

Big-O CheatSheet

	Best	Average	Worst	Space Comp
Quick sort	$\Omega(n \log n)$	$\Theta(n \log n)$	$O(n^2)$	$O(\log n)$
Merge sort	$\Omega(n \log n)$	$\Theta(n \log n)$	$O(n \log n)$	$O(n)$
Bubble sort	$\Omega(n)$	$\Theta(n^2)$	$O(n^2)$	$O(1)$
Insertion Sort	$\Omega(n)$	$\Theta(n^2)$	$O(n^2)$	$O(1)$
Selection Sort	$\Omega(n^2)$	$\Theta(n^2)$	$O(n^2)$	$O(1)$

Graph Ops

	Remove Edge	Storage	Add Vertex	Add Edge	Remove vertex	Query
Adj List	$O(\Delta E)$	$O(V + E)$	$O(1)$	$O(1)$	$O(V + E)$	$O(V)$
Incidence List	$O(E)$	$O(V + E)$	$O(1)$	$O(1)$	$O(E)$	$O(E)$
Adjacency Matrix	$O(1)$	$O(V ^2)$	$O(V ^2)$	$O(1)$	$O(V ^2)$	$O(1)$

Data Structures

	Average			Worst				
	Access	Search	Insert	Delete	Access	Search	Insert	Del
Singly Linked List	$O(n)$	$O(n)$	$O(1)$	$O(1)$	$O(n)$	$O(n)$	$O(1)$	$O(1)$
Doubly Linked List	$O(n)$	$O(n)$	$O(1)$	$O(1)$	$O(n)$	$O(n)$	$O(1)$	$O(1)$
BST	$O(\log n)$	$O(\log n)$	$O(\log n)$	$O(\log n)$	$O(n)$	$O(n)$	$O(n)$	$O(n)$

* Sparse graph → use adj list

* Dense graph → use adj matrix ($O(|V| + |E|)$)

DFS → $(O(V+E))$ time, $O(V)$ space $\uparrow V^2$

BFS → $O(V+E)$ time