Lesson 02 Demo 04

Implementing CRUD Operations on a Singly Linked List

Objective: To create a singly linked list in JavaScript with CRUD functionalities such as node addition, traversal, value modification, and node deletion to enhance your understanding of dynamic data structures

Tools required: Visual Studio Code (VS Code) and JavaScript

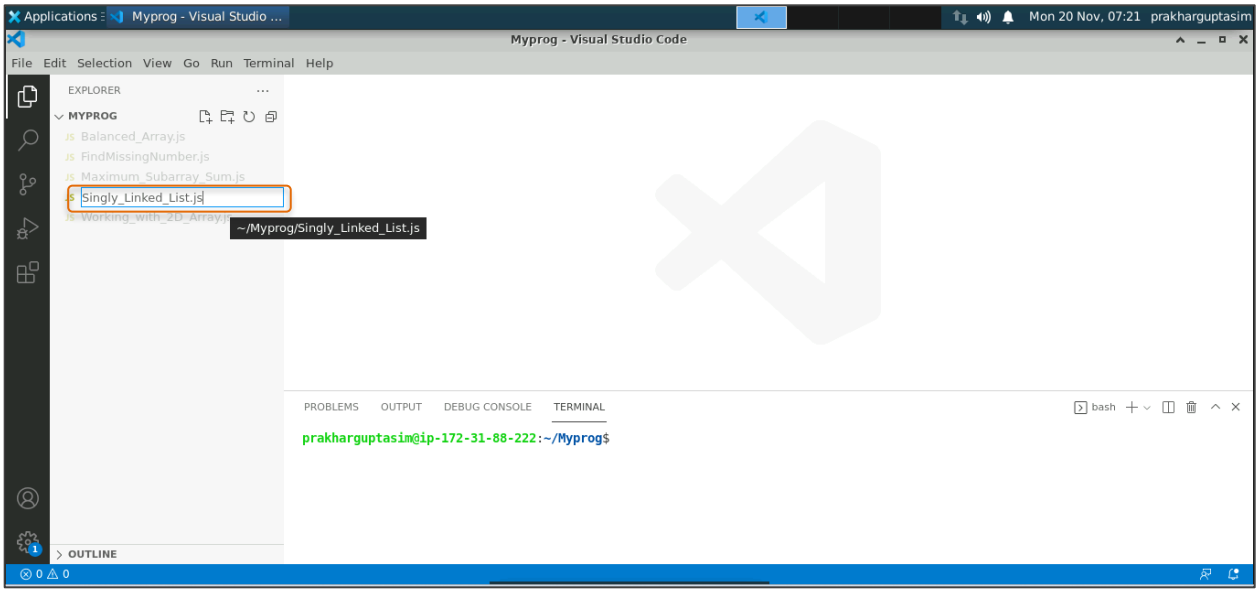
Prerequisites: Completion of Lesson 02 Demo 01

Steps to be followed:

1. Create a JavaScript file and execute it

Step 1: Create a JavaScript file and execute it

1.1 Open the Visual Studio Code editor and create a JavaScript file named **Singly_Linked_List.js**

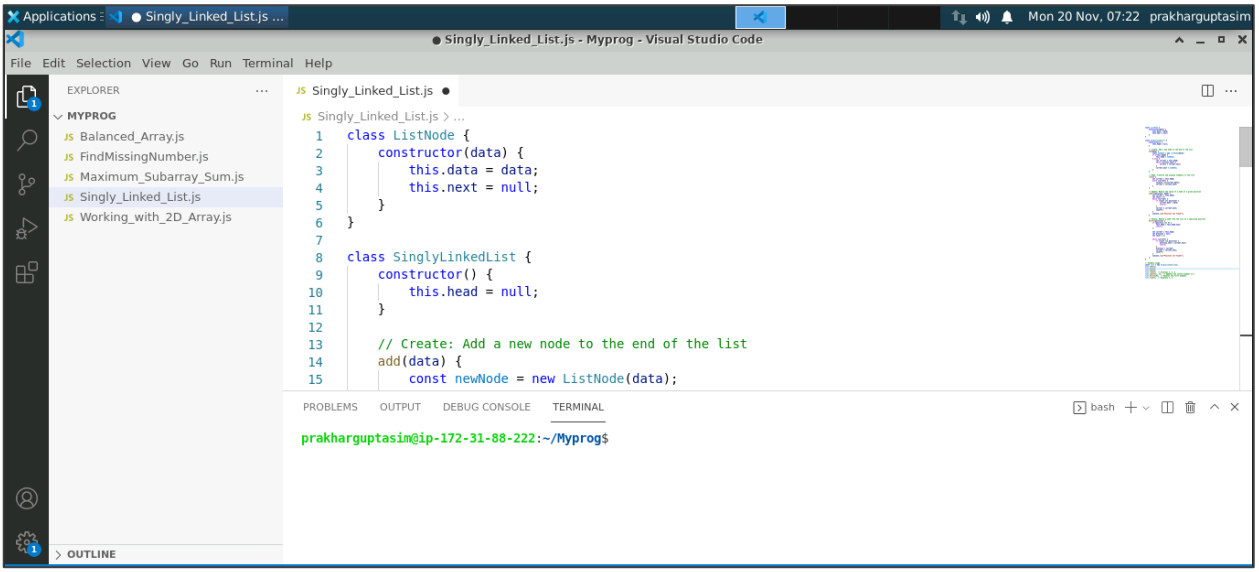


1.2 Add the following code to the file:

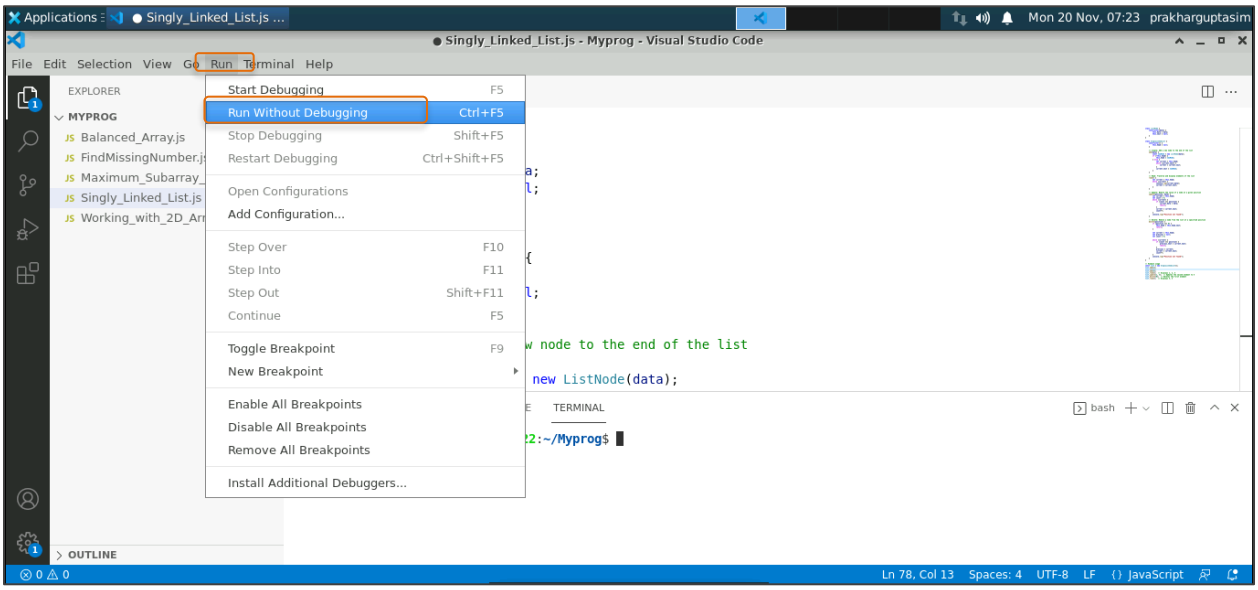
```
class ListNode {
  constructor(data) {
      this.data = data;
      this.next = null;
    }
}

class SinglyLinkedList {
    constructor() {
      this.head = null;
    }

// Create: Add a new node to the end of the list
    add(data) {
      const newNode = new ListNode(data);
      if (!this.head) {
        this.head = newNode;
      } else {
        let current = this.head;
        while (current.next) {
          current = current.next;
        }
        current.next = newNode;
      }
    }

    // Read: Traverse and display elements of the list
    read() {
      let current = this.head;
      while (current) {
        console.log(current.data);
        current = current.next;
      }
    }
```

