CSE220 Lab Quiz 5
Monday 11 AM Slot

Tentative Solutions and Rubrics

1.2 Set A

```
class BTNode {
    int energy;
    BTNode left, right;
    public BTNode(int energy) {
        this.energy = energy;
        this.left = null;
        this.right = null;
    }
}

public class Main {
    public static void main(String[] args) {
        // Tree Construction
        BTNode root = new BTNode(20);
        BTNode n1 = new BTNode(10);
        BTNode n2 = new BTNode(25);

        root.left = n1;
        root.right = n2;

        BTNode n3 = new BTNode(5);
        BTNode n4 = new BTNode(15);
        n1.left = n3;
        n1.right = n4;

        BTNode n5 = new BTNode(35);
        n2.right = n5;

        BTNode n6 = new BTNode(30);
        BTNode n7 = new BTNode(40);
        n5.left = n6;
        n5.right = n7;

        // Testing
        System.out.println(calculate_energy(root,30));
        System.out.println(calculate_energy(root,34));
    }

public static String calculate_energy(BTNode root, int energy)
{
        int totalEnergy = 1;
        BTNode current = root;

        while (current != null) {
            totalEnergy *= current.energy;
            if (current.energy == energy) {
                return "Total energy: " + (totalEnergy);
            } else if (energy < current.energy) {
                current = current.left;
            } else {
                current = current.right;
            }
        }
        return "route does not exist";
    }


}
```

1.3 Set B

```
class BTNode {
    int tax;
    String city;
    BTNode left, right;

    public BTNode(int tax, String city) {
        this.tax = tax;
        this.city = city;
        this.left = null;
        this.right = null;
    }
}


public class Main {
    public static void main(String[] args) {
        // Tree Construction
        BTNode khulna = new BTNode(20, "Khulna");
        BTNode ruppur = new BTNode(10, "Ruppur");
        BTNode bhanga = new BTNode(25, "Bhanga");
        khulna.left = ruppur;
        khulna.right = bhanga;

        BTNode pabna = new BTNode(5, "Pabna");
        BTNode bogra = new BTNode(15, "Bogra");
        ruppur.left = pabna;
        ruppur.right = bogra;

        BTNode bhulta = new BTNode(35, "Bhulta");
        bhanga.right = bhulta;

        BTNode rupganj = new BTNode(30, "Rupganj");
        BTNode sylhet = new BTNode(40, "Sylhet");
        bhulta.left = rupganj;
        bhulta.right = sylhet;
        // Testing
        System.out.println(crossingTax(khulna, "Sylhet",40));
        System.out.println(crossingTax(khulna, "Dhaka",34));

    }
     public static String crossingTax(BTNode root, String
targetCity, int targetCityTax) {
        int totalTax = 0;
        BTNode current = root;

        while (current != null) {
            totalTax += current.tax;
            if (current.city.equals(targetCity)) {
                return "Total Tax: " + (totalTax - root.tax) +
" tk";
            } else if (targetCityTax < current.tax) {
                current = current.left;
            } else {
                current = current.right;
            }
        }
        return "route does not exist";
    }

}
```

1.4 Marking Scheme

SL	Points to meet	Marks (15)
1	Construct the Node class	2.5
2	Construct the BST	2.5
3	Defining the function with correct parameters	1
4	Right return condition	1.5
5	Correct Recursive calls	3
6.	Correct Calculation (summation for set A and correct conditions for set B)	3
7.	Correct Output statements	1.5
Total		**10**