

DSA LAB EXAM

1. Write a Java program to
 - a. Perform quick sort
 - b. Perform preorder tree traversal

Solutio :

```
package com.labexam;

import java.util.Arrays;

public class exam {

    public static void main(String[] args) {

        int[] array = {5, 3, 8, 1, 4, 6, 9, 2, 7};

        // Perform quick sort

        quickSort(array, 0, array.length - 1);

        System.out.println("Sorted array: " + Arrays.toString(array));

        // Create a binary tree

        Node root = new Node(5);

        root.left = new Node(3);

        root.right = new Node(8);

        root.left.left = new Node(1);

        root.left.right = new Node(4);

        root.right.left = new Node(6);

        root.right.right = new Node(9);

        root.left.left.left = new Node(2);

        root.left.left.right = new Node(7);

        // Perform preorder tree traversal

        System.out.print("Preorder traversal: ");
```

```

preorderTraversal(root);

}

public static void quickSort(int[] array, int low, int high) {

    if (low < high) {

        int partitionIndex = partition(array, low, high);

        quickSort(array, low, partitionIndex - 1);

        quickSort(array, partitionIndex + 1, high);

    }

}

public static int partition(int[] array, int low, int high) {

    int pivot = array[high];

    int i = low - 1;

    for (int j = low; j < high; j++) {

        if (array[j] <= pivot) {

            i++;

            int temp = array[i];

            array[i] = array[j];

            array[j] = temp;

        }

    }

    int temp = array[i + 1];

    array[i + 1] = array[high];

    array[high] = temp;

    return i + 1;

}

public static void preorderTraversal(Node root) {

    if (root != null) {

```

```
System.out.print(root.data + " ");
```

```
preorderTraversal(root.left);
```

```
preorderTraversal(root.right);
```

```
}
```

```
}
```

```
static class Node {
```

```
int data;
```

```
Node left;
```

```
Node right;
```

```
public Node(int data) {
```

```
this.data = data;
```

```
left = null;
```

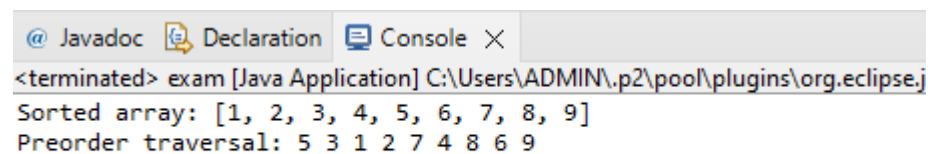
```
right = null;
```

```
}
```

```
}
```

```
}
```

Output :



```
<terminated> exam [Java Application] C:\Users\ADMIN\p2\pool\plugins\org.eclipse.j
Sorted array: [1, 2, 3, 4, 5, 6, 7, 8, 9]
Preorder traversal: 5 3 1 2 7 4 8 6 9
```