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Lesson 02 Demo 08

Implementing CRUD Operations on a Circular Doubly Linked List

Objective: To implement a circular doubly linked list in JavaScript with CRUD operations including node addition, traversal, value modification, and deletion, enhancing your understanding of advanced linked list structures

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

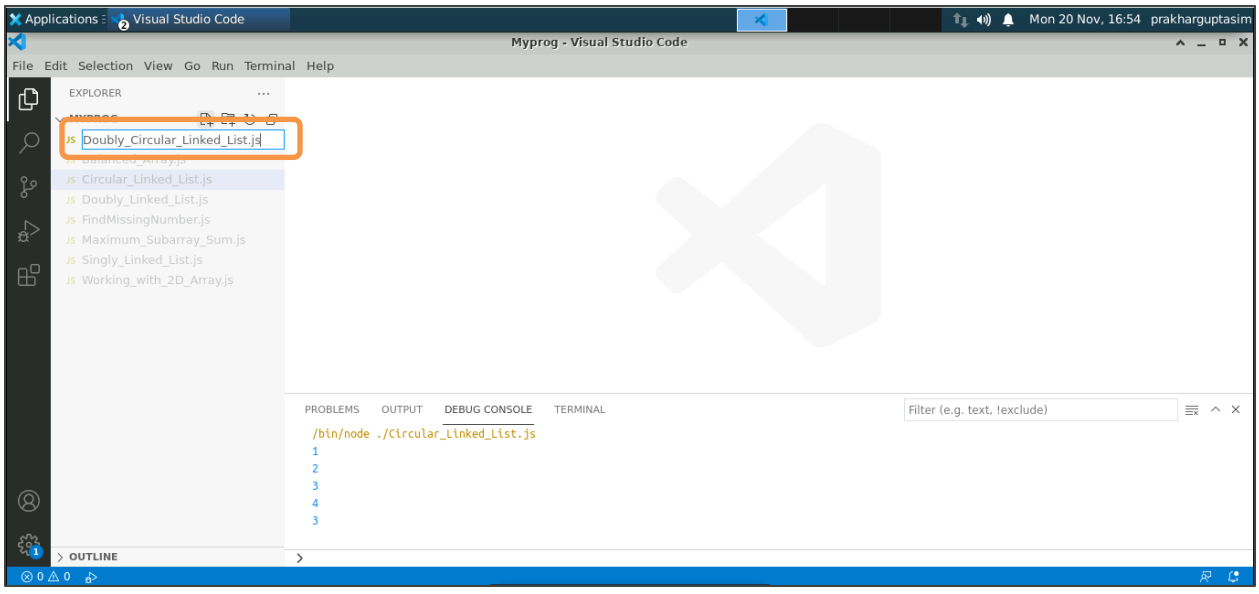
Prerequisites: Completion of Lesson 02 Demo 01

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 **Doubly_Circular_Linked_List.js**



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1.2 Add the following code to the file:

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

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

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

  // Read: Traverse and display elements of the list
  read() {
    if (!this.head) {
      return;
    }

    let current = this.head;
    do {
```

```
      console.log(current.data);
      current = current.next;
    } while (current !== this.head);
}

// Update: Modify the value of a node at a given position
update(position, data) {
    if (!this.head) {
      return;
    }

    let current = this.head;
    let count = 0;
    do {
      if (count === position) {
        current.data = data;
        return;
      }
      current = current.next;
      count++;
    } while (current !== this.head);

    console.log("Position not found");
}

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

    if (this.head.next === this.head) {
      if (position === 0) {
        this.head = null;
      }
      return;
    }
```

```
        let current = this.head;
        let count = 0;
        do {
            if (count === position) {
                current.prev.next = current.next;
                current.next.prev = current.prev;

                if (position === 0) {
                    this.head = current.next;
                }
                return;
            }
            current = current.next;
            count++;
        } while (current !== this.head);

