Qifan Luo(1010945)

Program Structures & Algorithms

Spring 2021

Assignment No. 2

- **Task**
- **Relationship Conclusion:**

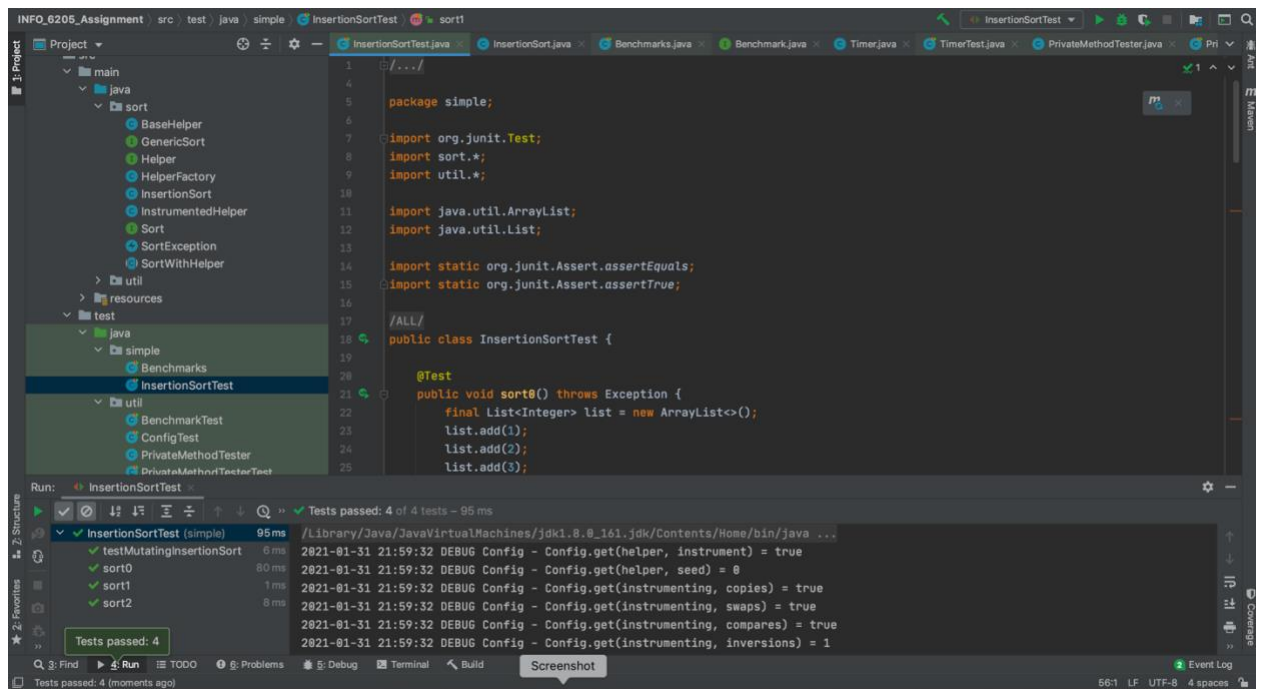**For Best Cases: O(n)**

For Worst Cases: O(n^2)

For Average Cases: O(n^2)

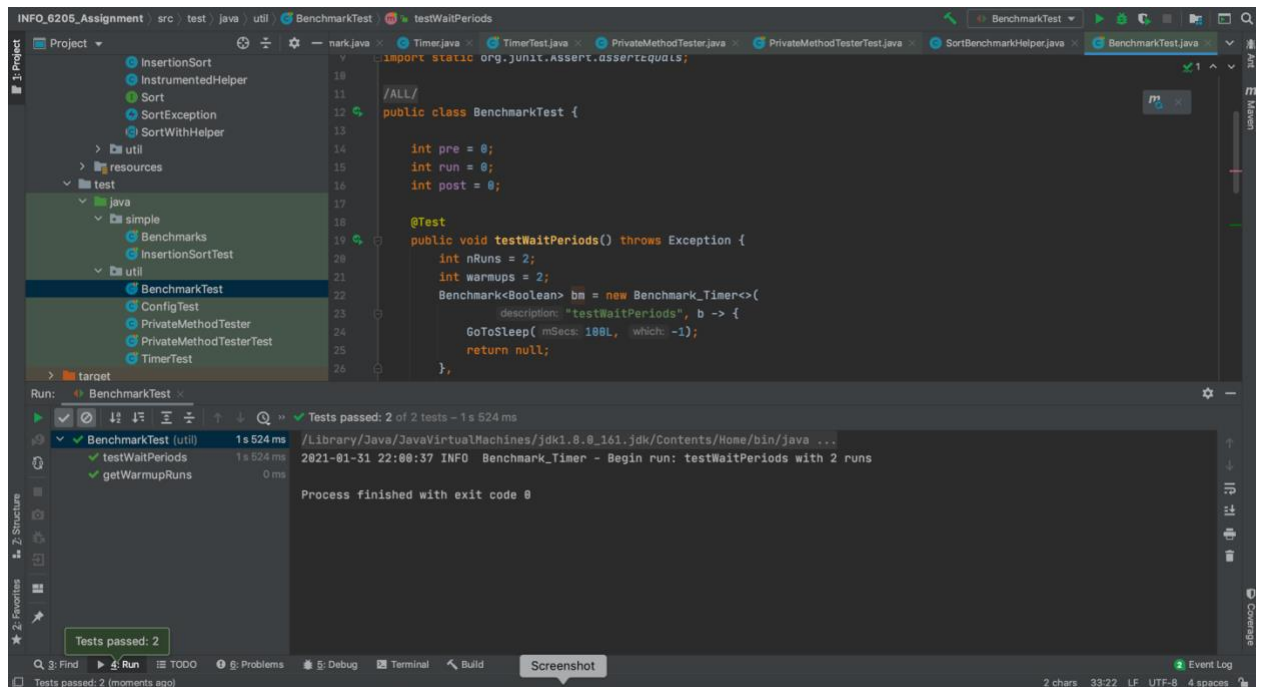**P.S. for partially ordered, I think the time complexity is nearly O(n), while the time is more than order condition.**

