ECS 60 Written Homework #2: Lists, Stacks, Queues, Recursion (10 points) Winter 2016

Due Wednesday, January 20th, 4:00 pm in 2131 Kemper

1. (2 points) Let A be an array of size $n \geq 6$ containing integers from 1 to $n - 5$, inclusive with exactly five repeated. Describe an O(n) algorithm for finding the five integers in A that are repeated. (Goodrich, p. 150)

2. (2 points) Given a list L of n arbitrary integers, describe an O(n) time function for finding an integer that cannot be formed as the sum of two integers in L. (Goodrich, p. 266)

3. (2 points) Describe how to implement a stack ADT using two queues. What is the running time of the `push()`, and `pop()` function in this case? (Goodrich p. 224)

4. (2 points) Propose a data structure that supports the stack push and pop operations, and a third operation findMin, which returns the smallest element in the data structure, all in O(1) worst-case time. (Weiss, p. 119)

5. (2 points) If the recursive routine on page 59 of the text used to compute Fibonacci numbers is run for $N = 50$, is stack space likely to run out? Why or why not? (Weiss p. 119)

Sources of questions:

Michael T. Goodrich, Roberto Tamassia, and David Mount, *Data Structures & Algorithms*, *Second Edition*, Hoboken, NJ, John Wiley & Sons, 2011.

Mark Weiss, *Data Structures and Algorithm Analysis in C++*, *Fourth Edition*, New York, NY, Pearson Education, 2014.