        console.log("Position not found");
    }
}

// Example usage
const list = new DoublyCircularLinkedList();
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
```

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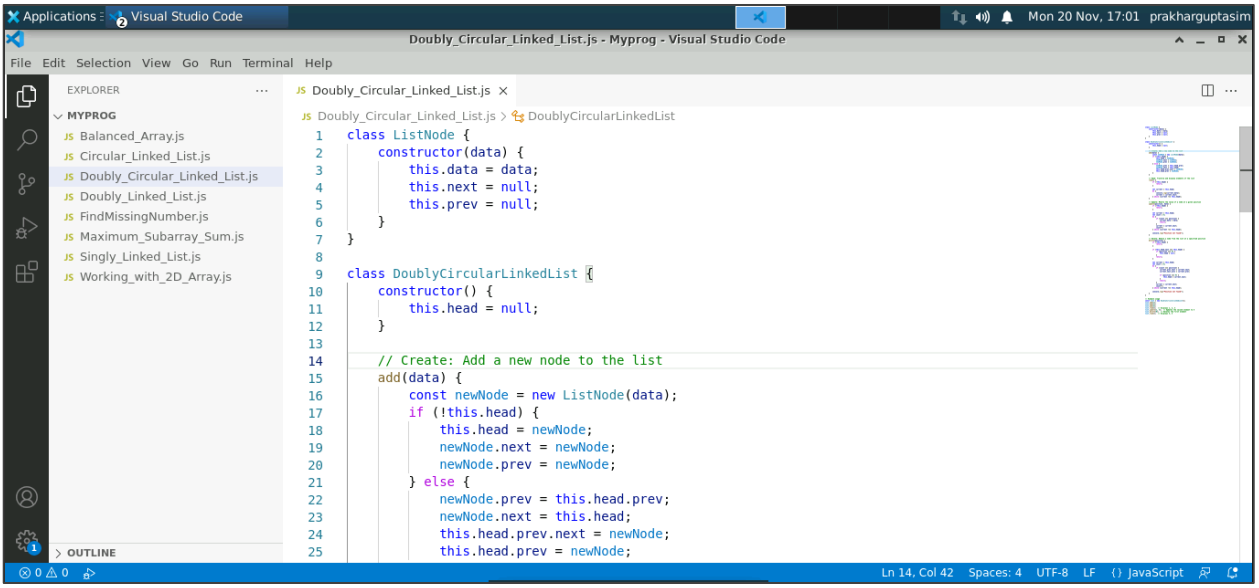
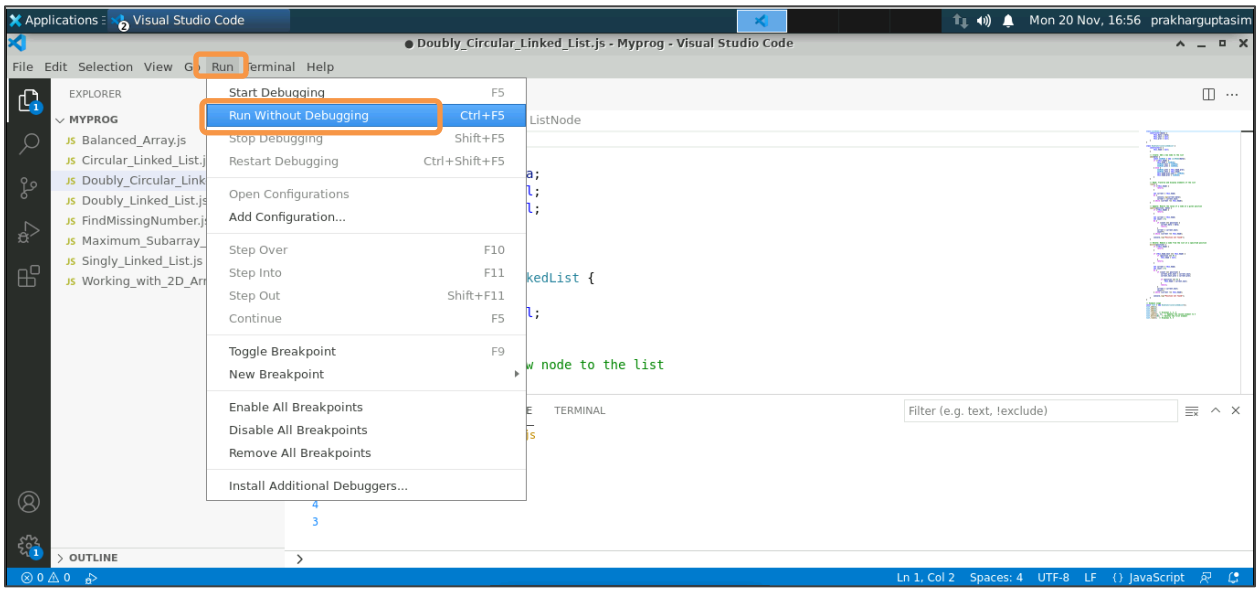


1.3 Click **Run** and then **Run Without Debugging**. Select **Node.js** to check the output in the DEBUG CONSOLE.



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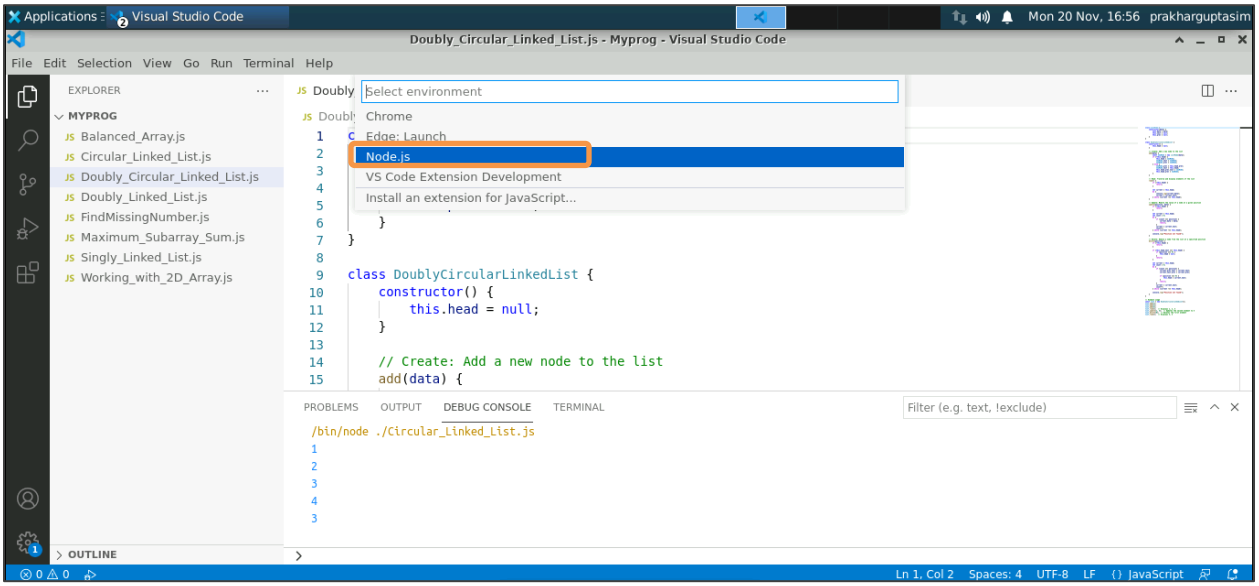
