MLDS 422 - Intro to Python
Lab 2

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Today's Lab Materials

- Search and sort algorithms
  - Backgrounds
  - Implementation Details
  - Time Complexities
- Homework 2
  - Timeit

Search Algorithms

- Sequential
- Binary

Sequential Search Algorithm

- Check one element at a time

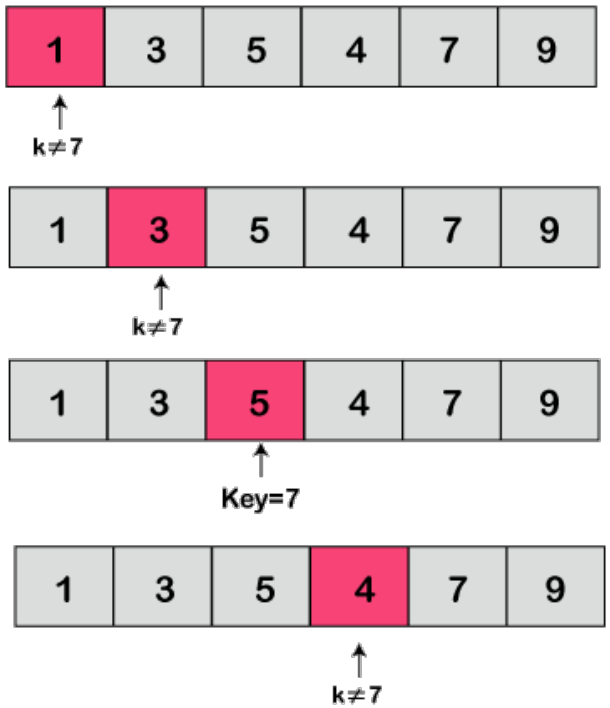

Figure: Linear Search Algorithm
https://www.javatpoint.com/linear-search-in-python

Binary Search Algorithm

- Successively divide into sublists

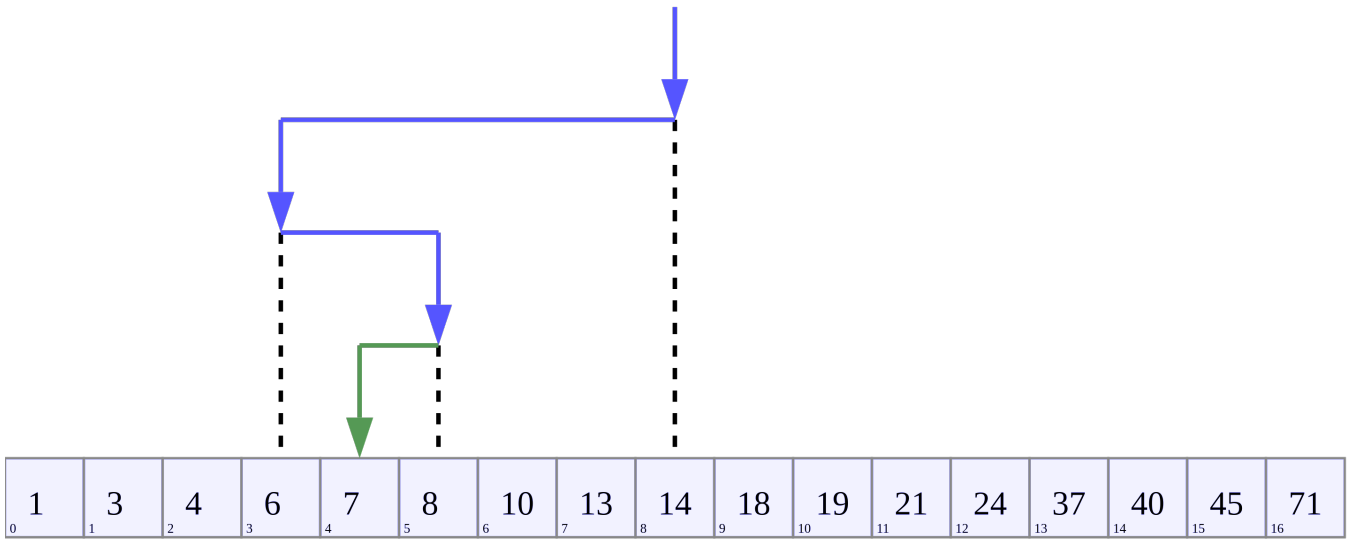

Figure: Binary Search Algorithm
https://en.wikipedia.org/wiki/Binary_search_algorithm

Time Complexities of Search Algorithms

	Best Case	Worst Case	Average Case
Item present (Sequential)	1	n	$\frac{n}{2}$
Item not present (Sequential)	n	n	n
Binary	1	log2(n)	log2(n)

