

Lesson 02 Demo 06

Implement CRUD Operations on a Doubly Linked List

Objective: To create a doubly linked list in JavaScript with CRUD functionalities such as node addition, traversal, value modification, and node deletion

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

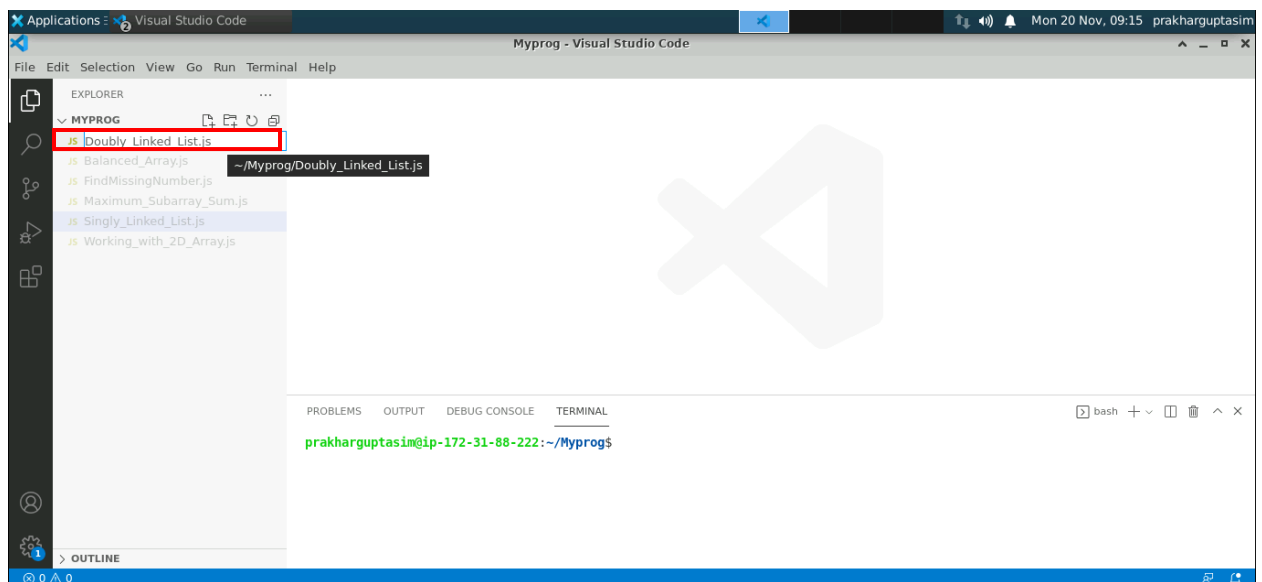
Prerequisites: Perform demo 01 of lesson 02

Steps to be followed:

1. Create and execute the JS file

Step 1: Create and execute the JS file

1.1 Create a JavaScript file named **Doubly_Linked_List.js** as shown below:



1.2 Paste the code in the file created in step 1.1 as shown below:

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

class DoublyLinkedList {
  constructor() {
    this.head = null;
    this.tail = 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;
      this.tail = newNode;
    } else {
      newNode.prev = this.tail;
      this.tail.next = newNode;
      this.tail = 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;  
    if (this.head) {  
      this.head.prev = null;  
    } else {  
      this.tail = null;  
    }  
    return;  
  }  
}
```

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

```
let count = 0;
```

```
while (current) {  
  if (count === position) {  
    if (current.next) {  
      current.next.prev = current.prev;  
    } else {  
      this.tail = current.prev;  
    }  
  }  
}
```

```

        if (current.prev) {
            current.prev.next = current.next;
        } else {
            this.head = current.next;
        }
        return;
    }
    current = current.next;
    count++;
}
console.log("Position not found");
}
}

