CSC210: Data Structures and Algorithms
Assignment 1

due: 9:30, on 2.8.2018

1. Trace INSERTION-SORT on the array $A =< 31, 41, 59, 26, 41, 58 >$. For each j write the value of t_j.

2. Write pseudocode for INSERTION-SORT-NONINCREASING, which sorts into nonincreasing instead of nondecreasing order.

3. Searching problem:
   Input: A sequence of n numbers $A =< a_1, a_2, \ldots, a_n >$ and a value ν.
   Output: An index i such that $\nu = A[i]$ or the special value NIL if ν does not appear in A.

   Write pseudocode for linear search, which scans through the sequence, looking for ν.

4. Consider the problem of adding two n-binary integers, stored in two n-element arrays A and B. The sum of the two integers should be stored in binary form in an $(n + 1)$-element array C. State the problem as a computation problem (Input, Output) and write pseudocode for adding such two integers.

5. Trace MERGE-SORT on the array $A =< 3, 41, 52, 26, 38, 57, 9, 49 >$

6. Rewrite the MERGE in such a way that it does not use sentinels. Instead let it stop once either array L or R has had all its elements copied back to A and then copying the remainder of the other array back to A. (Write pseudocode for this procedure.)