

Popular Asysmtotic Analysis

Legend

 Excellent  Fair  Horrible

DATA STRUCTURES									
DS Name	Time Complexity								Space Complexity
	Average				Worst				Worst
	Indexing	Search	Insertion	Deletion	Indexing	Search	Insertion	Deletion	
Array	$\Theta(1)$	$\Theta(n)$	$\Theta(n)$	$\Theta(n)$	$\Theta(1)$	$\Theta(n)$	$\Theta(n)$	$\Theta(n)$	$\Theta(n)$
Stack	$\Theta(n)$	$\Theta(n)$	$\Theta(1)$	$\Theta(1)$	$\Theta(n)$	$\Theta(n)$	$\Theta(1)$	$\Theta(1)$	$\Theta(n)$
Queue	$\Theta(n)$	$\Theta(n)$	$\Theta(1)$	$\Theta(1)$	$\Theta(n)$	$\Theta(n)$	$\Theta(1)$	$\Theta(1)$	$\Theta(n)$
SinglyLinked List	$\Theta(n)$	$\Theta(n)$	$\Theta(1)$	$\Theta(1)$	$\Theta(n)$	$\Theta(n)$	$\Theta(1)$	$\Theta(1)$	$\Theta(n)$
DoublyLinked List	$\Theta(n)$	$\Theta(n)$	$\Theta(1)$	$\Theta(1)$	$\Theta(n)$	$\Theta(n)$	$\Theta(1)$	$\Theta(1)$	$\Theta(n)$
Skip List	$\Theta(\log(n))$	$\Theta(\log(n))$	$\Theta(\log(n))$	$\Theta(\log(n))$	$\Theta(n)$	$\Theta(n)$	$\Theta(n)$	$\Theta(n)$	$\Theta(n \log(n))$
Hash Table	-	$\Theta(1)$	$\Theta(1)$	$\Theta(1)$	-	$\Theta(n)$	$\Theta(n)$	$\Theta(n)$	$\Theta(n)$
Binary Search tree	$\Theta(\log(n))$	$\Theta(\log(n))$	$\Theta(\log(n))$	$\Theta(\log(n))$	$\Theta(n)$	$\Theta(n)$	$\Theta(n)$	$\Theta(n)$	$\Theta(n)$
RedBlack tree	$\Theta(\log(n))$	$\Theta(\log(n))$	$\Theta(\log(n))$	$\Theta(\log(n))$	$\Theta(\log(n))$	$\Theta(\log(n))$	$\Theta(\log(n))$	$\Theta(\log(n))$	$\Theta(n)$
AVL tree	$\Theta(\log(n))$	$\Theta(\log(n))$	$\Theta(\log(n))$	$\Theta(\log(n))$	$\Theta(\log(n))$	$\Theta(\log(n))$	$\Theta(\log(n))$	$\Theta(\log(n))$	$\Theta(n)$
KD tree	$\Theta(\log(n))$	$\Theta(\log(n))$	$\Theta(\log(n))$	$\Theta(\log(n))$	$\Theta(n)$	$\Theta(n)$	$\Theta(n)$	$\Theta(n)$	$\Theta(n)$

*Ref: hackerearth.com, bigocheatsheet.com

SEARCHING ALGORITHMS

Algorithm	Data Structure	Time Complexity		Space Complexity
		Average	Worst	Worst
Depth First Search (DFS)	Graph of $ V $ vertices and $ E $ edges	-	$O(E + V)$	$O(V)$
Breadth First Search (BFS)	Graph of $ V $ vertices and $ E $ edges	-	$O(E + V)$	$O(V)$
Binary Search	Sorted Array of n elements	$O(\log(n))$	$O(\log(n))$	$O(1)$
Linear(Brute Force)	Array	$O(n)$	$O(n)$	$O(1)$
Shortest path by Dijkstra using a min-heap as priority queue	Graph of $ V $ vertices and $ E $ edges	$O((E + V)\log V)$	$O((E + V)\log V)$	$O(V)$
Shortest path by Dijkstra using an unsorted array as priority queue	Graph of $ V $ vertices and $ E $ edges	$O(V ^2)$	$O(V ^2)$	$O(V)$
Shortest path by bellman-ford	Graph of $ V $ vertices and $ E $ edges	$O(V E)$	$O(V E)$	$O(V)$
*Ref: hackerearth.com				

SORTING ALGORITHMS					
Algorithm	Data Structure	Time Complexity			Space Complexity
		Best	Average	Worst	Worst
Quicksort	Array	$O(n \log(n))$	$O(n \log(n))$	$O(n^2)$	$O(n)$
Mergesort	Array	$O(n \log(n))$	$O(n \log(n))$	$O(n \log(n))$	$O(n)$
Heapsort	Array	$O(n \log(n))$	$O(n \log(n))$	$O(n \log(n))$	$O(1)$
Bubble sort	Array	$O(n)$	$O(n^2)$	$O(n^2)$	$O(1)$
Insertion sort	Array	$O(n)$	$O(n^2)$	$O(n^2)$	$O(1)$
Select sort	Array	$O(n^2)$	$O(n^2)$	$O(n^2)$	$O(1)$
Bucket sort	Array	$O(n+k)$	$O(n+k)$	$O(n^2)$	$O(nk)$
Radix sort	Array	$O(nk)$	$O(nk)$	$O(nk)$	$O(n+k)$
*Ref: hackerearth.com					