This assignment is a review of some algorithm analysis techniques.

Page 14: Problem 1-1

Not in textbook: Examine the pseudocode for INSERTIONSORT on page 18. Write a summation expressing the number of element comparisons made by this algorithm, in the worst case, for an input size $n$. Simplify this summation to a form that does not include any summation symbols. Use the simplest possible $\Theta$ notation to classify the order of growth of this expression. Repeat these steps for the best case number of comparisons.

Page 39: Exercise 2.3-4

Not in textbook: Examine the pseudocode for MERGESORT on page 34 and its MERGE subroutine from page 31. Write a recurrence, with an appropriate base case, expressing the number of element comparisons made by this algorithm, in the worst case, for an input size $n$. Solve this recurrence—that is, express its growth using the simplest possible $\Theta$ notation—using your favorite (correct) method.

Not in the textbook: Arrange the following functions from left to right in descending order by asymptotic growth rate:

\[
0.1n^4 + n^3 \quad 2n^2 \quad 2^{(\log_2 n)^2} \quad 2^{\log n} \quad 3^n \quad 3^{n+1} \quad 5 \log(n + 100)^{10} \\
(\log n)^2 \quad (n - 2)! \quad n^{20} \quad n^{20}(\log n)^{20} \quad n^4 + 0.1n^3 \quad \sqrt[3]{n}
\]

If two or more functions have the same growth rate (that is, if one is $\Theta$ of another), arrange them vertically within the list.