Table: Time Complexities of Search Algorithms

Time Complexities of Search Algorithms

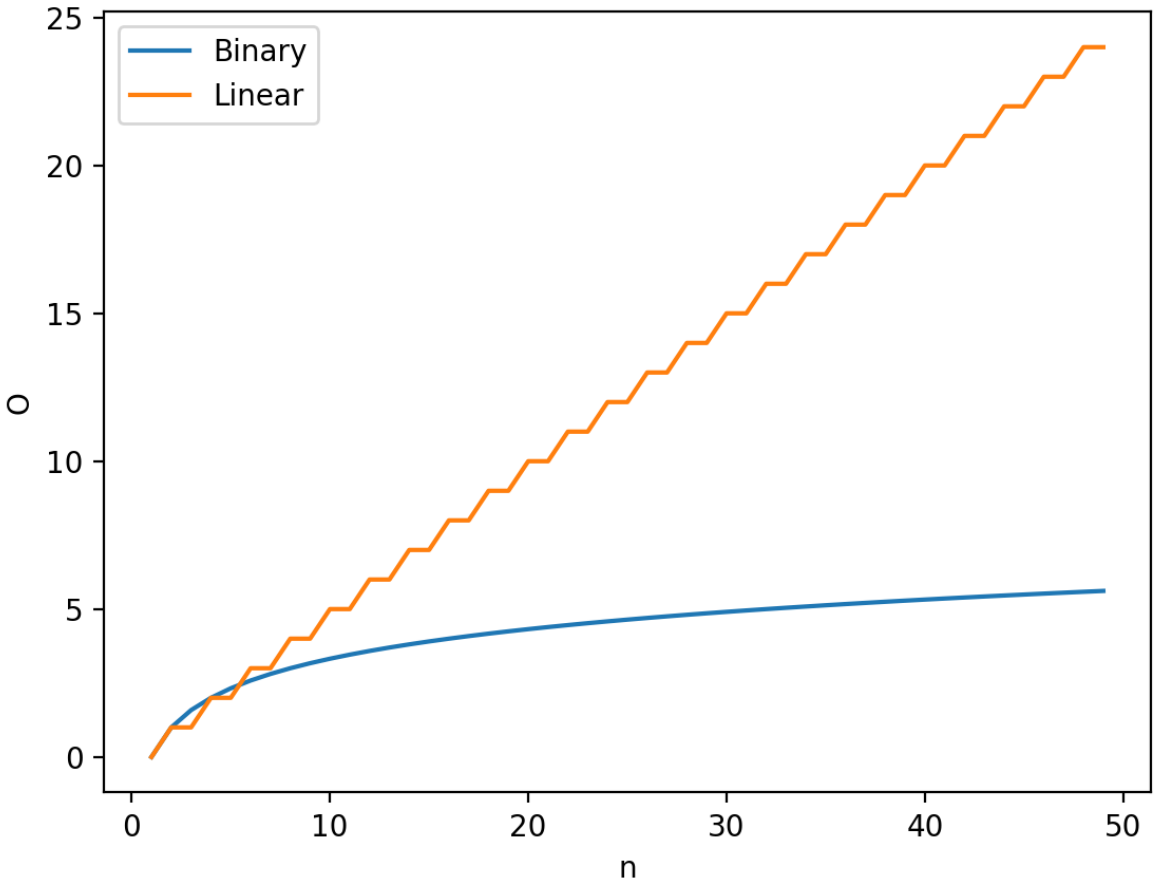

Figure: Time Complexities of Search Algorithms

Sort Algorithms

