**Sorting**

**Document Id 16**

**Concepts**

1. Insertion Sort or Quicksort algorithm => O(n^2)
2. Shellsort is better than O(n^2)
3. Heapsort uses queues => sort O(N log N)
4. Mergesort uses recursion => O(N log N )
5. For Strings we can use Radix Sort

**Section 1 Sorting Concepts**

[**http://bigocheatsheet.com/**](http://bigocheatsheet.com/)

Learning Objectives

* Insertion Sort
* Comparison-based sorting
* Inversion (sorting attribute)

**Guided Learning Task**

Implement Insertion Sort with comparator

Insertion Sort Analysis Calculate the Inversion

**Lab 1 Practical**

Compute the number of distinct values in array of N integers.

**Section 2 Breaking the Quadratic time barrier**

Learning Objectives

* Shell Sort
* Increment sequence
* Heap Sort

**Guided Learning Task**

Implement Shell Sort

Implement Heap Sort

**Section 3 Recursive Sorting Algorithms**

Learning Objectives

* Quicksort
* MergeSort

**Guided Learning Task**

Implement Quicksort

Implement MergeSort

**Lab 2 Practical**

Optimise subsequences

**Section 4 Radix sort**

Learning Objective

* Radix sort

**Guided Learning Task**

Implement Radix sort

**Lab 3 Practical**

Radix sort string arrays