- **Evidence to support the conclusion:**

- **Graphical representation:**

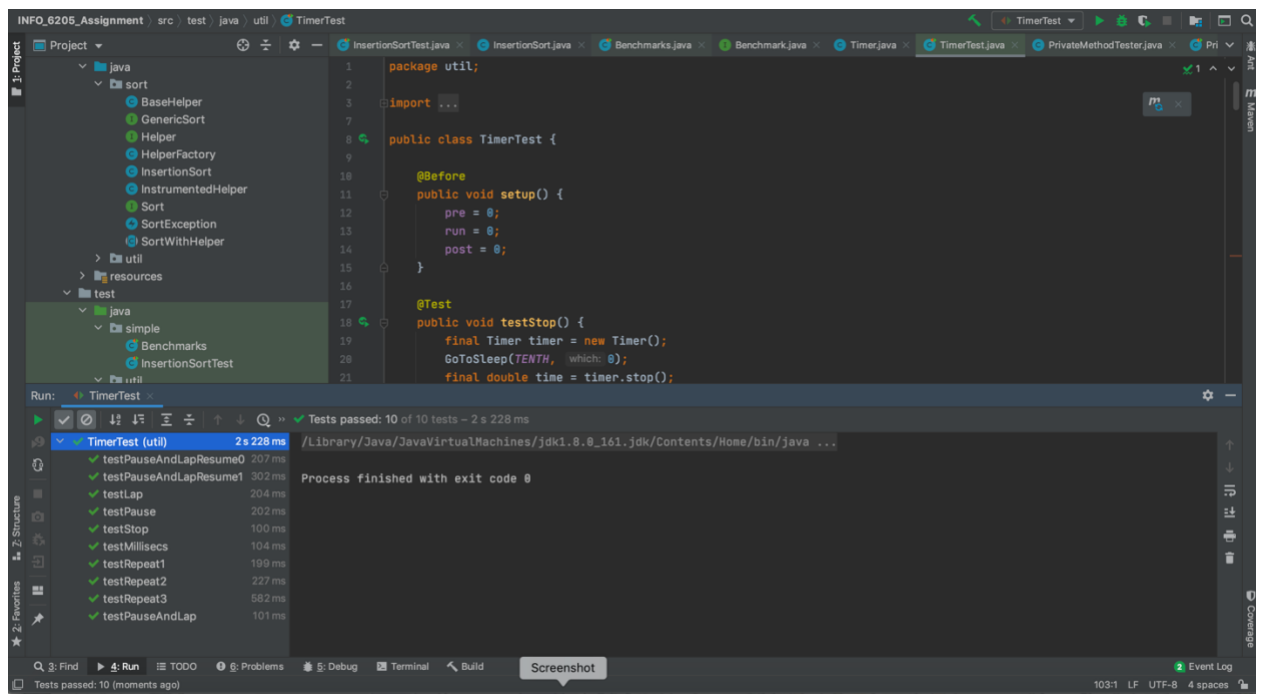| A	B	C	D	E	
	Random	Order	Partially-ordered	Reverse-ordered	
5	0.0023	0.0018	0.00206	0.00284	
10	0.0075	0.00326	0.0073	0.00842	
20	0.018	0.00487	0.0135	0.0216	
40	0.055	0.00714	0.038	0.0683	
80	0.204	0.0156	0.0649	0.226	

- **Unit tests result:**

Insertion Sort Unit Test

Benchmark Test Picture

Timer Test Picture