HOSPITAL ER QUEUE SYSTEM

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Problem Statement

A hospital needs to manage ER patients efficiently using a queue system that handles:

- Critical patients added at beginning
- Normal patients added at end
- Insert at specific positions
- Remove from beginning after treatment

Proposed Solution

Data Structure: Doubly Linked List

Each node has: Patient ID, prev pointer, next pointer

Why? Easy insertion/deletion from both ends and traversal in both directions.

Operations Trace

Step 1: insertAtEnd(101)

101

First patient

Step 2: insertAtEnd(102)

101 ⇄ 102

Step 3: insertAtBeginning(200)

200 ⇄ 101 ⇄ 102

Critical patient!

Step 4: insertAtPosition(150, 2)

200 ⇄ 150 ⇄ 101 ⇄ 102

Inserted at position 2

Step 5: deleteFromBeginning()

150 ⇄ 101 ⇄ 102

Patient 200 removed

Step 6: insertAtEnd(300) - FINAL

150 ⇄ 101 ⇄ 102 ⇄ 300

Head: 150 | Tail: 300

Final Answers

(a) Head Patient ID: **150**

(b) Tail Patient ID: **300**

(c) Forward: **150 ⇄ 101 ⇄ 102 ⇄ 300**

(d) Backward: **300 ⇄ 102 ⇄ 101 ⇄ 150**