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Doubly Linked List Operations

Patient Queue Management System - Data Structures

PROBLEM STATEMENT

Inefficient patient queuing in emergency wards causes **critical delays**. Static systems cannot dynamically handle **priority insertions** and removals without time-consuming data shuffling.

SOLUTION

Doubly Linked List enables O(1) priority insertions, bidirectional traversal, and efficient front/back operations—eliminating data shifting in emergency scenarios.

CORE OPERATIONS

Priority Insert	Std Insert	Delete
O(1)	O(1)	O(1)

KEY ADVANTAGES

- ✓ Bidirectional Access
- ✓ O(1) Insertions
- ✓ No Data Shifting
- ✓ Dynamic Memory
- ✓ Flexible Position
- ✓ Dual Pointers

Example 1: Insert 101, 102

Example 2: Priority Insert(200)

Example 3: Insert 150 at Position 2

Example 4: Delete from Front (Treated)

NODE STRUCTURE

```
Node {
  data: PatientID
  next: Node*
  prev: Node*
}
```