

### Experiment 3

Aim: Write a program to implement following operations on singly linked list.

1. create
2. Insert beginning
3. Insert end
4. Delete beginning
5. Delete end
6. display

Lab outcome:

Implement linear data structure & be able to handle operations like insertion, deletion and display operations

Practice Questions.

Q1. Difference bet<sup>n</sup> array/Linked list.

Parameter	Array	Linked list
memory allocation	static memory allocation	Dynamic memory allocation (Heap)
Allocation	Contiguous	Random
Types	1D/2D/3D	singly/Doubly/circular
Access	Random access of element available	To get element, traverse whole list

Q2. Advantages and disadvantages of singly linked list.

Advantages.

- 1. It is a dynamic data structure which can grow & shrink while program is running.
- 2. Other data structures like stacks and queues can also be implemented using linked list.
- 3. Backtracking is possible.

Disadvantages.

- 1. In linked list pointer needs extra memory.
- 2. In linked list, random access is not provided. & user has to traverse whole list or each node in sequential manner.
- 3. Linked nodes are not at contiguous memory locations. Hence access time of individual node is  $O(n)$ .
- 4. Linked list has heap memory restriction.

Q3. Applications of linked list.

- 1. Maintenance of block directory.
- 2. Performing arithmetic operation on long integers.
- 3. Representation of sparse matrices.
- 4. Manipulation of polynomial by storing constants in each node.