**Project Computational Algorithms**

**Introduction of Sorting Algorithms**

Sorting Algorithms are importing steps of many computational algorithms for instance in computer graphics, phone books, web searches like Google, bank transaction etc. The sorting algorithms puts elements of a list’s/array’s or collections in a certain order. Sorting algorithm has pre-defined ordering rules. The most frequently used orders are numerical and lexicographic order. The numerical order is a mathematical order and the lexicographic order is an alphabetical order. Many computational tasks are simplified by pre-sorting data’s in advance e.g. find duplicate data’s, find the frequency of data, find the maximum ,minimum and median values of a data set etc. A collection of data deemed to be sorted when the data are less or equal to his successor. The output of the sorted data is the reordering, but retaining all the originally elements of the input also called permutation. Duplicate data’s must be in a contiguous order no other element can be between them. Many sorting algorithms comparing items in a collection. If the items are numerical values it can be sorted by less or greater than the previous numerical value. If the items are lexicographic values the items can be sorted by the string characters. To sort lexicographic values, the ASCII character table can be used. The comparison sorting algorithms determine which item or element of two items should appear first. The comparisons algorithms are the most widely used sorting algorithms. Many of the well know sorting algorithms like Bubble Sort, Insertion Sort, Selection Sort, Merge Sort, Quick Sort

and Heap Sort are comparisons based. In analysing comparison algorithms a very important result is that no comparison algorithm can do better than n (linear) or log n (logarithm) performance in the best, average and worst case scenario. Under some special condition it is possible to design different type of non-comparison algorithms what can have better time worst case scenarios. Some examples would be Counting Sort, Radix Sort and Bucket Sort algorithm.

The output is a [permutation](https://en.wikipedia.org/wiki/Permutation) (a reordering, yet retaining all of the original elements) of the input

[1],[2].

**References**

[1] Lecturer notes

[2] https://en.wikipedia.org/wiki/Sorting\_algorithm