

Introduction to Data Structures and Algorithms (DSA).

Data Structures:

Arrays:

- Contiguous memory allocation.
- Access elements using indices.
- $O(1)$ time complexity for random access.

Linked Lists:

- Dynamic data structure.
- Nodes connected by pointers.
- Singly and doubly linked lists circular linked list.

Stacks:

- LIFO (Last In, First Out) structure.
- Used for function call management and parsing expressions.

Queues:

- FIFO (First In, First Out) structure.
- Used in scheduling, printing, and breadth-first search.

Trees:

- Hierarchical data structure.
- Binary trees, AVL trees, etc.
- Useful in hierarchical relationships.

Graphs:

- Nodes and edges representation.
- Directed and undirected graphs.
- Traversal algorithms: DFS, BFS.