Program Structures and Algorithms
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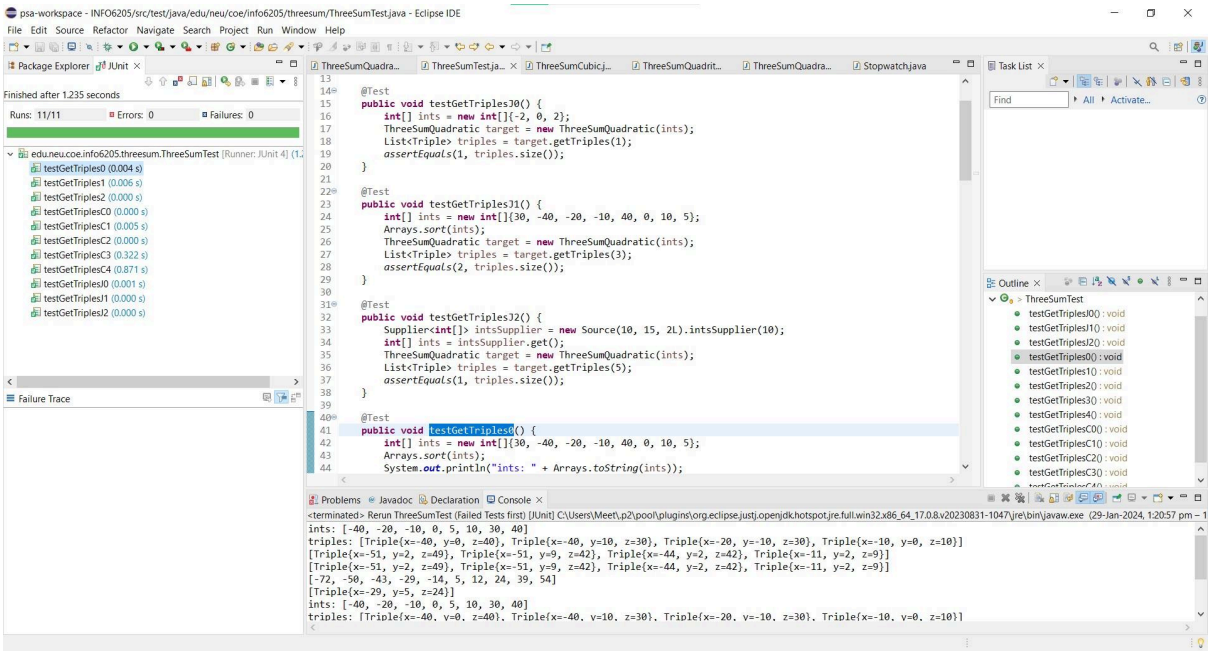
GITHUB LINK: https://github.com/karnikmeet/psa-assignment

**Task:** 3 sum experiment

**Unit Test Screenshots:**




**Timing Observations:** Here is a table which shows the time taken by each method taken to find the number of triplets in a array containing random integers of size N = 88,176,352,704,1408

| 3-Sum Method | No. of values | Time(in milliseconds) | | 3-Sum Method | No. of values | Time(in milliseconds) |
|---|---|---|---|---|---|---|
| Quadratic | 88 | 7 | | Quadrithmic | 88 | 2 |
| | 176 | 7 | | | 176 | 1 |
| | 352 | 3 | | | 352 | 3 |
| | 704 | 23 | | | 704 | 7 |
| | 1408 | 180 | | | 1408 | 28 |
| | | | | | | |
| | | | | | | |
| 3-Sum Method | No. of values | Time(in milliseconds) | | 3-Sum Method | No. of values | Time(in milliseconds) |
| QuadraticwithCallipers | 88 | 3 | | Cubic | 88 | 3 |
| | 176 | 2 | | | 176 | 5 |
| | 352 | 3 | | | 352 | 3 |
| | 704 | 5 | | | 704 | 20 |
| | 1408 | 5 | | | 1408 | 151 |

**Why does the quadratic method work:**
For this experiment, the reasons why quadratic methods work are as follows:

1. With a fixed middle index, the 3-sum problem immediately turns into a 2-sum problem where we would find two numbers whose sum with the middle element would be 0
2. The problem gets divided into two smaller subproblems, which in turn helps us avoid redundancies.