// Example usage
const list = new DoublyLinkedList();
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

```

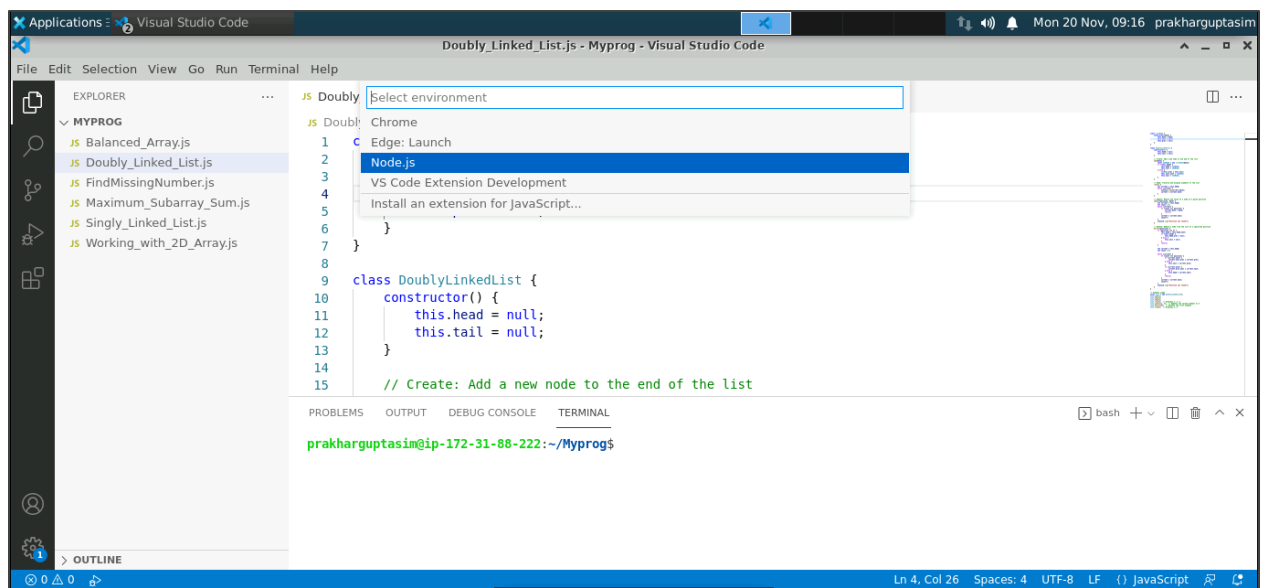
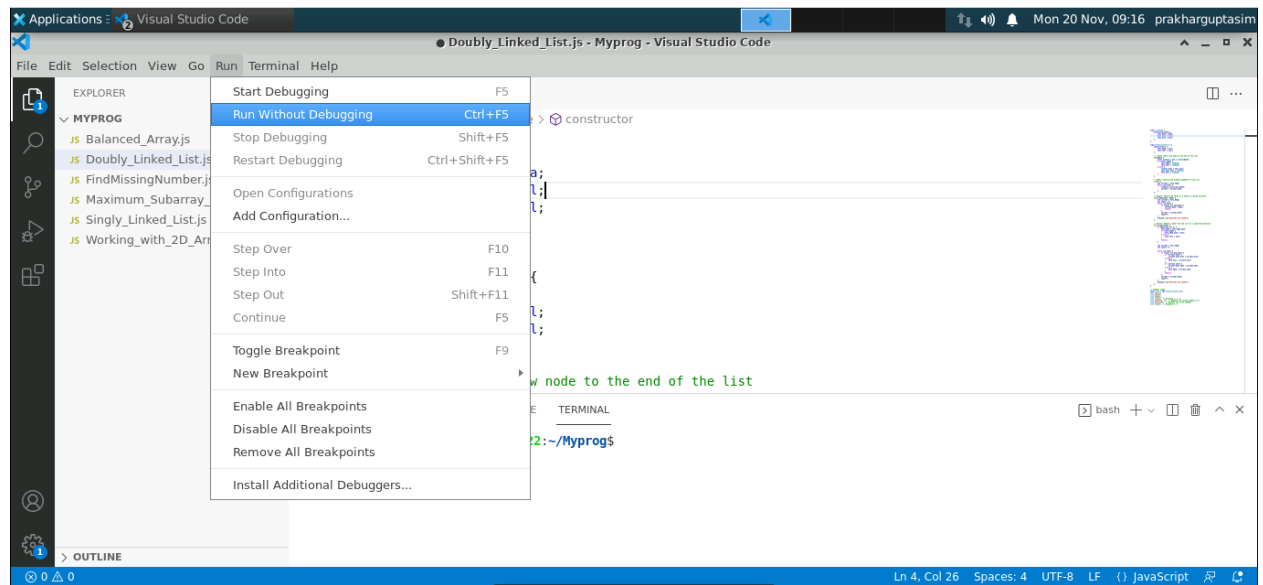
```

