Lesson 03 Demo 02

Working with Binary Tree

Objective: To demonstrate the important methods for binary tree in JavaScript

Tools required: Visual Studio Code and Node.js

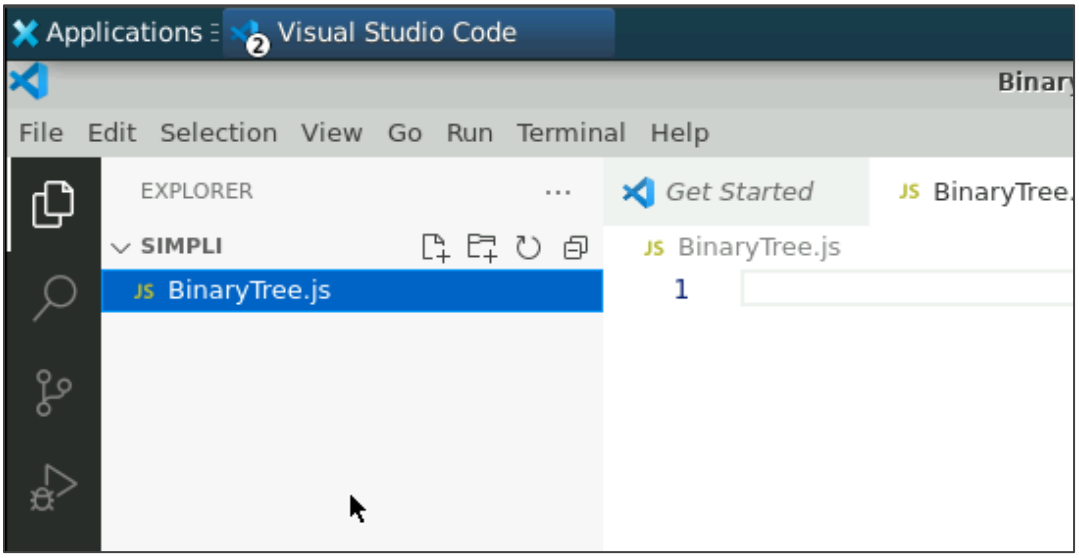
Prerequisites: Familiarity with binary tree basics and JavaScript

Steps to be followed:

1. Create and execute the JS file

Step 1: Create and execute the JS file

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



1.2 Write the code given below in the **BinaryTree.js** file:

```
// Binary tree node definition
class Node {
   constructor(data) {
      this.data = data;
      this.left = null;
      this.right = null;
   }
}
// Binary tree implementation
class BinaryTree {
   constructor() {
      this.root = null;
   }
   // Function to insert a node into the binary tree
   insert(data) {
      this.root = this._insert(this.root, data);
   }
   _insert(node, data) {
      if (!node) {
         return new Node(data);
      }
      if (data < node.data) {
         node.left = this._insert(node.left, data);
      } else if (data > node.data) {
         node.right = this._insert(node.right, data);
      }
      return node;
   }
   // Function to search for a node in the binary tree
   search(data, node = this.root) {
      if (!node) {
         return false;
      }
      if (data === node.data) {
return true;
      } else if (data < node.data) {
         return this.search(data, node.left);
      } else {
         return this.search(data, node.right);
      }
   }
```

```
  // Function to find the minimum value in the binary tree
  findMin(node = this.root) {
    if (!node) {
      return null;
    }

    while (node.left) {
      node = node.left;
    }
    return node.data;
  }
}

// Example usage
const tree = new BinaryTree();
tree.insert(10);
tree.insert(5);
tree.insert(15);
tree.insert(3);
tree.insert(8);

console.log('Searching for 15:', tree.search(15));
console.log('Minimum value:', tree.findMin());
```

JS BinaryTree.js > ...

```
1   // Binary tree node definition
2   class Node {
3       constructor(data) {
4           this.data = data;
5           this.left = null;
6           this.right = null;
7       }
8   }
9
10  // Binary tree implementation
11  class BinaryTree {
12      constructor() {
13          this.root = null;
14      }
```

```
15
16      // Function to insert a node into the binary tree
17      insert(data) {
18          this.root = this._insert(this.root, data);
19      }
20
21      _insert(node, data) {
22          if (!node) {
23              return new Node(data);
24          }
25
26          if (data < node.data) {
27              node.left = this._insert(node.left, data);
28          } else if (data > node.data) {
29              node.right = this._insert(node.right, data);
30          }
31
32          return node;
33      }
34
```

```
35      // Function to search for a node in the binary tree
36      search(data, node = this.root) {
37          if (!node) {
38              return false;
39          }
40
41          if (data === node.data) {
42              return true;
43          } else if (data < node.data) {
44              return this.search(data, node.left);
45          } else {
46              return this.search(data, node.right);
47          }
48      }
49
```

```
50      // Function to find the minimum value in the binary tree
51      findMin(node = this.root) {
52          if (!node) {
53              return null;
54          }
55
56          while (node.left) {
57              node = node.left;
58          }
59          return node.data;
60      }
61  }
62
63  // Example usage
64  const tree = new BinaryTree();
65  tree.insert(10);
66  tree.insert(5);
67  tree.insert(15);
68  tree.insert(3);
69  tree.insert(8);
70
71  console.log('Searching for 15:', tree.search(15));
72  console.log('Minimum value:', tree.findMin());
```

1.3 Save the file and execute it in the terminal using the command given below:
node BinaryTree.js

```
51      findMin(node = this.root) {
52          if (!node) {
53              return null;
54          }
55
56          while (node.left) {
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL bash

```
priyanshurajsim@ip-172-31-35-72:~/Downloads/Simpli$ ls
BinaryTree.js
priyanshurajsim@ip-172-31-35-72:~/Downloads/Simpli$ node BinaryTree.js
Searching for 15: true
Minimum value: 3
priyanshurajsim@ip-172-31-35-72:~/Downloads/Simpli$
```

This example shows key techniques like searching for a node and finding the smallest value in a binary tree with JavaScript.

By following these steps, you have successfully implemented and executed the methods for binary tree in JavaScript.