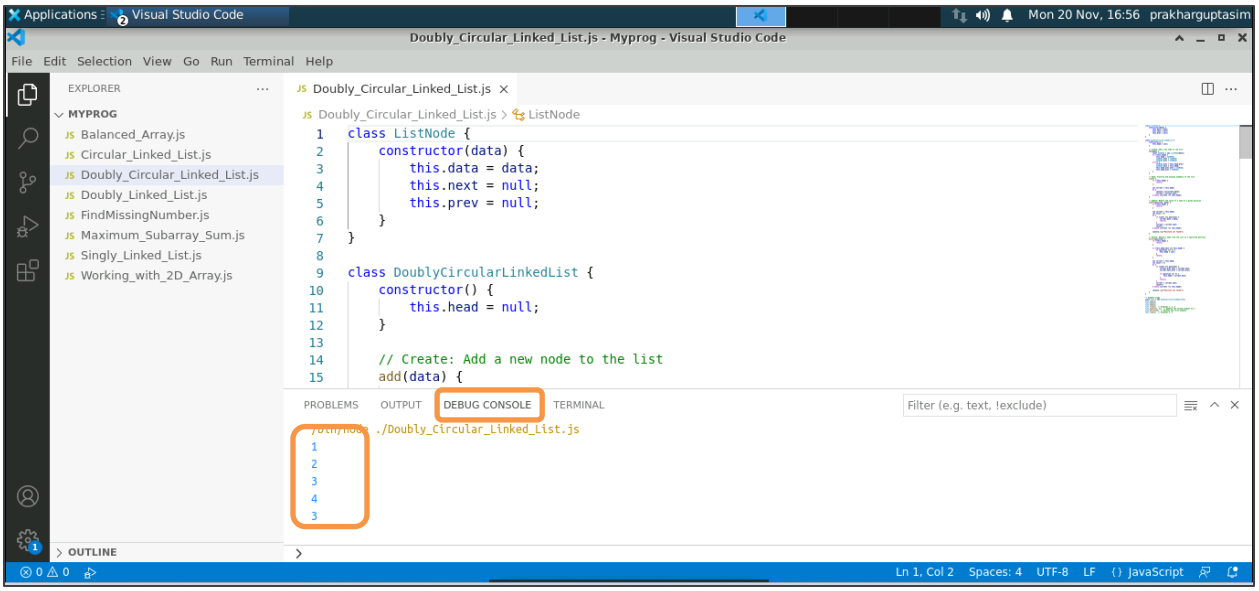


1.4 View the output in the **DEBUG CONSOLE** as shown below:



By following these steps, you have successfully executed **CRUD** operations on a circular doubly linked list, enhancing your understanding of advanced linked list structures. The **add()** method inserts a new node at the end, the **read()** method traverses and prints the list, the **update()** method modifies the value at a specified position, and the **delete()** method removes a node from the given position.