Visual Studio Code
Doubly_Linked_List.js - Myprog - Visual Studio Code
File Edit Selection View Go Run Terminal Help

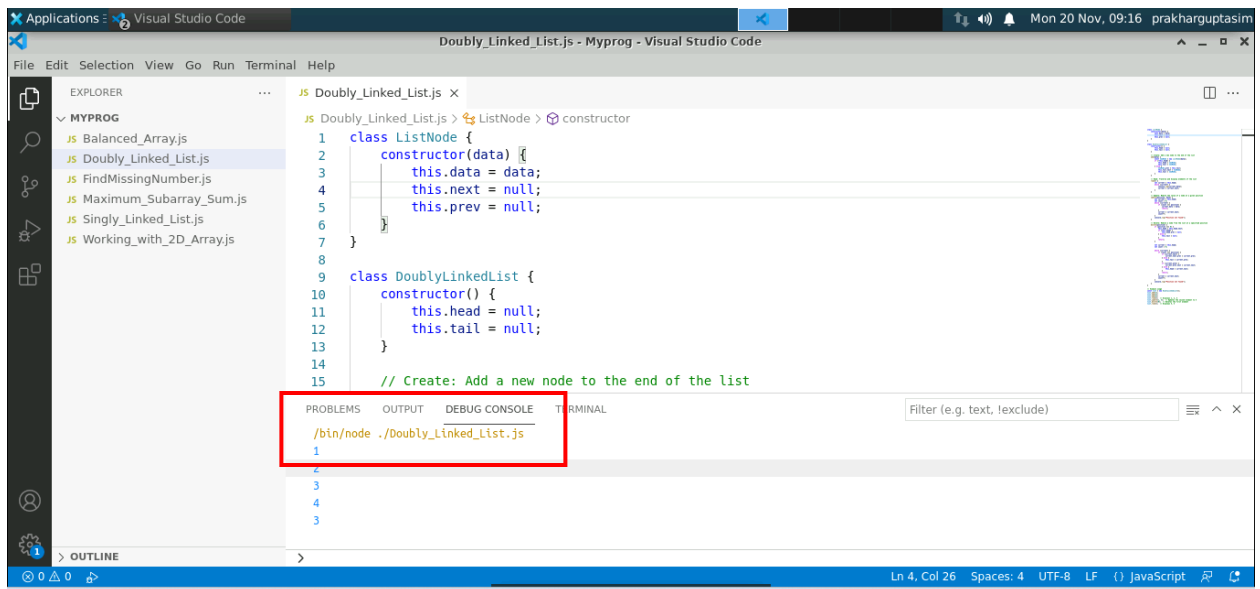
EXPLORER
MYPROG
  JS Balanced_Array.js
  JS Doubly_Linked_List.js
  JS FindMissingNumber.js
  JS Maximum_Subarray_Sum.js
  JS Singly_Linked_List.js
  JS Working_with_2D_Array.js

JS Doubly_Linked_List.js
1 class ListNode {
2   constructor(data) {
3     this.data = data;
4     this.next = null;
5     this.prev = null;
6   }
7 }
8
9 class DoublyLinkedList {
10  constructor() {
11    this.head = null;
12    this.tail = null;
13  }
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15  // Create: Add a new node to the end of the list
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```

1.3 Save the code and click on **Run->Run Without Debugging->Node.js** to check the output in the debug console



- Now you can see the output in the debug console as shown below:



The screenshot shows the Visual Studio Code editor with the file `Doubly_Linked_List.js` open. The file contains the following code:

```
1 class ListNode {
2   constructor(data) {
3     this.data = data;
4     this.next = null;
5     this.prev = null;
6   }
7 }
8
9 class DoublyLinkedList {
10  constructor() {
11    this.head = null;
12    this.tail = null;
13  }
14
15  // Create: Add a new node to the end of the list
```

The debug console at the bottom shows the command `/bin/node ./Doubly_Linked_List.js` and the output:

```
1
2
3
4
3
```

By following the above steps, you have successfully performed the **CRUD** operations on a doubly linked list. Here, the **add()** method adds a new node at the end of the list, **read()** method traverses and prints the list, **update()** method changes the value at a given position, and **delete()** method removes a node at a specified position.