Week 5	Linear (arrays) Vs. nonlinear (pointer) structures – Run time and Space requirements, when to use what? Introduction to Linked Lists, Examples: Image Viewer, Music Player etc., Applications.

Linked List

- **A Linked List data structure contains a collection of nodes, each of which contains data and at least one link to another node.**
- A linked list is a linked structure in which the nodes are connected in sequence.
- The last node in the list, commonly called the **tail node**, is indicated by a null link reference.
- The First node in the list commonly called as the **head node, or head reference**.
- A linked list can also be empty, which is indicated when the head reference is null.
- **There are two types of Linked List:**
    1. **Singly Linked List**
    2. **Doubly Linked List**

Examples of Linked List:

1. **Image Viewer:** Previous and next images can be accesses by implementing image viewer using Linked List Data Structure.
2. **Music Player:** Songs in music player are linked to previous and next song so music player can have implemented using Linked List Data Structure.
3. **Previous and Next Pages in web browser:** We can access previous and next pages of website by clicking on Prev and Next button, which can be implemented using Linked List Data Structure.

Applications of Linked List

1. Implementation of Stack and Queue Data Structures
2. Implementation of Graphs
3. Dynamic Memory Allocation
4. Maintaining of directory of names
5. Performing arithmetic operations on long integers
6. Manipulation of Polynomials
7. To represent sparse matrices