1. Write a Java program to

   a. Sort elements using insertion sort

   b. Implement breadth first tree traversal

                    * * * * * * * * * *

a)

```java
package com.corejava.entity;

public class InsertionSort {
    public static void main(String[] args) {
        int[] arr = {5, 2, 9, 1, 5, 6, 10, 23, 1, 2, 4};

        for (int i = 1; i < arr.length; i++) {
            int key = arr[i];
            int j = i - 1;

            while (j >= 0 && arr[j] > key) {
                arr[j + 1] = arr[j];
                j = j - 1;
            }
            arr[j + 1] = key;
        }

        for (int i = 0; i < arr.length; i++) {
            System.out.print(arr[i] + " ");
        }
    }
}
```

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<terminated> InsertionSort [Java Application] C:\Users\asus\Downloads\eclipse-jee-2022-09-R-win32-x86_64\eclipse\plugins\org.eclipse.justj.openjdk.hotspot.jre.f
1 1 2 2 4 5 5 6 9 10 23

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b)

```java
1  package com.corejava.main;
2  import java.util.LinkedList;
3  import java.util.Queue;
4
5  public class BFS {
6      static class Node {
7          int data;
8          Node left;
9          Node right;
10         public Node(int data) {
11             this.data = data;
12             left = null;
13             right = null;
14         }
15     }
16
17     static void bfs(Node root) {
18         Queue<Node> queue = new LinkedList<>();
19         queue.add(root);
20         while (!queue.isEmpty()) {
21             Node current = queue.poll();
22             System.out.print(current.data + " ");
23             if (current.left != null) {
24                 queue.add(current.left);
25             }
26             if (current.right != null) {
27                 queue.add(current.right);
28             }
29         }
30     }
31
32     public static void main(String[] args) {
33         Node root = new Node(1);
34         root.left = new Node(2);
35         root.right = new Node(3);
36         root.left.left = new Node(4);
37         root.left.right = new Node(5);
38         bfs(root);
39     }
40 }
41
```

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<terminated> BFS (1) [Java Application] C:\Users\asus\Downloads\eclipse-jee-2022-09-R-win32-x86_64\eclipse\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_17.0.4.v20

1 2 3 4 5