

Sorting

Algorithm	Best Case	Average Case	Worst Case	Space Complexity	Stable
Bubble sort	$O(n^2)$	$O(n^2)$	$O(n^2)$	$O(1)$	Yes
Selection sort	$O(n^2)$	$O(n^2)$	$O(n^2)$	$O(1)$	No
Insertion sort	$O(n)$	$O(n^2)$	$O(n^2)$	$O(1)$	Yes
Merge sort	$O(n \log n)$	$O(n \log n)$	$O(n \log n)$	$O(n)$	Yes
Quick sort	$O(n \log n)$	$O(n \log n)$	$O(n^2)$	$O(1)$ / $O(\log n)$ for stack	No
Radix sort	$O(n+k)$	$O(nk)$	$O(nk)$	$O(n+k)$	Yes
Heap sort	$O(n \log n)$	$O(n \log n)$	$O(n \log n)$	$O(1)$	No
Bucket sort	$O(n+k)$	$O(n+k)$	$O(n^2)$	$O(n+k)$	Depends on underlying sort
Count sort	$O(n+\text{maximum})$	$O(n+\text{maximum})$	$O(n+\text{maximum})$	$O(\text{maximum})$	Both versions exist

Searching

Algorithm	Best Case	Average Case	Worst Case	Space Complexity	Approach
Linear search	$O(1)$	$O(n)$	$O(n)$	$O(1)$	Brute Force
Binary search	$O(1)$	$O(\log n)$	$O(\log n)$	$O(1)$	Divide and Conquer
Jump search	$O(1)$	$O(\sqrt{n})$	$O(\sqrt{n})$	$O(1)$	Divide and Conquer

Graphs

Algorithm	Time Complexity	Space Complexity	Approach
DFS	$O(V+E)$	$O(V)$	Backtracking
BFS	$O(V+E)$	$O(V)$	-
Topological sort	$O(V+E)$	$O(V)$	Backtracking
Kruskal's	$O(E \log E)$	$O(V)$	Greedy
Prim's	$O(V^2)/O(E \log V)/O(V \log V)$	$O(V)$	Greedy
Dijkstra's	$O(V^2)/O(E \log V)/O(V \log V)$	$O(V)$	Greedy
Bellman Ford	$O(V^2)$	$O(V)$	Dynamic
Floyd Warshall	$O(V^3)$	$O(V^2)$	Dynamic

Greedy

Algorithm	Time Complexity	Space Complexity
Activity Selection	$O(n)$	$O(1)$
Job Sequencing	$O(\text{jobs} \times \text{time})$	$O(\text{time})$
Huffman Encoding	$O(n \log n)$	$O(n)$
Fractional Knapsack	$O(n \log n)$	$O(1)$ / $O(n)$ if we store v/w in an array

Dynamic

Algorithm	Time Complexity	Space Complexity
0/1 Knapsack	$O(n^2)$	$O(n^2)$
Matrix Multiplication	$O(n^3)$	$O(n^2)$
LCS	$O(n^2)$	$O(n^2)$
Fibonacci	$O(n)$	$O(n)$

String matching

Algorithm	Time Complexity	Preprocessing	Matching	Space Complexity
Naive	$O(n^2)$	$O(1)$	$O(n^2)$	$O(1)$
Rabin Karp	$O(n+m)$	$O(n+m)$	$O(n+m)$	$O(1)$
Knuth Morris Pratt	$O(n+m)$	$O(m)$	$O(n+m)$	$O(m)$