

Good

Fair

Poor

Searching

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 with $ V $ vertices and $ E $ edges	$O((V + E) \log V)$	$O((V + E) \log V)$	$O(V)$
Shortest path by Dijkstra, using an unsorted array as priority queue	Graph with $ V $ vertices and $ E $ edges	$O(V ^2)$	$O(V ^2)$	$O(V)$
Shortest path by Bellman-Ford	Graph with $ V $ vertices and $ E $ edges	$O(V E)$	$O(V E)$	$O(V)$

Sorting

Algorithm	Data Structure	Time Complexity			Worst Case Auxiliary 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	$O(nk)$	$O(nk)$	$O(nk)$	$O(nk)$

Graphs

Node / Edge Management	Storage	Add Vertex	Add Edge	Remove Vertex	Remove Edge	Query
Adjacency list	$O(V + E)$	$O(1)$	$O(1)$	$O(V + E)$	$O(E)$	$O(V)$
Incidence list	$O(V + E)$	$O(1)$	$O(1)$	$O(E)$	$O(E)$	$O(E)$
Adjacency matrix	$O(V ^2)$	$O(V ^2)$	$O(1)$	$O(V ^2)$	$O(1)$	$O(1)$
Incidence matrix	$O(V \cdot E)$	$O(V \cdot E)$	$O(V \cdot E)$	$O(V \cdot E)$	$O(V \cdot E)$	$O(E)$

Notation for asymptotic growth

letter	bound	growth
(theta) Θ	upper and lower, tight ^[1]	equal ^[2]
(big-oh) O	upper, tightness unknown	less than or equal ^[3]
(small-oh) o	upper, not tight	less than
(big omega) Ω	lower, tightness unknown	greater than or equal
(small omega) ω	lower, not tight	greater than

