1. Show that there is no comparison sort whose running time is linear for at least half of the $n!$ inputs of length $n$.
   (The first part of problem 8.1-3, page 194.)

2. Problem 8.3-1, page 199.

3. Which of the following sorting algorithms are stable: INSERTION-SORT, MERGE-SORT, HEAP-SORT and QUICK-SORT?
   For extra points: Give a simple scheme that makes any sorting algorithm stable. How much additional time and space does your scheme entail?
   (Problem 8.3-2, page 200.)

4. Given an array of $n$ items, all integers, design a linear-time in-place algorithm that rearranges the numbers such that all even numbers are placed before odd numbers (i.e., at positions with lower indices).
   For example, for $[4, 5, 2, 9, 7, 6, 1]$ the result might be $[4, 6, 2, 9, 1, 5, 7]$.
   Provide verbal description of the algorithm as well as its pseudocode. Prove the time complexity.