

Task 02:

Linked List Middle Element Search

You are given a singly linked list. Write a function to find the middle element without using any extra space and only one traversal through the linked list.

Program-:

```
package com.wipro.assignment;

public class LinkedList
{
    static class Node
    {
        int data;
        Node next;
        Node(int data)
        {
            this.data = data;
            this.next = null;
        }
    }
}
```

```
public static Node findMiddle(Node head)
{
    if (head == null)
    {
        return null;
    }
    Node slow = head;
    Node fast = head;
    while (fast != null && fast.next != null)
    {
        slow = slow.next;
        fast = fast.next.next;
    }
    return slow;
}

public static void main(String[] args)
{
    Node head = new Node(1);
    head.next = new Node(2);
    head.next.next = new Node(3);
}
```

```

Node middleNode = findMiddle(head);

if (middleNode != null)
{
    System.out.println("Middle element: " +
middleNode.data);
}
else
{
    System.out.println("List is empty");
}
}
}

```

Output:-

```

package com.wipro.assignment;
public class LinkedList
{
    static class Node
    {
        int data;
        Node next;
        Node(int data)
        {
            this.data = data;
            this.next = null;
        }
    }

    public static Node findMiddle(Node head)
    {
        if (head == null)
        {
            return null;
        }
        Node slow = head;
        Node fast = head;
        while (fast != null && fast.next != null)
        {
            slow = slow.next;
            fast = fast.next.next;
        }
        return slow;
    }

    public static void main(String[] args)
    {
        Node head = new Node(1);
        head.next = new Node(2);
        head.next.next = new Node(3);
        Node middleNode = findMiddle(head);
        if (middleNode != null)
        {
            System.out.println("Middle element: " + middleNode.data);
        }
        else
        {
            System.out.println("List is empty");
        }
    }
}

```

Console Output: Middle element: 2