

Assignment

7. Yes, the given program can be easily modified to find the k-th largest element. But it will be using a higher space complexity and time complexity. So, I shall be recommending to use a sorting algorithm for efficiency in case of a need to find k-th largest element in an integer array.
8. I utilised the set class from the C++ standard library to quickly locate duplicate characters in an unordered character array. Sets are containers that store distinct elements in a predetermined sequence. The set container aids in bringing down the program's time complexity to $O(n)$.

q. In this program, the function with the most complexity is reverse-sort since it employs nested loops. In the function, an array of numbers is sorted in decreasing order using insertion sort. Each element (key) is checked against elements after it in an iterative process by the algorithm. When an element is larger than the one before it, they are switched around until the elements are in the key element is in the proper place in each iteration.

As the function has a nested loop, the worst-case time complexity of this technique is $O(n^2)$ as the inner and outer loop works n-times.