenarios