## Laufzeit Vergleich Sort

Algorithmus	Best Case	Average Case	Worst Case	Space	Stable?
Insertion Sort	$\Theta(n)$	$\Theta(n^2)$	$\Theta(n^2)$	O(1)	✓ Yes
Selection Sort	$\Theta(n^2)$	$\Theta(n^2)$	$\Theta(n^2)$	O(1)	<b>X</b> No
<b>Bubble Sort</b>	$\Theta(n)$	$\Theta(n^2)$	$\Theta(n^2)$	O(1)	√ Yes
Merge Sort	$\Theta(n \log n)$	$\Theta(n \log n)$	$\Theta(n \log n)$	O(n)	√ Yes
Quick Sort	$\Theta(n \log n)$	$\Theta(n \log n)$	$\Theta(n^2)$	$O(\log n)$	X No (depends on partition)
Heap Sort	$\Theta(n \log n)$	$\Theta(n \log n)$	$\Theta(n \log n)$	O(1)	<b>X</b> No
Counting Sort	$\Theta(n+k)$	$\Theta(n+k)$	$\Theta(n+k)$	O(n+k)	√ Yes
Radix Sort	$\Theta(d(n+k))$	$\Theta(d(n+k))$	$\Theta(d(n+k))$	O(n+k)	√ Yes
Bucket Sort	$\Theta(n+k)$	$\Theta(n+k)$ (depends on distribution)	$\Theta(n^2)$	O(n)	<b>V</b> Yes

## 📌 记忆要点:

- 比较类排序(Insertion, Selection, Bubble, Merge, Quick, Heap): 下界  $\Omega(n \log n)$ (比较树理论)。
- 非比较类排序(Counting, Radix, Bucket): 利用键的结构(数字范围、位数), 可以打破  $n\log n$  下界。