Group 26

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Sort Algorithm Comparisons

*nlogn vs n-squared*

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nlogn vs n-squared

As part of Short project 1 we implemented Merge sort and insertion in Java. Merge sort was implemented in 2 ways

1. Using generics Type
2. Using basic Integers

We ran the programs for various input sizes. To do this, we first initialized an integer (basic int array) array with continuous values (1 to n) and called the shuffle method on the array. 2 copies of the same array of type Integer (integer wrapper class) were used to maintain identical inputs for all the sorting algorithm.

Below are the results of our program runs

|  |  |  |  |
| --- | --- | --- | --- |
| Input size | Runtime (milliseconds) | | |
| integer merge sort | Generic merge sort | Insertion sort (n2) |
| 1000000 | 172 | 606 | 6323878 |
| 5000000 | 740 | 2599 | >20000000 |
| 8000000 | 1097 | 4548 | >20000000 |
| 10000000 | 1387 | 5653 | >20000000 |
| 14000000 | 2165 | 8234 | >20000000 |
| 1600000 | 2365 | 9233 | >20000000 |

Observations drawn from the above chart

1. N-squared algorithm takes hours to sort even a small dataset of 1 million items.
2. When we implement algorithms using generics there is an overhead which is more observable with increase in data size.
3. nlogn sort algorithm can easily handle large data set and produce the desired output within seconds.