# SORTING ALGORITHMS

A sorting algorithm is used to rearrange a given data according to a given parameter which will determine the final sorted data, i.e, results.

Sample of the tested sorting algorithms:

1. Insertion sort
2. Merge Sort
3. Quick sort

## Insertion sort

The algorithm works by splitting the array/list into the sorted and the unsorted part. The algorithm run recursively by picking all the unsorted values from the unsorted part and placing them into the sorted part.

Time complexity for this algorithm is defined as T(n)=O(n^2).

## Merge sort

This algorithm works by the divide and conquer problem solving methodology. The array is recursively divided into two equal parts to its simplest form and from the the outermost left value it compares the values and merge them until the whole array is sorted.Since it is a recursive algorithm, time complexity for the this sorting method is expressed as T(n)=2T(n/2) + O(n)

## Quick sort

This algorithm is almost similar to the merge sort only the it the array is partitioned(divide) around a given pivot(value position). Time taken by can be expressed as T(n)=T(k) +T(n-k-1) + O(n).

|  |  |  |  |
| --- | --- | --- | --- |
|  | insertion sort | Merge sort | Quick sort |
| arr20.txt | 1.7389998902217485e-05 | 0.00012195499948575161 | 8.48420004331274e-05 |
| arr20.txt | 3.802500032179523e-05 | 0.0005155180006113369 | 0.0010288120010955026 |
| arr20.txt | 0.0002783439995255321 | 0.008227985999837983 | 0.11607458499929635 |
| arr20.txt | 0.0010060160002467455 | 0.04154679800012673 | 1.4359536039992236 |

Table 1: Time in seconds for the algorithms

## References

Mishra, A. D., & Garg, D. (2008). Selection of best sorting algorithm. International Journal of intelligent information Processing, 2(2), 363-368.

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