Program Structures and Algorithms
Spring 2023(SEC –03)

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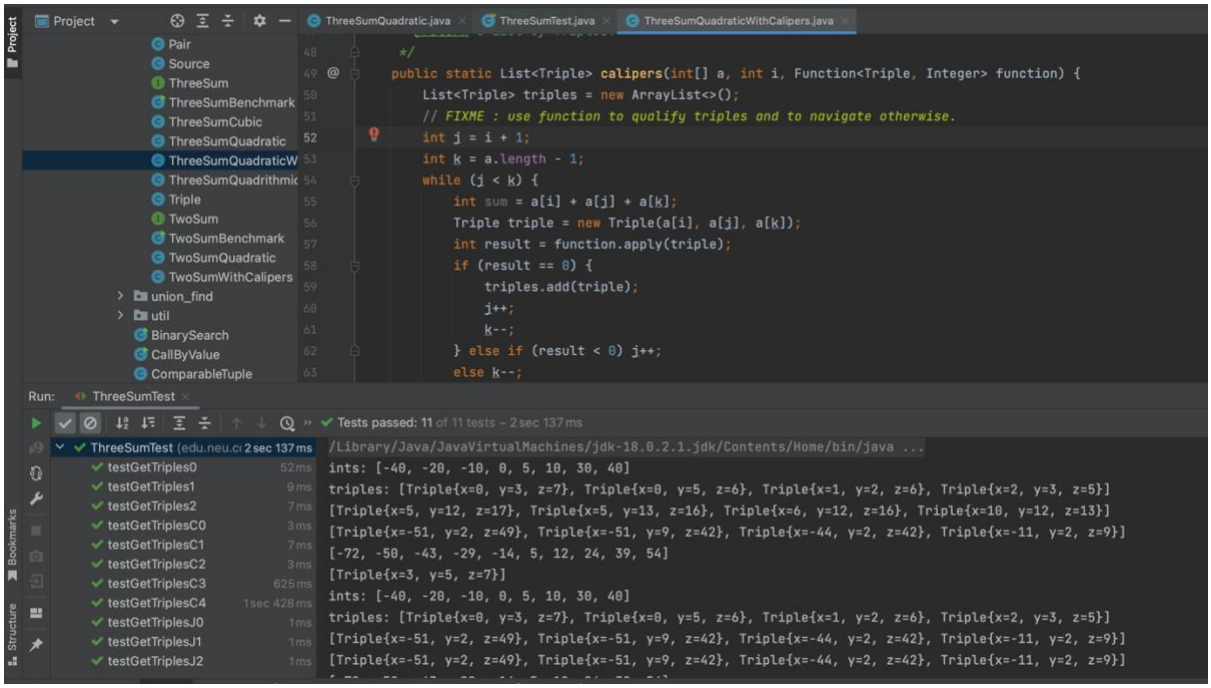
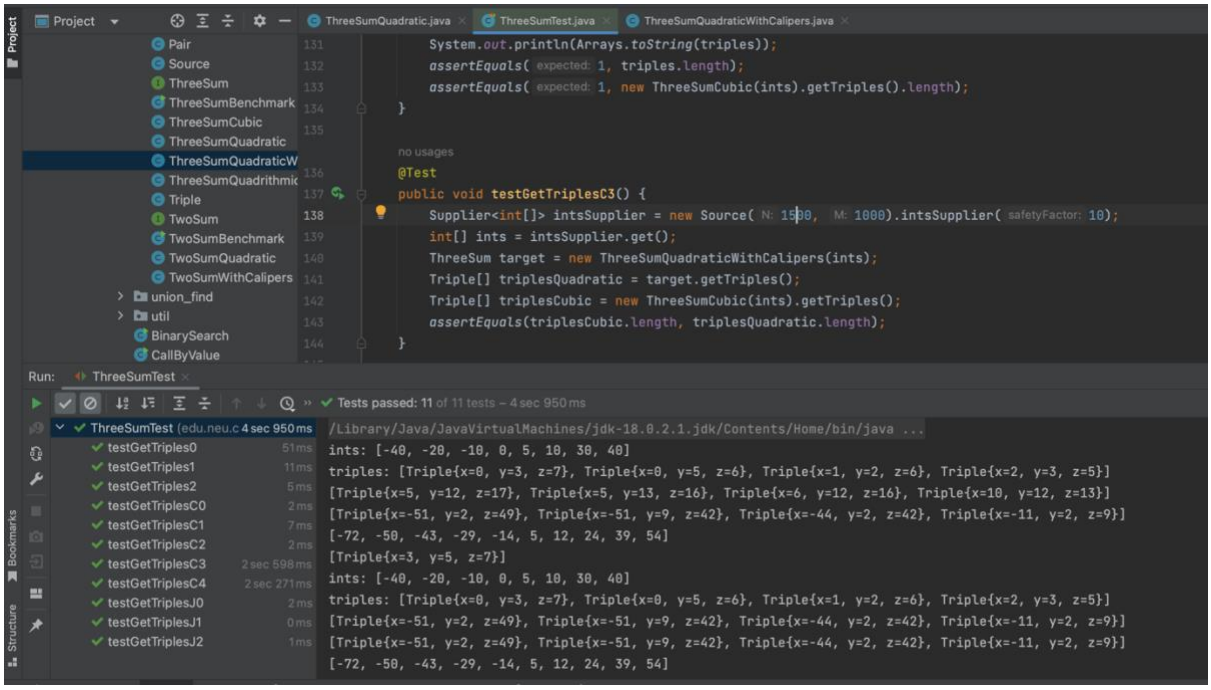
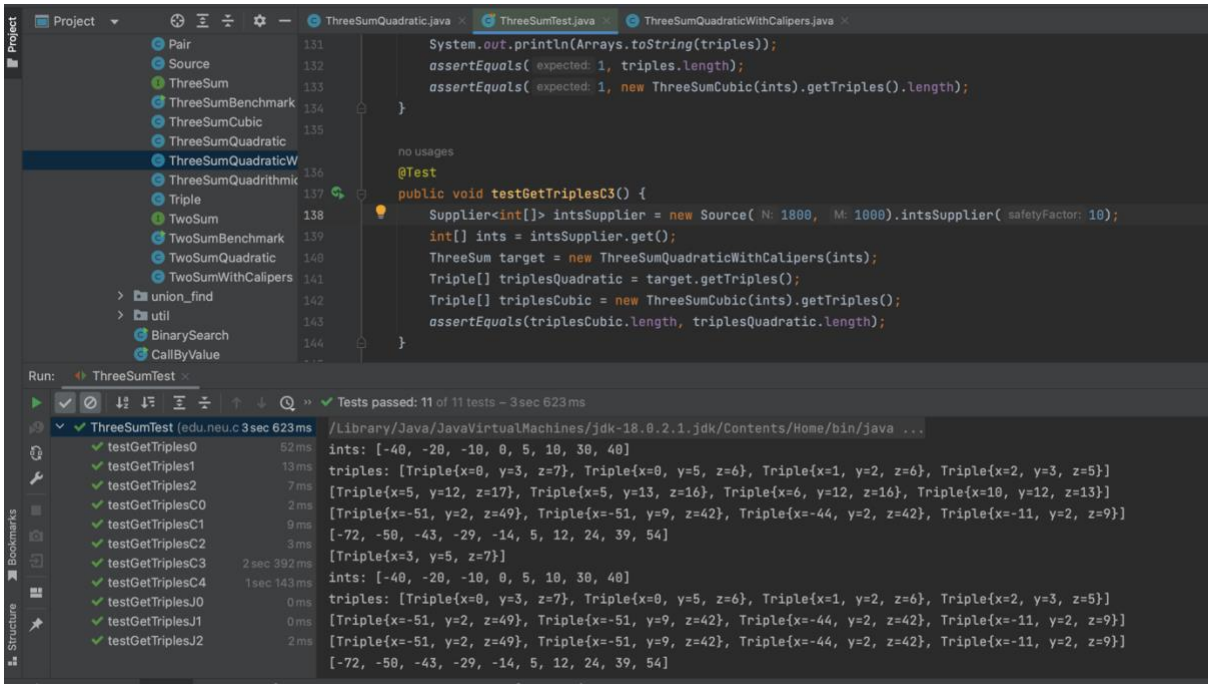
Task: Assignment 2 (3-SUM)

Unit Test Screenshots:







Observation:

The quadratic algorithms are efficient because they divide the problem space into N subspaces, with each subspace associated with a specific value of the middle index among three values. Once the middle index is fixed, the only remaining step to solve the problem is to identify two elements in the remaining indices that add up to the negative of the middle element. This is a critical factor in solving the problem.
By fixing the middle index and solving the problem for each subspace, the need to compare every possible triplet in the input array, which would take cubic time, is avoided. Instead, each subspace is solved in linear time using two pointers to search for the remaining two elements whose sum is the negative of the middle element.
This approach reduces the time complexity of the three-sum problem from cubic to quadratic, resulting in a significant improvement in running time.