

Session – 8

Queue





CONTENTS

1. Introduction to Queue
2. Operation on Queue
3. Types of Queue
4. Applications of Queue
5. Queue Vs Stack
6. Activity



01

Introduction to Queue

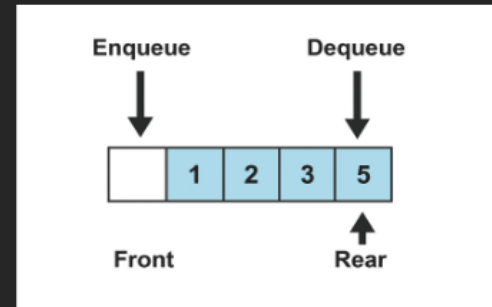


• Introduction to Queue

- A linear data structure that follows **FIFO (First In, First Out)**.
- Real-life analogy: Line at a ticket counter, queue of people.
- First inserted element is the first to be removed.

Queue Representation

- Array-based queue
- Linked list-based queue



02

Operations on Queue



• Operations on Queue

- Enqueue (Insert)
- Dequeue (Remove)
- Peek / Front
- isEmpty
- isFull (for fixed-size queues)



03

Types of Queue



• Types of Queue

1. Simple Queue (Linear Queue)
2. Circular Queue
3. Priority Queue
4. Deque (Double Ended Queue)



• Types of Queue

Circular Queue

- Solves problem of wasted space in linear queues.
- Circular link from rear to front.
- Front and Rear pointer logic explained.

Priority Queue

- Elements are dequeued based on priority, not insertion order.
- Use of heap internally (in Java: PriorityQueue class)

Deque (Double Ended Queue)

- Insert/Delete at both ends.
- Used in sliding window problems, palindrome check, etc.



04

Applications of Queue



• **Application of Queue**

1. **Job scheduling**
2. **Print queue**
3. **CPU task scheduling**
4. **BFS (Breadth-First Search) in graphs**
5. **Caching (FIFO cache)**
6. **Real-time data buffers (e.g., IO Buffers)**



05

Queue Vs Stack



• Queue Vs Stack

Feature	Queue (FIFO)	Stack (LIFO)
Insert	Rear	Top
Remove	Front	Top
Use case	Scheduling	Recursion



06

Activity



Activity

⌞/⌟ Design a Circular Queue

⌞/⌟ Sliding Window Maximum (Hard)

⌞/⌟ Implement Stack using queues

