

1. Insert a Node in a Sorted Doubly Linked List

Insert a new node in a sorted doubly linked list while keeping it sorted.

Example:

Input: $2 \rightleftarrows 4 \rightleftarrows 8 \rightleftarrows 10$, value = 6

Output: $2 \rightleftarrows 4 \rightleftarrows 6 \rightleftarrows 8 \rightleftarrows 10$

2. Delete All Occurrences of a Given Key

Delete every node that contains the given key.

Example:

Input: $1 \rightleftarrows 2 \rightleftarrows 2 \rightleftarrows 3 \rightleftarrows 4$, key = 2

Output: $1 \rightleftarrows 3 \rightleftarrows 4$

Hint: Carefully handle deletion at the head, middle, and tail nodes.

3. Find Pairs with a Given Sum

Find all pairs in a sorted doubly linked list whose sum equals a given number.

Example:

Input: $1 \rightleftarrows 2 \rightleftarrows 4 \rightleftarrows 5 \rightleftarrows 6 \rightleftarrows 8 \rightleftarrows 9$, sum = 7

Output: (1,6), (2,5)

Hint: Use two pointers: one from the start and one from the end. Move them based on the sum comparison.

4. Rotate Doubly Linked List by N Nodes

Rotate the list by `N` nodes from the beginning.

Example:

Input: `10 ⇌ 20 ⇌ 30 ⇌ 40 ⇌ 50`, `N = 2`

Output: `30 ⇌ 40 ⇌ 50 ⇌ 10 ⇌ 20`

Hint: Find the `N`th node, adjust `head` and `tail` pointers accordingly.

5. Merge Two Sorted Doubly Linked Lists

Merge two sorted DLLs into one sorted list (without creating new nodes).

Example:

Input: `List1 = 2 ⇌ 4 ⇌ 8`, `List2 = 1 ⇌ 3 ⇌ 5`

Output: `1 ⇌ 2 ⇌ 3 ⇌ 4 ⇌ 5 ⇌ 8`

Hint: Compare nodes from both lists one by one, adjusting `prev` and `next` pointers.

6. Convert Binary Tree to Doubly Linked List

Convert a binary tree into a doubly linked list using inorder traversal.

Example:

Binary Tree:



Doubly Linked List: $5 \rightleftharpoons 10 \rightleftharpoons 20$

7. Find Triplets with Given Sum in a Sorted Doubly Linked List

Find all triplets in a sorted doubly linked list that sum to a given value X .

Example:

Input: $1 \rightleftharpoons 2 \rightleftharpoons 4 \rightleftharpoons 5 \rightleftharpoons 6 \rightleftharpoons 8 \rightleftharpoons 9$, sum = 17

Output: (2, 6, 9) and (4, 5, 8)

8. Merge K Sorted Doubly Linked Lists

You are given K sorted doubly linked lists.

Merge them all into one sorted list in $O(N \log K)$ time.

Example: List1 = $1 \rightleftharpoons 4 \rightleftharpoons 5$, List2 = $1 \rightleftharpoons 3 \rightleftharpoons 4$, List3 = $2 \rightleftharpoons 6$

Output: $1 \rightleftharpoons 1 \rightleftharpoons 2 \rightleftharpoons 3 \rightleftharpoons 4 \rightleftharpoons 4 \rightleftharpoons 5 \rightleftharpoons 6$

9. Reverse Doubly Linked List in Groups of K

Reverse nodes of a doubly linked list in groups of size K .

Example:

Input: $1 \rightleftharpoons 2 \rightleftharpoons 3 \rightleftharpoons 4 \rightleftharpoons 5 \rightleftharpoons 6 \rightleftharpoons 7 \rightleftharpoons 8$, $K = 3$

Output: $3 \rightleftharpoons 2 \rightleftharpoons 1 \rightleftharpoons 6 \rightleftharpoons 5 \rightleftharpoons 4 \rightleftharpoons 7 \rightleftharpoons 8$

Hint: Reverse the first K nodes, then recursively call for the rest of the list. Reattach using the new head and tail pointers.

10. Split a Circular Doubly Linked List into Two Halves

Given a **circular DLL**, split it into two equal halves.

Example:

Input: $10 \rightleftharpoons 20 \rightleftharpoons 30 \rightleftharpoons 40 \rightleftharpoons 50 \rightleftharpoons (\text{back to } 10)$

Output: List1 = $10 \rightleftharpoons 20 \rightleftharpoons 30$, List2 = $40 \rightleftharpoons 50$