Monday 8th November 2021

Sorting Algorithms

Order of Sorting

When sorting data with a bubble sort, it can be sorted into two orders: descending (5,4,3,2,1) or ascending (1,2,3,4,5).

How a Bubble Sort works

1. The 1st and 2nd numbers in the list are examined. If they are not in the correct order, they are swapped.
2. The 2nd and 3rd numbers are examined. They are swapped if necessary
3. This repeats until it reaches the end of the list. Completing the pass
4. More passes until the list is fully sorted

Chart, scatter chart

Description automatically generated

Merge Sort

A Merge Sort breaks a list into each of its component parts, and then rebuilds it in the correct order.

Text

Description automatically generated with medium confidence

Efficiency - Searching

|  |  |  |
| --- | --- | --- |
|  | Linear Search | Binary Search |
| Best Case | Search term is at the start of the list | Search term is the first median item |
| Worst Case | Search term is at the end of the list | Search term is the last median item |
| Good for | Unsorted list  Short list  List that is not searched often | Long list  List which is searched often |
| Advantages | Simple algorithm | Breaks the list down into smaller parts  Executes quickly |
| Disadvantages | Brute force | List must already be sorted  Complex algorithm |

Efficiency - Searching

|  |  |  |
| --- | --- | --- |
|  | Bubble Sort | Merge Sort |
| Best Case | Already Sorted list – only one pass needed | Search term is the first median item |
| Worst Case | Reverse sorted list – one full pass needed for each item |  |
| Good for | List with fewer items | List with more items |
| Advantages | Simple algorithm  No extra storage needed for copies of data | Breaks the list down into smaller parts  Longer lists only add a small amount of extra execution time |
| Disadvantages | Brute force  Longer lists take much longer to sort | Uses additional memory for copies of the list  Data must be split, even in short lists  Complex algorithm |