Assignment 2

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1. Task
2. Implemented three functions named as getClock(),toMiliseconds(), repeat() in Timer.java class.
3. Implemented insertion sort in insertSort class
4. Wrote jUnit test cases to check time required to sort array with insertionSort for all four cases random, ordered, partially-ordered and reverse-ordered.
5. Verified that test cases are passing for TimerTest and BenchmarkTimer and insertion sort test.
6. Created report, tables and graph for my observations
7. Also Wrote conclusion as per my observations
8. Code
9. private static double toMillisecs(long ticks) {
10. return ticks / 1000000;
12. }
14. private static long getClock() {
15. return System.nanoTime();
16. }
18. public <T, U> double repeat(int n, Supplier<T> supplier, Function<T, U> function, UnaryOperator<T> preFunction, Consumer<U> postFunction) {
19. logger.trace("repeat: with " + n + " runs");
20. // TO BE IMPLEMENTED: note that the timer is running when this method is called and should still be running when it returns.
22. pause();
24. for (int i = 0; i < n; i++) {
25. T tt;
26. if(preFunction != null)
27. {
28. tt=preFunction.apply(supplier.get());
29. }else
30. {
31. tt=supplier.get();
32. }
33. resume();
34. // function.apply(tt);
35. U u=function.apply(tt);
36. pauseAndLap();
37. if(postFunction != null)
38. {
40. postFunction.accept(u);
41. }
42. }
44. return meanLapTime();
45. }

For Insertion Sort:

1. public void sort(X[] xs, int from, int to) {
2. final Helper<X> helper = getHelper();
4. for (int i = from+1; i < to; i++)
5. {
6. for(int j=i;j>from;j--)
7. {
8. if(helper.compare(xs[j-1],xs[j])>0)
9. {
10. helper.swap(xs,j-1,j);
11. }else {
12. break;
13. }
15. }
16. }



1. Output

Text, letter

Description automatically generated

1. Graph and Table

Table

Description automatically generatedChart, line chart

Description automatically generated

Sorted Array:

Table

Description automatically generatedChart, line chart

Description automatically generated

Unsorted Array

Table

Description automatically generatedChart, line chart

Description automatically generated

Partially Sorted

Table

Description automatically generatedChart, line chart

Description automatically generated

Reverse Sorted

Table

Description automatically generatedChart, line chart

Description automatically generated

1. **Test Cases:**

Adjusted time as suggested by Professor to pass test cases as I have Windows system.

Graphical user interface, application, table, Excel

Description automatically generatedGraphical user interface, text, application, chat or text message

Description automatically generated

Insertion Sort Test Cases

Graphical user interface, text, application, chat or text message

Description automatically generated

**6.Conclusion**

For insertion sort for all 4 orders such as sorted, Unsorted, Partially Sorted, Reverse Sorted time increases as array size increases. Also sorting time increases as we go sorted-> Unsorted->Partially Sorted->Reverse Sorted.