搜索

| **算法** | **数据结构** | **时间复杂度** | | **空间复杂度** | | |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | **平均** | **最差** | **最差** |  |  |
| [深度优先搜索 (DFS)](http://en.wikipedia.org/wiki/Depth-first_search) | Graph of |V| vertices and |E| edges | - | O(|E| + |V|) | O(|V|) |  |  |
| [广度优先搜索 (BFS)](http://en.wikipedia.org/wiki/Breadth-first_search) | Graph of |V| vertices and |E| edges | - | O(|E| + |V|) | O(|V|) |  |  |
| [二分查找](http://en.wikipedia.org/wiki/Binary_search_algorithm) | Sorted array of n elements | O(log(n)) | O(log(n)) | O(1) |  |  |
| [穷举](http://en.wikipedia.org/wiki/Brute-force_search)查找 | Array | O(n) | O(n) | O(1) |  |  |
| [最短路径-Dijkstra，用小根堆作为优先队列](http://en.wikipedia.org/wiki/Dijkstra'%20rel=) | Graph with |V| vertices and |E| edges | O((|V| + |E|) log |V|) | O((|V| + |E|) log |V|) | O(|V|) |  |  |
| [最短路径-Dijkstra，用无序数组作为优先队列](http://en.wikipedia.org/wiki/Dijkstra'%20rel=) | Graph with |V| vertices and |E| edges | O(|V|^2) | O(|V|^2) | O(|V|) |  |  |
| [最短路径-Bellman-Ford](http://en.wikipedia.org/wiki/Bellman%E2%80%93Ford_algorithm) | Graph with |V| vertices and |E| edges | O(|V||E|) | O(|V||E|) | O(|V|) |  |  |

排序

| **算法** | **数据结构** | **时间复杂度** | | | **最坏情况下的辅助空间复杂度** | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **最佳** | **平均** | **最差** | **最差** |  |  |
| [快速排序](http://en.wikipedia.org/wiki/Quicksort) | 数组 | O(n log(n)) | O(n log(n)) | O(n^2) | O(n) |  |  |
| [归并排序](http://en.wikipedia.org/wiki/Merge_sort) | 数组 | O(n log(n)) | O(n log(n)) | O(n log(n)) | O(n) |  |  |
| [堆排序](http://en.wikipedia.org/wiki/Heapsort) | 数组 | O(n log(n)) | O(n log(n)) | O(n log(n)) | O(1) |  |  |
| [冒泡排序](http://en.wikipedia.org/wiki/Bubble_sort) | 数组 | O(n) | O(n^2) | O(n^2) | O(1) |  |  |
| [插入排序](http://en.wikipedia.org/wiki/Insertion_sort) | 数组 | O(n) | O(n^2) | O(n^2) | O(1) |  |  |
| [选择排序](http://en.wikipedia.org/wiki/Selection_sort) | 数组 | O(n^2) | O(n^2) | O(n^2) | O(1) |  |  |
| [桶排序](http://en.wikipedia.org/wiki/Bucket_sort) | 数组 | O(n+k) | O(n+k) | O(n^2) | O(nk) |  |  |
| [基数排序](http://en.wikipedia.org/wiki/Radix_sort) | 数组 | O(nk) | O(nk) | O(nk) | O(n+k) |  |  |

