1 (1 point)

Write an algorithm that combines INSERTION-SORT and MERGE-SORT. It should use INSERTION-SORT for small segments of an array, and recursively merge sort segments. A segment $A[p..r]$ is small if its length is no larger than some fixed value $k$, that is, $r - p < k$.

2 (1 point)

Some credit-card companies ask each customer to specify the mother’s maiden name, and use the first four letters as a password; if the name has fewer than four letters, the computer adds space to obtain a four-letter password. Suppose that you work with a database that includes several million customers and their four-letter passwords. This database is unsorted, and you need to arrange it in the alphabetical order of passwords, that is, to sort it by passwords. What sorting algorithm will you use? Why? What is the time complexity?