



Data Structure Operation

	Time Complexity				Space Complexity			
	Average		Worst		Worst		Worst	
	Access	Search	Insertion	Deletion	Access	Search	Insertion	Deletion
Array	Θ(1)	Θ(n)	Θ(n)	Θ(n)	Θ(1)	Θ(n)	Θ(n)	Θ(n)
Stack	Θ(n)	Θ(n)	Θ(1)	Θ(1)	Θ(n)	Θ(n)	Θ(1)	Θ(n)
Queue	Θ(n)	Θ(n)	Θ(1)	Θ(1)	Θ(n)	Θ(n)	Θ(1)	Θ(n)
Singly-Linked List	Θ(n)	Θ(n)	Θ(1)	Θ(1)	Θ(n)	Θ(n)	Θ(1)	Θ(n)
Doubly-Linked List	Θ(n)	Θ(n)	Θ(1)	Θ(1)	Θ(n)	Θ(n)	Θ(1)	Θ(n)
Skip List	Θ(log(n))	Θ(log(n))	Θ(log(n))	Θ(log(n))	Θ(n)	Θ(n)	Θ(n)	Θ(n log(n))
Hash Table	N/A	Θ(1)	Θ(1)	Θ(1)	N/A	Θ(n)	Θ(n)	Θ(n)
Binary Search Tree	Θ(log(n))	Θ(log(n))	Θ(log(n))	Θ(log(n))	Θ(n)	Θ(n)	Θ(n)	Θ(n)
Cartesian Tree	Θ(log(n))	Θ(log(n))	Θ(log(n))	Θ(log(n))	N/A	Θ(n)	Θ(n)	Θ(n)
B-Tree	N/A	Θ(log(n))	Θ(log(n))	Θ(log(n))	Θ(log(n))	Θ(log(n))	Θ(log(n))	Θ(n)
Red-Black Tree	Θ(log(n))	Θ(log(n))	Θ(log(n))	Θ(log(n))	Θ(log(n))	Θ(log(n))	Θ(log(n))	Θ(n)
Splay Tree	N/A	Θ(log(n))	Θ(log(n))	Θ(log(n))	N/A	Θ(log(n))	Θ(log(n))	Θ(n)
AVL Tree	Θ(log(n))	Θ(log(n))	Θ(log(n))	Θ(log(n))	Θ(log(n))	Θ(log(n))	Θ(log(n))	Θ(n)
KD Tree	Θ(log(n))	Θ(log(n))	Θ(log(n))	Θ(log(n))	Θ(n)	Θ(n)	Θ(n)	Θ(n)

Array Sorting Algorithms

	Time Complexity				Space Complexity			
	Best		Average		Worst		Worst	
	Access	Search	Insertion	Deletion	Access	Search	Insertion	Deletion
Quicksort	Θ(n log(n))	Θ(n log(n))	Θ(n log(n))	Θ(n log(n))	Θ(n log(n))	Θ(n log(n))	Θ(n log(n))	Θ(n log(n))
Mergesort	Θ(n log(n))	Θ(n log(n))	Θ(n log(n))	Θ(n log(n))	Θ(n log(n))	Θ(n log(n))	Θ(n log(n))	Θ(n log(n))
Timsort	Θ(n)	Θ(n)	Θ(n log(n))	Θ(n log(n))	Θ(n)	Θ(n log(n))	Θ(n log(n))	Θ(n)
Heapsort	Θ(n log(n))	Θ(n log(n))	Θ(n log(n))	Θ(n log(n))	Θ(n log(n))	Θ(n log(n))	Θ(n log(n))	Θ(n log(n))
Bubble Sort	Θ(n)	Θ(n)	Θ(n^2)	Θ(n^2)	Θ(n)	Θ(n^2)	Θ(n^2)	Θ(n)
Insertion Sort	Θ(n)	Θ(n)	Θ(n^2)	Θ(n^2)	Θ(n)	Θ(n^2)	Θ(n^2)	Θ(n)
Selection Sort	Θ(n^2)	Θ(n^2)	Θ(n^2)	Θ(n^2)	Θ(n^2)	Θ(n^2)	Θ(n^2)	Θ(n^2)
Tree Sort	Θ(n log(n))	Θ(n log(n))	Θ(n^2)	Θ(n^2)	Θ(n log(n))	Θ(n log(n))	Θ(n^2)	Θ(n log(n))
Shell Sort	Θ(n log(n))	Θ(n log(n))	Θ(n log(n))^2	Θ(n log(n))^2	Θ(n log(n))	Θ(n log(n))	Θ(n log(n))	Θ(n log(n))
Bucket Sort	Θ(n+k)	Θ(n+k)	Θ(n+k)	Θ(n+k)	Θ(n+k)	Θ(n+k)	Θ(n+k)	Θ(n+k)
Radix Sort	Θ(n+k)	Θ(n+k)	Θ(n+k)	Θ(n+k)	Θ(n+k)	Θ(n+k)	Θ(n+k)	Θ(n+k)
Counting Sort	Θ(n+k)	Θ(n+k)	Θ(n+k)	Θ(n+k)	Θ(n+k)	Θ(n+k)	Θ(n+k)	Θ(n+k)
Cubesort	Θ(n)	Θ(n)	Θ(n log(n))	Θ(n log(n))	Θ(n)	Θ(n log(n))	Θ(n log(n))	Θ(n log(n))