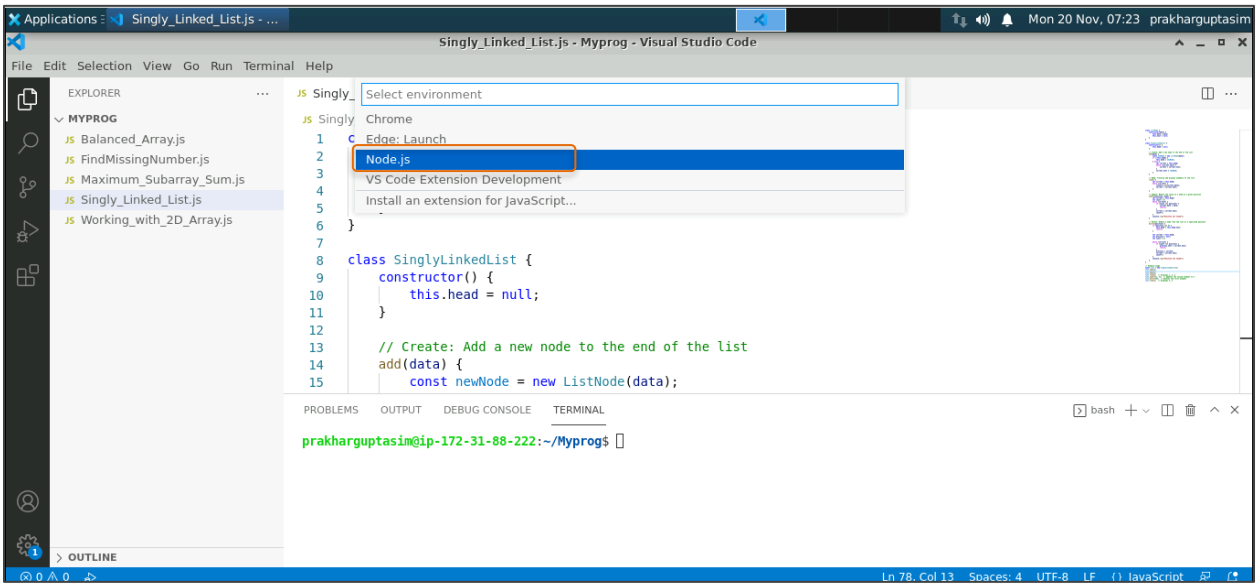
```
// Update: Modify the value of a node at a given position
update(position, data) {
   let current = this.head;
   let count = 0;
   while (current) {
      if (count === position) {
         current.data = data;
         return;
      }
      current = current.next;
      count++;
   }
   console.log("Position not found");
}

// Delete: Remove a node from the list at a specified position
delete(position) {
   if (position === 0) {
      this.head = this.head.next;
      return;
   }

   let current = this.head;
   let previous = null;
   let count = 0;

   while (current) {
      if (count === position) {
         previous.next = current.next;
         return;
      }
      previous = current;
      current = current.next;
      count++;
   }
   console.log("Position not found");
}}
```

```
// Example usage
const list = new SinglyLinkedList();
list.add(1);
list.add(2);
list.add(3);
list.read();  // Displays 1, 2, 3
list.update(1, 4);  // Updates the second element to 4
list.delete(0);  // Deletes the first element
list.read();  // Displays 4, 3
```

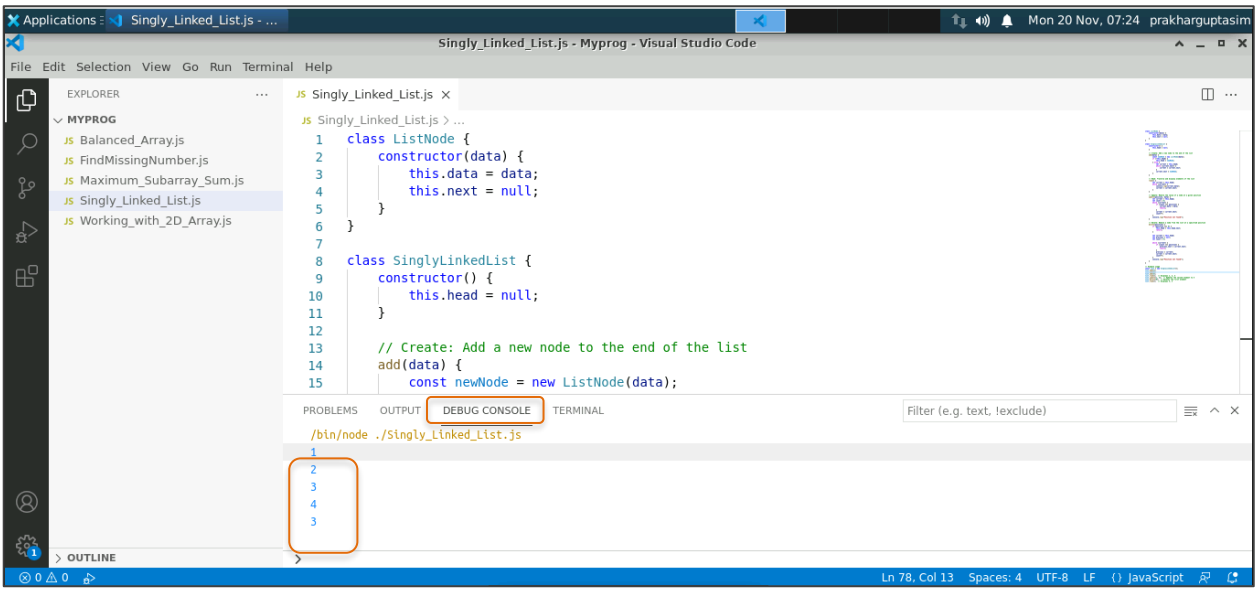


1.3 Click **Run** and then **Run Without Debugging**. Select **Node.js** to check the output in the DEBUG CONSOLE.





1.4 View the output in the **DEBUG CONSOLE** as shown below:



By following these steps, you have successfully performed CRUD operations on a singly linked list. The **add()** method adds a new node at the end of the list, the **read()** method traverses and prints the list, the **update()** method changes the value at a given position, and the **delete**() method removes a node at a specified position. These are essential operations when working with dynamic data structures.