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Program Structures & Algorithms Assignment 2

CONCLUSION:

By partitioning the solution-space into N sub-spaces, each of which corresponds to a fixed value for the middle index of the three values, the quadratic approach for solving the ThreeSum problem can be applied. By extending the reach of the other two indices outward from the beginning point, the approach then resolves each sub-space. The overall complexity is O(N2) because it is possible to solve each subspace in O(N) time.

The two-pointer strategy is employed in the specific instance of the code I gave to effectively solve each sub-space. The first and last entries of the array are used as the initial values for the two pointers, low and high. The procedure then iterates through the subspace, adjusting the low pointer and high pointer as necessary, and determining whether the total is correct. is equal to zero for the values at the low, j, and high indices. If so, the pointers are incremented and a new Triple is added to the list of triples. The low pointer is increased if the sum is less than 0, while the high pointer is decreased if the amount is more than 0.

This method can function effectively because the array is sorted, preventing the needless tests that would be included in a brute force strategy, which checks all possible combinations of I j, and k. The method can only verify items that are most likely to produce a triple that adds up to zero by using the two-pointer strategy.

A quadratic method with callipers differs from a simple quadratic method in that it adds an additional data structure to keep track of the values that have already been processed and avoid checking them again. Callipers are a type of data structure that are frequently used to improve algorithms that handle huge datasets.

The fundamental principle behind callipers is to identify the pieces that have been processed and skip them on the subsequent iteration. Once an element has been used as the middle element of a triple in the ThreeSum problem, it should not be used again. The approach uses a calliper to keep track of the processed items, selectively checking certain combinations of I j, and k rather than all possible combinations.

TEST CASE RESULT: