

19.9 Big O Summary for This Chapter's Searching and Sorting Algorithms

Figure 19.7 summarizes the searching and sorting algorithms covered in this chapter with the Big O for each. Figure 19.8 lists the Big O values we've covered in this chapter along with a number of values for n to highlight the differences in the growth rates.

Algorithm	Location	Big O
<i>Searching Algorithms:</i>		
Linear search	<u>Section 19.2</u>	$O(n)$
Binary search	<u>Section 19.4</u>	$O(\log n)$
Recursive linear search	<u>Exercise 19.8</u>	$O(n)$
Recursive binary search	<u>Exercise 19.9</u>	$O(\log n)$
<i>Sorting Algorithms:</i>		
Selection sort	<u>Section 19.6</u>	$O(n^2)$
Insertion sort	<u>Section 19.7</u>	$O(n^2)$
Merge sort	<u>Section 19.8</u>	$O(n \log n)$
Bubble sort	<u>Exercises 19.5 and 19.6</u>	$O(n^2)$

Fig. 19.7

Searching and sorting algorithms with Big O values.

$n =$	$O(\log n)$	$O(n)$	$O(n \log n)$	$O(n^2)$
1	0	1	0	1
2	1	2	2	4
3	1	3	3	9
4	1	4	4	16
5	1	5	5	25
10	1	10	10	100
100	2	100	200	10,000
1000	3	1000	3000	10^6
1,000,000	6	1,000,000	6,000,000	10^{12}
1,000,000,000	9	1,000,000,000	9,000,000,000	10^{18}

Fig. 19.8

Number of comparisons for common Big O notations.