



Data Structures

Data structures are formats used for storing, retrieving, organizing and processing data. There are different types suited for different objectives. They can be thought of as building blocks for applications, as they are a collection of data, their relationships, functions and organizations. Data structures provide a framework for information of data.

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Why learn Data Structures?

Simply because it is the core of computer science.

- DSA is the **main** ingredient of algorithmic thinking, and logical capabilities in any field.
- It **improves the processing power** of the systems due to the **effective utilization** of the stored data.
- Data structures bring together the data elements and provide a model for how they must be **organized, used and shared.**

Let's start!

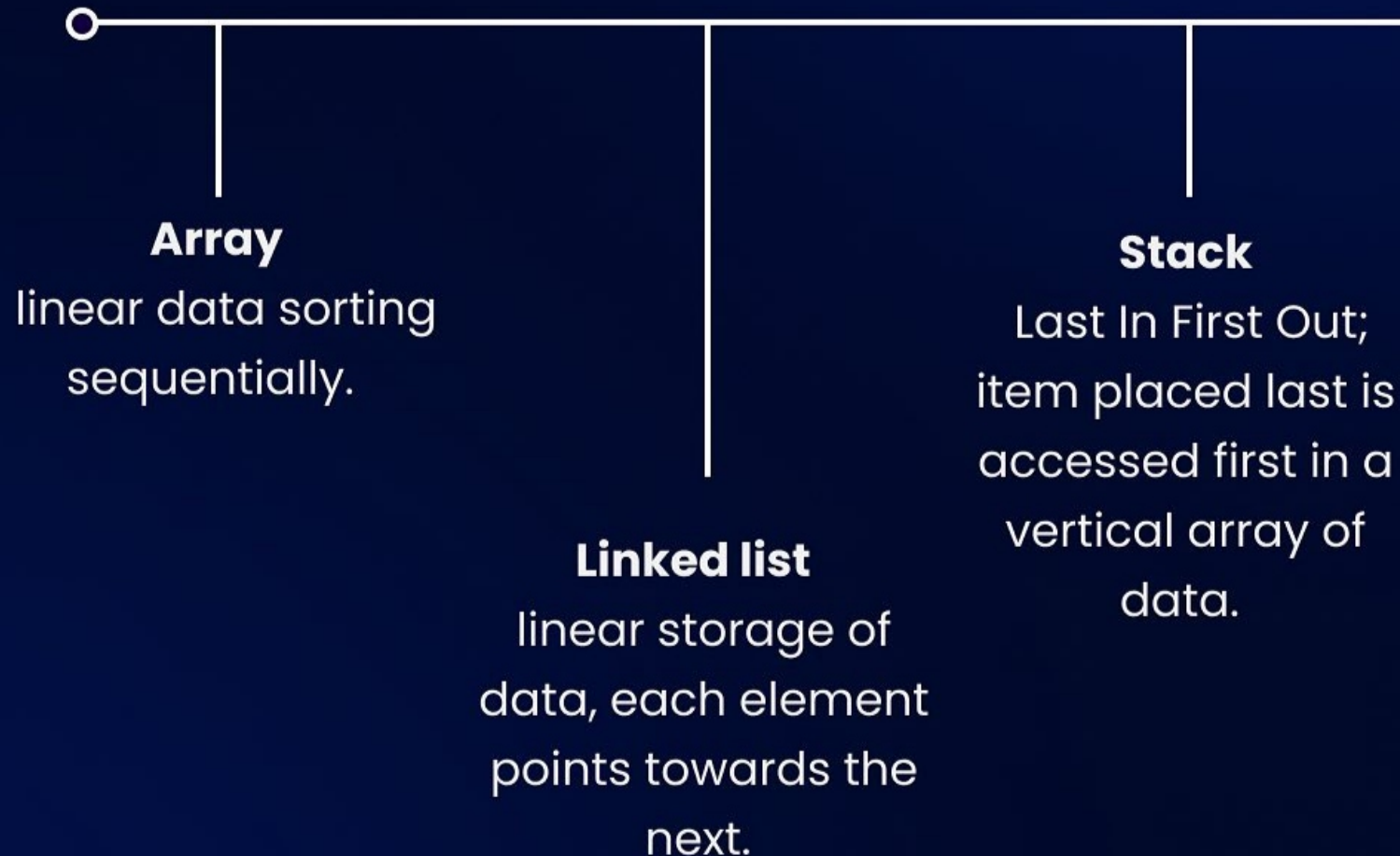
Pick a language: You can go ahead with your favourite one. If you're starting, C/C++ is the way, otherwise, you can try Java too.

Go through all the fundamentals, data structures, algorithms, OS, networking, design patterns.

Study programming languages you're comfortable with and solve at least 50 easy problems on leetcode. Increase the difficulty as you go.



Types of Data Structures



Types of Data Structures

Queue

First In First Out;
item placed first is
accessed first in a
vertical array of
data.

Tree

Non-linear DS
that stores data
in a hierarchical
manner, i.e., at
levels.

Graph

Stores data in a
non-hierarchical
manner, like a
network of nodes.

Types of Data Structures

Trie/Tree

stores strings as data elements organized in a visual graph

Hash table

stores a collection of items in an array that plots keys to values.

Heap

Tree-based structure where parent nodes' key value $>$ any of its children's key values.



Say Hi to Algorithms

An algorithm is a sequence of instructions that can be followed by machines, which when written in a programming language becomes a code.

Your fundamental algorithms look something like this:

- — **Searching Algorithm**—Linear search, Binary search
- **Sorting Algorithm**—Bubble sort, Quick sort, Merge sort, Selection sort, Insertion sort

Types of Algorithms



Recursive

Divide and Conquer Algorithm

Dynamic Programming

Greedy Algorithm

Brute Force Algorithm

Backtracking



Algorithms you must know!



Have a good grasp on these



Tower of Hanoi

Huffman Coding & Dijkstra's algorithm

Travelling salesman problem

N Queens Problem

Dial algorithm

Bit masking

Coin change problem



Resources



YouTube:

Data Structures Easy to Advanced Course by
[freeCodeCamp.org](https://www.freecodecamp.org)

Data Structures & Algorithms Tutorial by codebasics
[LeetCode.com](https://leetcode.com)

Coursera:

Algorithms part
Algorithms part 2

Data Structures on GeeksforGeeks

InterviewBit

