CS23302 - Data Structures Lab

Lab 4

Date: 31.07.25

Observation Questions

1. *A class wants to maintain attendance for students who are added in real-time. Describe how you would use a **Singly Linked List** to model this system. What will be the structure of the node? Show how insertion and deletion would occur.*
   (Input: Roll numbers – 102, 105, 111)
2. Browsers allow moving forward and backward between visited pages. Explain how a **Doubly Linked List** would support this feature.
   Draw the DLL after visiting pages: ["google.com", "chat.openai.com", "stackoverflow.com"].
3. What is the difference between a singly linked list, doubly linked list, and circular linked list?
4. Draw the memory representation (nodes and links) of a doubly linked list containing 3 elements.
5. Manually convert the infix expression A + B * C - D / E ^ F to postfix. Explain each step using stack and operator precedence.

Execution Questions

1. A library system maintains a list of books currently issued. Create a SLL where each node contains: Book ID, Title.
   Implement:

   * Insertion at end (when new book is issued)
   * Deletion by Book ID (when returned)
     Input: Insert: (101, "DSA"), (102, "Python"), (103, "AI")
     Delete Book ID = 102
     Expected Output: List before and after deletion.

2. A text editor tracks user actions using a DLL. Implement a DLL where each node contains an action: "Insert A", "Delete B", etc.
   Add support for forward and backward traversal.
   Input: Insert → ["Insert A", "Insert B", "Delete A"]
   Show forward and reverse traversal.
3. Model a simple round-robin task scheduler using CLL. Each task has a Task ID. Traverse and simulate 3 rounds.
   Input: Task IDs = [201, 202, 203]
   Output: Circular traversal (201→202→203→201→...) with stop after 3 full cycles.
4. A calculator accepts expressions in infix format. Convert and evaluate the infix expression:
   3 + 4 * 2 / (1 - 5) ^ 2 ^ 3
   Expected Output: Postfix: 3 4 2 * 1 5 - 2 3 ^ ^ / +