📘 Queue – Data Structure

🔹 Definition:

A **Queue** is a **linear data structure** that follows the **FIFO (First In First Out)** principle.
This means the element inserted **first** will be removed **first**.

🔹 Key Characteristics:

- **Insertion** happens at the **rear (end)**.
- **Deletion** happens from the **front (beginning)**.
- It is a **linear structure**, just like a line of people.

🔹 Queue Operations:

1. **Enqueue:** Add an element to the rear.
2. **Dequeue:** Remove an element from the front.
3. **Front():** Get the front element without removing it.
4. **Rear():** Get the last element.
5. **isEmpty():** Check if the queue is empty.
6. **isFull():** Check if the queue is full (only in array-based implementation).

🔹 Types of Queues:

1. **Simple Queue** – Standard FIFO queue.
2. **Circular Queue** – The last position is connected to the first to save space.

3. **Priority Queue** – Elements are served based on priority, not just order.
4. **Deque (Double Ended Queue)** – Insertion and deletion can happen from both ends.

🔹 **Implementation:**

- Using **Array**
- Using **Linked List**
- Using **Two Stacks** (for special logic)

🔹 **Real-life Examples:**

- Queue at a ticket counter
- Print job scheduling
- Call center phone queues
- Operating system task scheduling