What is a Linked List?

A linked list is a linear data structure that consists of a series of nodes connected by pointers. Each node contains data and a reference to the next node in the list. Unlike arrays, linked lists allow for efficient insertion or removal of elements from any position in the list, as the nodes are not stored contiguously in memory. [(1)](https://www.geeksforgeeks.org/data-structures/linked-list/)

Linked Lists vs Arrays:

|  |  |  |
| --- | --- | --- |
| Data Structure | Non-contiguous | Contiguous |
| Memory Allocation | Dynamic | Static |
| Insertion | Efficient | Inefficient |
| Access | Sequential | Random |

Types of Linked List:

1. Singly Linked List
2. Doubly Linked List
3. Circular Linked List
4. Circular Doubly Linked List
5. Header Linked List

Operations of Linked Lists:

* Linked List Insertion
* Search an element in a Linked List (Iterative and Recursive)
* Find Length of a Linked List (Iterative and Recursive)
* Reverse a linked list
* Linked List Deletion (Deleting a given key)
* Linked List Deletion (Deleting a key at given position)
* Write a function to delete a Linked List
* Write a function to get Nth node in a Linked List
* Nth node from the end of a Linked List

Linked List Applications:

* Implementing stacks and queues using linked lists.
* Using linked lists to handle collisions in hash tables.
* Representing graphs using linked lists.
* Allocating and deallocating memory dynamically.

A singly linked list's structure is illustrated in the diagram below:

