

Summary Tables

These are all the tables summarizing the comparisons between different data structures and algorithms covered in this course.

Access and Modification Characteristics

	get/set	add/remove
Arrays	$O(1)$	$O(1 + \min(i, n-i))$
LinkedList	$O(1 + \min(i, n-i))$	$O(1)*$
Skiplist	$O(\log n)$	$O(\log n)$

*given a pointer to the location, else traversal is necessary

Binary Search Tree Implementations

	find()	add()	remove()
BST	$O(n)$	$O(n)$	$O(n)$
RBST / Treaps	$O(\log n)$ [expected]	$O(\log n)$ [expected]	$O(\log n)$ [expected]
Scapegoat Trees	$O(\log n)$ [amortized]	$O(\log n)$ [amortized]	$O(\log n)$ [amortized]
2-4 / RedBlack Trees	$O(\log n)$ [worst-case]	$O(\log n)$ [worst-case]	$O(\log n)$ [worst-case]

Sorted Set Implementations

Runtime

Skiplists	$O(\log n)$ [expected]
Treaps	$O(\log n)$ [expected]
Scapegoat Trees	$O(\log n)$ [amortized]
2-4 / RedBlack Trees	$O(\log n)$ [worst-case]

Comparison-based Algorithms

	Comparisons	In-place	Stable
Merge Sort	$n \bullet \log(n)$ [worst-case]	no	yes
Heap Sort	$1.38n \bullet \log(n) + O(n)$ [expected]	yes	no
Quick Sort	$2n \bullet \log(n) + O(n)$ [worst-case]	yes	no