- Bubblesort
- Mergesort

Bubble Sort Algorithm

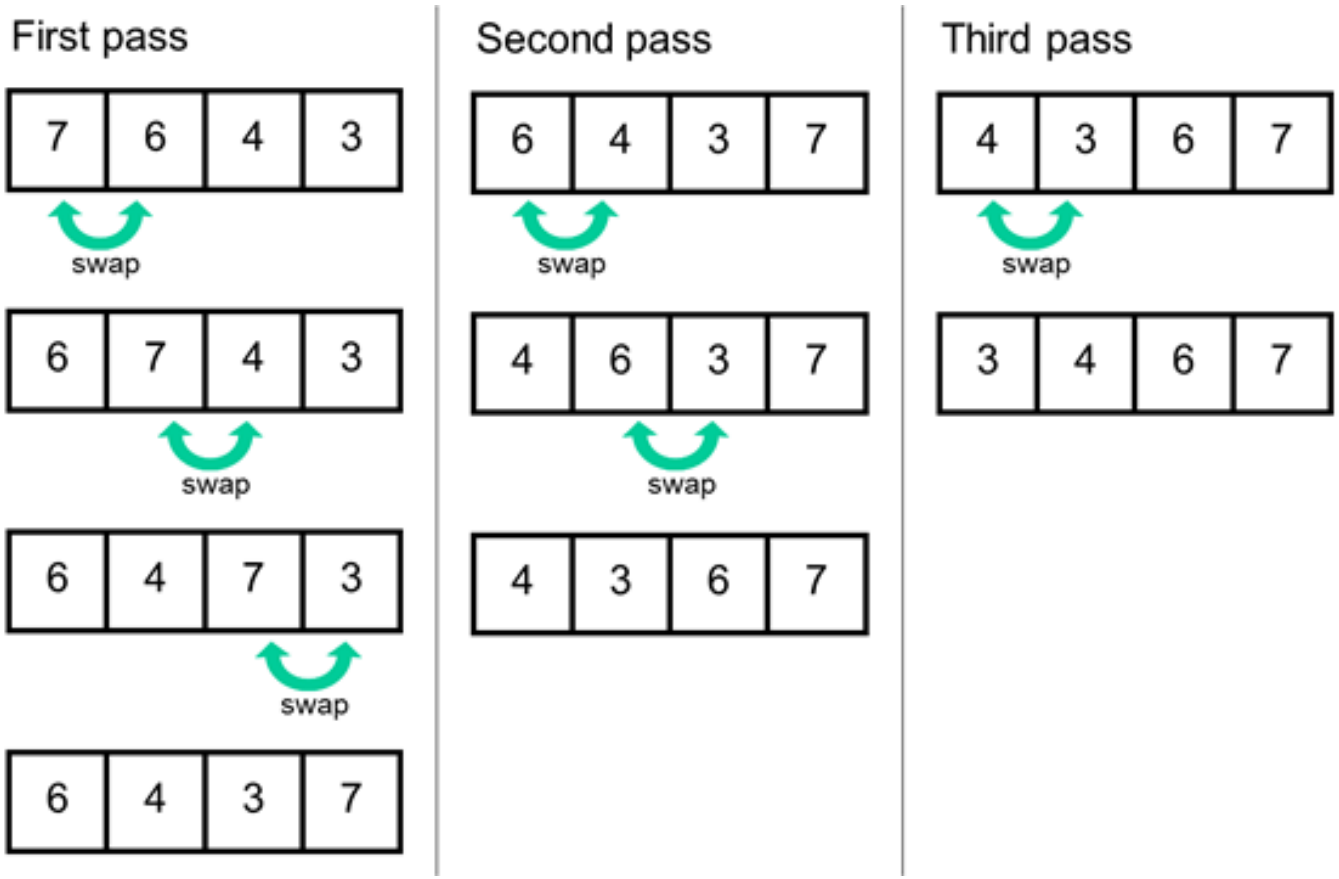

Figure: Bubble Sort Algorithm https://www.computersciencebytes.com/sorting-algorithms/bubble-sort/

