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Program Structures & Algorithms
Fall 2021
Assignment 2
Benchmark

- **Tasks**

1. Implemented methods of Timer Class:

- ❖ Implemented methods getClock by using function System.nanoTime function.
- ❖ Implemented toMillisecs method by converting nanosecond to millisecond.
- ❖ Implemented repeat method by calculating average milliseconds per repetition. This was calculated from pre function, applying the function till post function.

2. InsertionSort:

Implemented sort method in insertionSort class by running nested for loop and swapping smaller numbers to left and larger one to right.

3. Executing benchmark on Insertion Sort:

Sorted and benchmarked timings of random, ordered, partially-ordered and reverse-ordered arrays of different lengths and noted the observation.

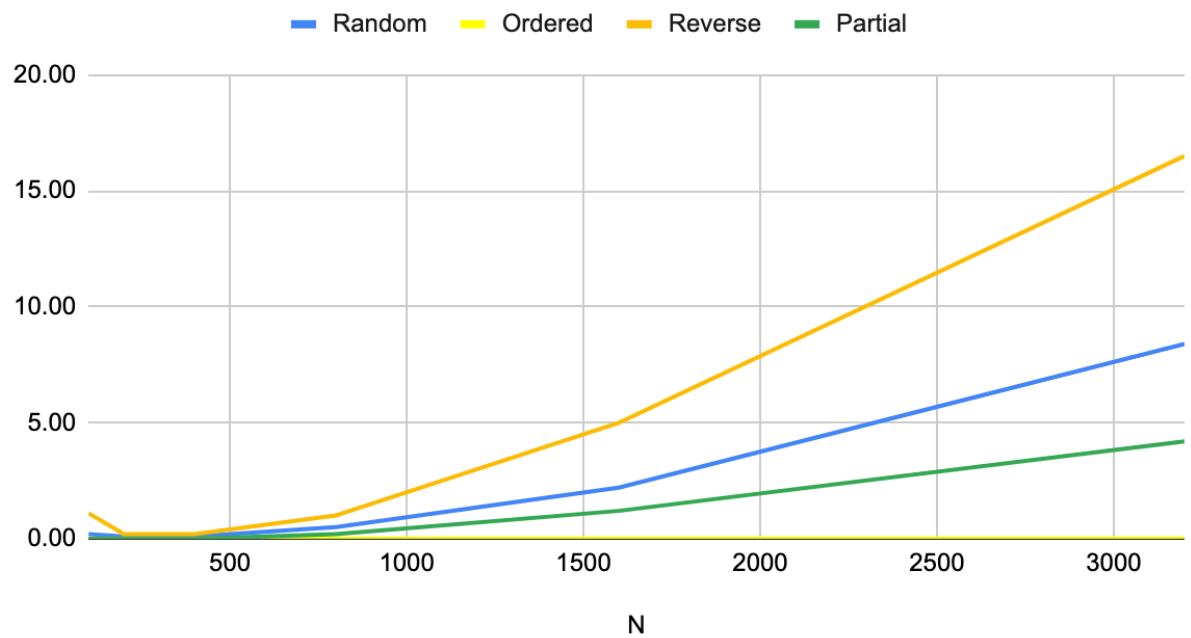
- **Conclusion:**

Benchmark time for the reverse-ordered arrays was the highest followed by random-ordered arrays followed by partial and ordered which has almost zero. The order of growth of time was the most for the reverse-order as this was the worst case scenario and the loop had to run for $O(n)^2$.

