Lesson 40: Sorting Routines

What is sorting?

Sorting simply means **arranging items in ascending or descending order**. Two types of approaches to sorting are described here:

1. The **incremental** approach
2. The **divide-and-conquer** approach (typically uses recursion)

Of the two, divide-and-conquer is by far the **fastest** (in most cases)…but also the most complicated.

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Big O Summary

It will probably be easier to learn the Big O designation for each sorting and search routine when simultaneously viewing all of them in a table:

Sorts	**Best Case**	**Average Case**	**Worst Case**
Bubble Sort	O(n)	$O(n^2)$	$O(n^2)$
Selection Sort	$O(n^2)$	$O(n^2)$	$O(n^2)$
Insertion Sort	O(n)	$O(n^2)$	$O(n^2)$
Quick Sort	O(n log n)	O(n log n)	$O(n^2)$
Merge Sort	O(n log n)	O(n log n)	O(n log n)
Radix Sort	O(n log n)	O(n log n)	O(n log n)
Searches			
Linear or Sequential	O(1)	O(n)	O(n)
Binary	O(1)	O(log n)	O(log n)
Binary Search Tree	O(1)	O(log n)	O(n)

Occasionally, “best case” is referred to as the **most restrictive** or **fastest executing** case. Similarly, “worst case” is referred to as the **least restrictive** or **slowest executing** case.