Merge Sort Algorithm

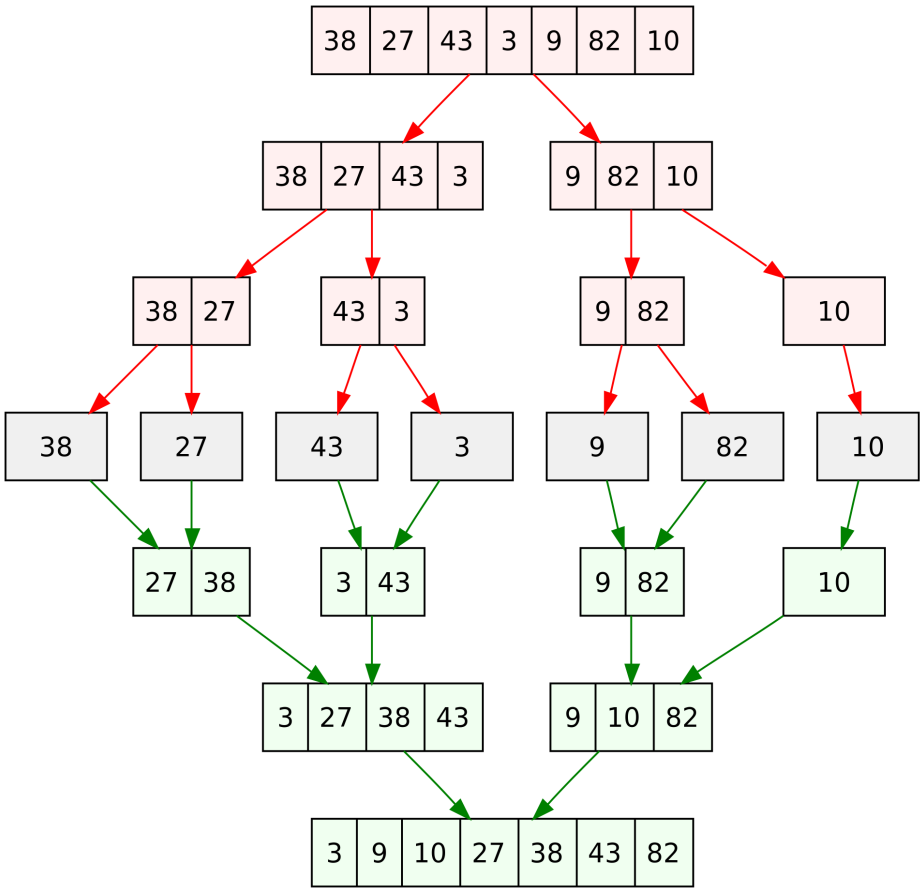

Figure: Merge Sort Algorithm
https://en.wikipedia.org/wiki/Merge_sort

Time Complexities of Sort Algorithms

	Best Case	Worst Case	Average Case
Bubble	n	n^2	n^2
Merge	nlog2(n)	nlog2(n)	nlog2(n)

Table: Time Complexities of Sort Algorithms

Time Complexities of Sort Algorithms

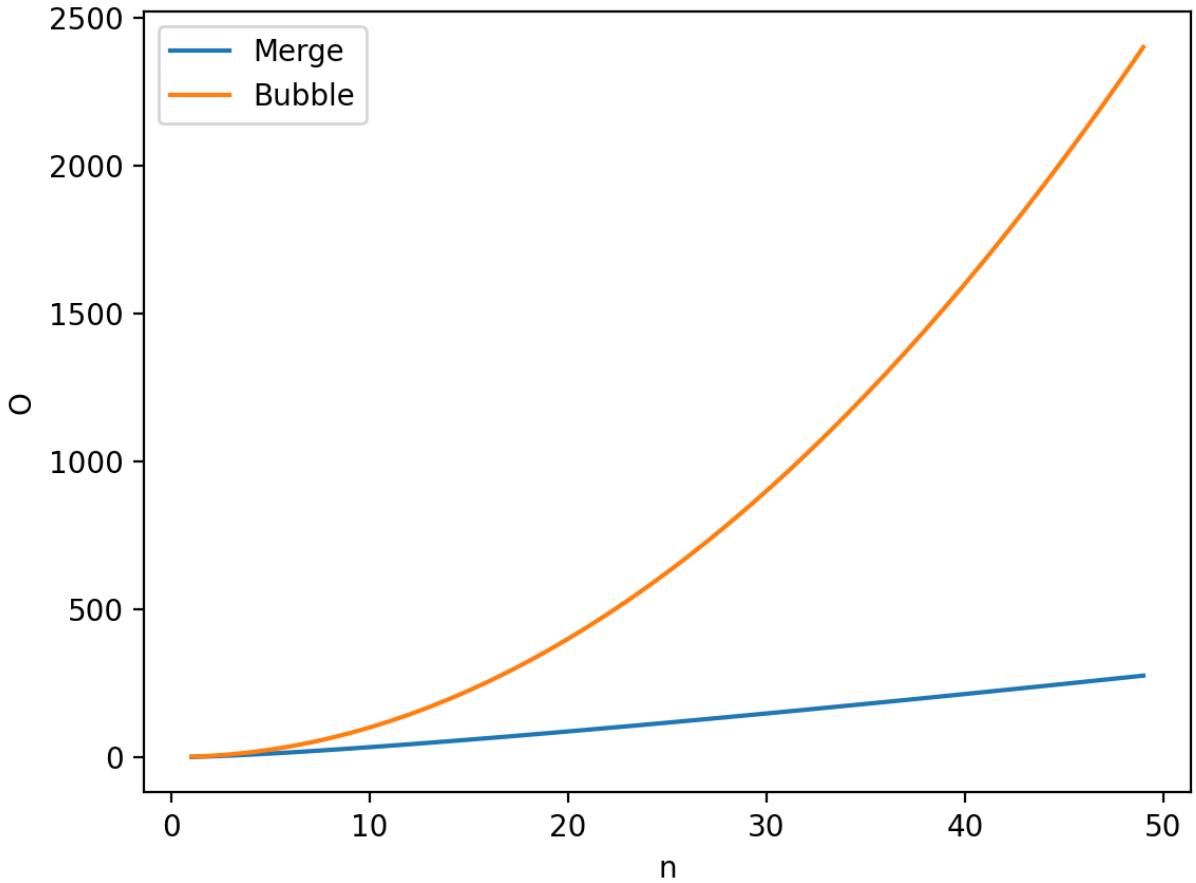

Figure: Time Complexities of Sort Algorithms