5.5 (1) (12)

3. a. Write a pseudocode for the divide-into-three algorithm for the fake-coin problem. (Make sure that your algorithm handles properly all values of n, not only those that are multiples of 3.)

   b. Set up a recurrence relation for the number of weighings in the divide-into-three algorithm for the fake-coin problem and solve it for $n = 3^k$.

   c. For large values of n, about how many times faster is this algorithm than the one based on dividing coins into two piles? (Your answer should not depend on n.)

3. While it is obvious how one needs to proceed if $n \bmod 3 = 0$ or $n \bmod 3 = 1$, it is somewhat less so if $n \bmod 3 = 2$.

2. (5)   Which permutation immediately follows 37246510 in lexicographic order?
   Show how you use the algorithm from Day 21 class to get your answer.

3. (5)   If the permutations of the numbers 0-7 are numbered from 0 to 8!-1,
   what is the (lexicographic ordering) sequence number of the permutation 37246510?

4. (5)   Which permutation of 01234567 is number 25000 in lexicographic order?