What?

Algorithms that place items in a list in a certain order.

Why important?

Used extensively in other more complicated algorithms, like searching.

Provide a good introduction to important concepts in computer science.

Classification

TODO

## Simple sorts

Only efficient on small datasets

Insertion sort

More efficient than selection sort since only a partial scan of the dataset is required.

Selection sort

## Efficient sorts

Merge sort

Heap sort

Quick sort

## Bubble sort and variants

Generally only presented for educational purposes.

Simple but very inefficient.

Bubble sort

## Distribution sort

An algorithm which distributes inputs into multiple intermediate data structures

Intermediate structures are then gathered and placed on the output

Good for solving problems where input size is too large to be handled on a single machine

Can be considered for external sorting

External sort

Used to handle huge amounts of data

External refers to the use of data storage outside of main memory

Counting sort

Useful when each input is known to belong to a particular set of possibilities.

To be efficient, the set of possibilities must be small.

Bucket sort

Divide and conquer algorithm

Generalizes counting sort.

Partitions input set into a finite number of buckets.

Each bucket is then sorted individually by either applying a different sorting algorithm or recursively applying bucket sort.

Works best when input set is evenly distributed across buckets

Stable sort

A sort in which the order of input elements that are compared as equal will have their relative order with relation to each other maintained in the output

Non-divide and conquer

Quadratic

Insertion sort

Bubble sort

Selection sort

Divide and conquer

Merge sort

Growth rate is n \* log(n), which is much less expensive than quadratic simpler algorithms

Bucket sort

Quicksort

Terms

Computational Complexity - Classification related to the complexity / difficulty of solving a problem.