

RECURSION

1. When a function calls itself
2. A base case is necessary to establish as it is the point at which the recursion knows to 'go back up' the chain.

GRAPHS

1. A network of nodes
2. Different from a tree in that a tree goes 'one way' (parent to child). Graphs can go 'to and from'.
3. Example graph: LinkedIn network

Data Structure	Index	Search	Add-R	Add-L	Pop-L	Pop-R
Python List (Array)	$O(1)$	$O(n)$	$O(1)$	$O(n)$	$O(n)$	$O(1)$
Linked List	$O(n)$	$O(n)$	$O(1)$	$O(1)$	$O(1)$	$O(n)$
Doubly-Linked List	$O(n)$	$O(n)$	$O(1)$	$O(1)$	$O(1)$	$O(1)$
Queue (as Array)	X	X	$O(1)$	X	$O(n)$	X
Queue (as LL or DLL)	X	X	$O(1)$	X	$O(1)$	X
Stack (as Array, LL, or DLL)	X	X	$O(1)$	X	X	$O(1)$
Deque (as DLL)	X	X	$O(1)$	$O(1)$	$O(1)$	$O(1)$

Data Structure	Get	Add	Delete	Iterate	Memory
Dictionary (Hash Map)	$O(1)$	$O(1)$	$O(1)$	$O(n)$	medium
Set (Hash Map)	$O(1)$	$O(1)$	$O(1)$	$O(n)$	medium
Binary Search Tree	$O(\log n)$	$O(\log n)$	$O(\log n)$	$O(n)$	low
Tree	$O(n)$	$O(n)$	$O(n)$	$O(n)$	low

Bubble Sort

At every iteration the highest value bubbles to the top

Merge Sort

Take two sorted lists and merge them together. If the lists aren't pre-sorted, use merge sort to sort them.

Quick Sort

Randomly select a pivot. Compare all items in a list to the pivot, put in left bucket if lower, right if higher. Insert the pivot in the middle.