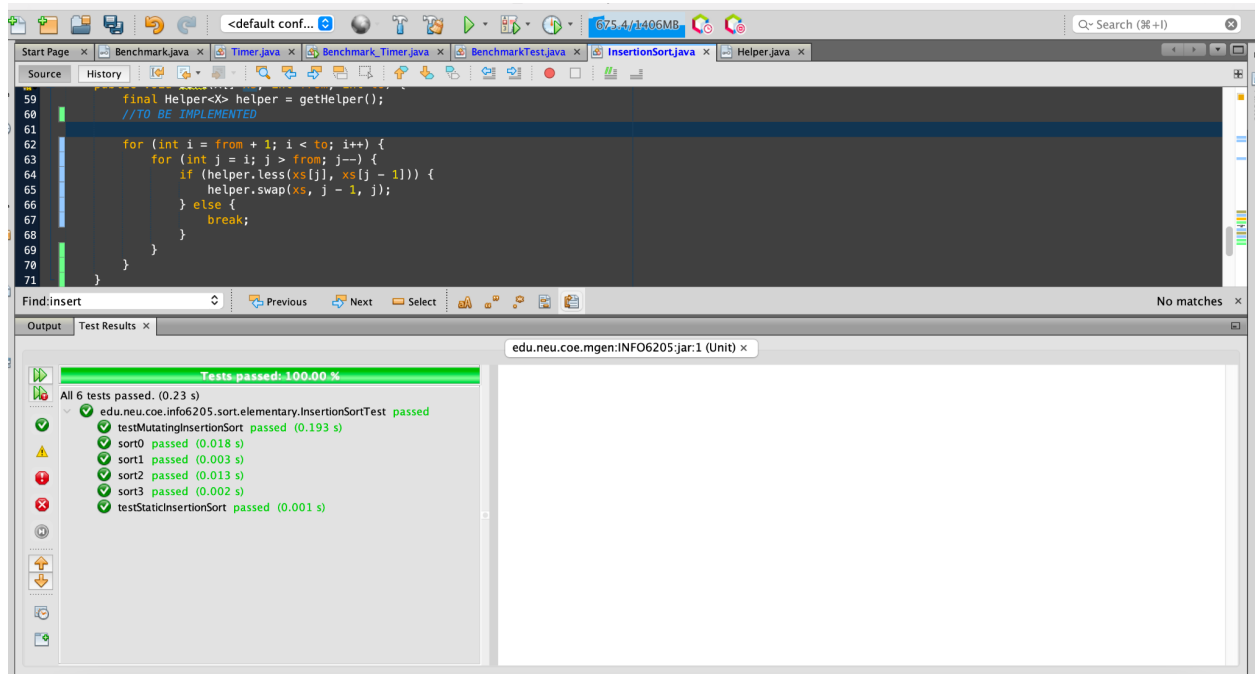
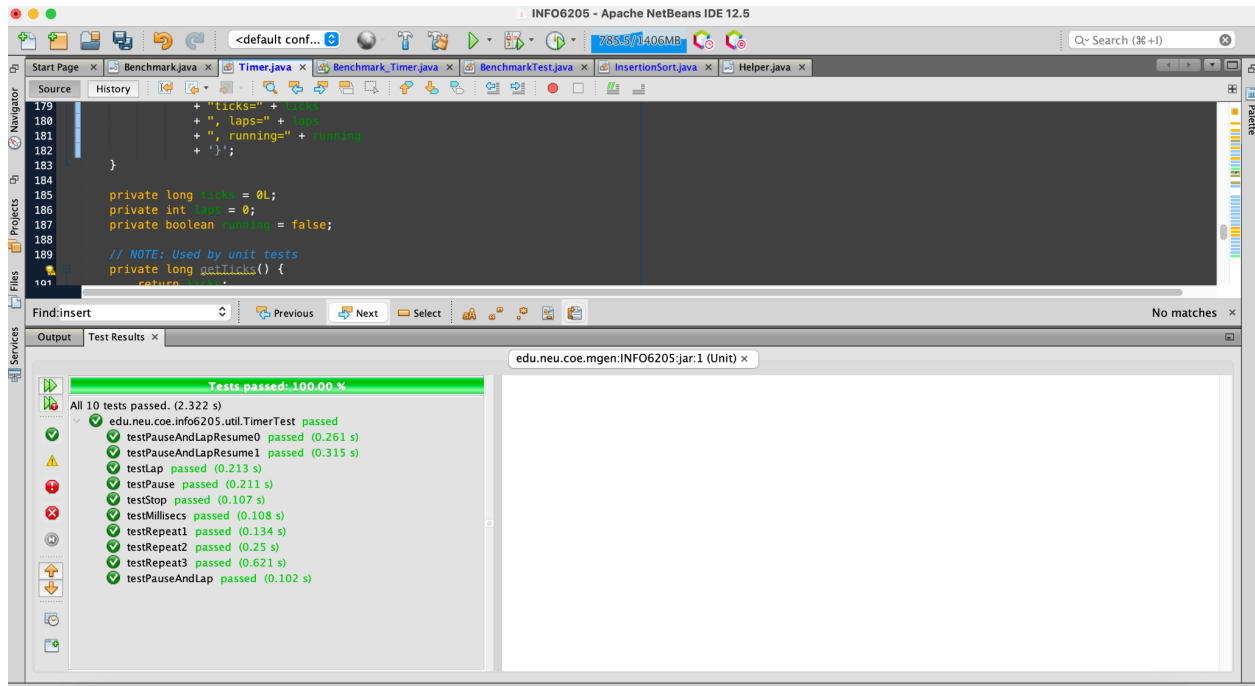
- Evidence:

N	Random	Ordered	Reverse	Partial
100	0.20	0.00	1.10	0.00
200	0.10	0.00	0.20	0.00
400	0.10	0.00	0.20	0.00
800	0.50	0.00	1.00	0.20
1600	2.20	0.00	5.00	1.20
3200	8.40	0.00	16.50	4.20

Random, Ordered, Reverse and Partial



- Output & Screen Shorts





Assignment 2 Benchmark



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	A	B	C	D	E	F	G	H	I	J	K	L
1	N	Random	Ordered	Reverse	Partial							
2		100	1.00	0.00	0.50	0.00						
3		300	0.40	0.00	0.20	0.00						
4		900	0.60	0.00	1.30	0.30						
5		2700	6.50	0.00	13.90	3.30						
6		8100	52.00	0.00	123.90	30.60						
7		24300	566.20	0.10	1,130.40	282.50						
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