数据结构

| **数据结构** | **时间复杂度** | | | | | | | | **空间复杂度** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **平均** | | | | **最差** | | | | **最差** |
|  | **索引** | **查找** | **插入** | **删除** | **索引** | **查找** | **插入** | **删除** |  |
| [基本数组](http://en.wikipedia.org/wiki/Array_data_structure) | O(1) | O(n) | - | - | O(1) | O(n) | - | - | O(n) |
| [动态数组](http://en.wikipedia.org/wiki/Dynamic_array) | O(1) | O(n) | O(n) | O(n) | O(1) | O(n) | O(n) | O(n) | O(n) |
| [单链表](http://en.wikipedia.org/wiki/Singly_linked_list#Singly_linked_lists) | O(n) | O(n) | O(1) | O(1) | O(n) | O(n) | O(1) | O(1) | O(n) |
| [双链表](http://en.wikipedia.org/wiki/Doubly_linked_list) | O(n) | O(n) | O(1) | O(1) | O(n) | O(n) | O(1) | O(1) | O(n) |
| [跳表](http://en.wikipedia.org/wiki/Skip_list) | O(log(n)) | O(log(n)) | O(log(n)) | O(log(n)) | O(n) | O(n) | O(n) | O(n) | O(n log(n)) |
| [哈希表](http://en.wikipedia.org/wiki/Hash_table) | - | O(1) | O(1) | O(1) | - | O(n) | O(n) | O(n) | O(n) |
| [二叉搜索树](http://en.wikipedia.org/wiki/Binary_search_tree) | O(log(n)) | O(log(n)) | O(log(n)) | O(log(n)) | O(n) | O(n) | O(n) | O(n) | O(n) |
| [笛卡尔树](https://en.wikipedia.org/wiki/Cartesian_tree) | - | O(log(n)) | O(log(n)) | O(log(n)) | - | O(n) | O(n) | O(n) | O(n) |
| [B-树](http://en.wikipedia.org/wiki/B_tree) | O(log(n)) | O(log(n)) | O(log(n)) | O(log(n)) | O(log(n)) | O(log(n)) | O(log(n)) | O(log(n)) | O(n) |
| [红黑树](http://en.wikipedia.org/wiki/Red-black_tree) | O(log(n)) | O(log(n)) | O(log(n)) | O(log(n)) | O(log(n)) | O(log(n)) | O(log(n)) | O(log(n)) | O(n) |
| [伸展树](https://en.wikipedia.org/wiki/Splay_tree) | - | O(log(n)) | O(log(n)) | O(log(n)) | - | O(log(n)) | O(log(n)) | O(log(n)) | O(n) |
| [AVL 树](http://en.wikipedia.org/wiki/AVL_tree) | O(log(n)) | O(log(n)) | O(log(n)) | O(log(n)) | O(log(n)) | O(log(n)) | O(log(n)) | O(log(n)) | O(n) |

堆

| **Heaps** | **时间复杂度** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **建堆** | **查找最大值** | **提取最大值** | **Increase Key** | **插入** | **删除** | **合并** |  |
| [链表（已排序）](http://en.wikipedia.org/wiki/Linked_list) | - | O(1) | O(1) | O(n) | O(n) | O(1) | O(m+n) |  |
| [链表（未排序）](http://en.wikipedia.org/wiki/Linked_list) | - | O(n) | O(n) | O(1) | O(1) | O(1) | O(1) |  |
| [二叉堆](http://en.wikipedia.org/wiki/Binary_heap) | O(n) | O(1) | O(log(n)) | O(log(n)) | O(log(n)) | O(log(n)) | O(m+n) |  |
| [二项堆](http://en.wikipedia.org/wiki/Binomial_heap) | - | O(log(n)) | O(log(n)) | O(log(n)) | O(log(n)) | O(log(n)) | O(log(n)) |  |
| [斐波那契堆](http://en.wikipedia.org/wiki/Fibonacci_heap) | - | O(1) | O(log(n))\* | O(1)\* | O(1) | O(log(n))\* | O(1) |  |

图

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **节点 / 边 管理** | **Storage** | **Add Vertex** | **Add Edge** | **Remove Vertex** | **Remove Edge** | **Query** |
| [邻接表](http://en.wikipedia.org/wiki/Adjacency_list) | O(|V|+|E|) | O(1) | O(1) | O(|V| + |E|) | O(|E|) | O(|V|) |
| [关联表](http://en.wikipedia.org/wiki/Incidence_list) | O(|V|+|E|) | O(1) | O(1) | O(|E|) | O(|E|) | O(|E|) |
| [邻接矩阵](http://en.wikipedia.org/wiki/Adjacency_matrix) | O(|V|^2) | O(|V|^2) | O(1) | O(|V|^2) | O(1) | O(1) |
| [关联矩阵](http://en.wikipedia.org/wiki/Incidence_matrix) | O(|V| ⋅ |E|) | O(|V| ⋅ |E|) | O(|V| ⋅ |E|) | O(|V| ⋅ |E|) | O(|V| ⋅ |E|) | O(|E|) |