LAB # 12

Task No 01: By looking at the formulae for an ellipse, provide the missing code for all of the methods in the class Ellipse including the toString() method. Test your program using the TestShapes.java class.

Code:

Main:

```
package lab12task01;

public class Lab12task01 {

    public static void main(String[] args) {

        Ellipse e =new Ellipse(80,80);
        e.String();
        System.out.println("++++++++++++++++++++++");
        Circle c=new Circle(10.0);
        c.String();
    }
}
```

Incentric (Interface):

```
package lab12task01;

public interface Incentric {
    double eccentricity();
}
```

Shape (Abstract):

```
package lab12task01;

public abstract class Shape {

    public abstract double area();
    public abstract double perimeter();
    public abstract void String();
}
```

Ellipse (Child):

```
package lab12task01;

public class Ellipse extends Shape implements Incentric {

    double a, b;

    public Ellipse(double s1, double s2) {
        if (s1 < s2) {
            a = s2;
            b = s1;
        } else {
            a = s1;
            b = s2;
        }
    }
```

```
    public double area() {
        double area = Math.PI * a * b;
        return area;
    }
    public double perimeter() {
        double perimeter = Math.sqrt((2 * (Math.pow(a, 2) + Math.pow(b, 2)) -
Math.pow(a - b, 2) / 2));
        return perimeter;
    }
    public void String() {
        System.out.println("Area:" + area() + "\nPerimeter:" + perimeter() +
"\nEccentricity:" + eccentricity());
    }
    public double eccentricity() {
        double eccen = Math.sqrt(1 - (Math.pow(b, 2) / Math.pow(a, 2)));
        return eccen;
    }
}
```

Circle (Child):

```
package lab12task01;

public class Circle extends Ellipse{

    public Circle(double radius) {
        super(radius, radius);
    }
}
```

Output:

```
Area:20106.192982974677
Perimeter:160.0
Eccentricity:0.0
++++++++++++++++++++++
Area:314.1592653589793
Perimeter:20.0
Eccentricity:0.0
------------------------------------------
BUILD SUCCESS
------------------------------------------
```

Task No 02: Write a program which implements interface of Banking System by having all standard functionalities and will be implemented by branches.

Code:

Main:

```
package lab12task02;

public class Lab12task02 {

    public static void main(String[] args) {

        Bank ublBank = new UBL();
        ublBank.CreateAccount();
        ublBank.SearchAccountDetails(2);
```

```
        ublBank.UpdateCustomerInfo(2, "Abdullah Sadiq", 10000);
        ublBank.CashWithdraw(2, 1100);
        ublBank.CashDeposit(2, 1200);

        Bank askariBank = new AskariBank();
        askariBank.CreateAccount();
        askariBank.SearchAccountDetails(1);
        askariBank.UpdateCustomerInfo(1, "Adil Khan", 1000000);
        askariBank.CashWithdraw(1, 2000);
        askariBank.CashDeposit(1, 5000);
    }
}
```

Bank (Interface):

```
package lab12task02;

public interface Bank {

    void CreateAccount();
    void SearchAccountDetails(int id);
    void UpdateCustomerInfo(int id, String name, int bal);
    void CashWithdraw(int id, int cash);
    void CashDeposit(int id, int cash);
}
```

UBL (Child):

```
package lab12task02;

public class UBL implements Bank{

    int id = 2;
    String name = "Abdullah Sadiq";
    int bal = 10000;

    public void CreateAccount() {
        System.out.println("Your account has been created in UBL bank
successfully...");
    }
    public void SearchAccountDetails(int id) {
        System.out.println("Searching account details for id # " + id);
    }
    public void UpdateCustomerInfo(int id, String name, int bal) {
        this.id = id;
        this.name = name;
        this.bal = bal;
    }
    public void CashWithdraw(int id, int cash) {
        bal = bal - cash;
        System.out.println("ID # " + id + " has withdrawn " + cash + " PKR");
    }
    public void CashDeposit(int id, int cash) {
        bal = bal + cash;
        System.out.println("ID # " + id + " has deposited " + cash + " PKR");
    }
}
```

AskariBank (Child):

```
package lab12task02;

public class AskariBank implements Bank {

    int id = 1;
    String name = "Adil Khan";
    int bal = 10000;

    public void CreateAccount() {
        System.out.println("Your account has been created in UBL bank
successfully...");
    }
    public void SearchAccountDetails(int id) {
        System.out.println("Searching account details for id # " + id);
    }
    public void UpdateCustomerInfo(int id, String name, int bal) {
        this.id = id;
        this.name = name;
        this.bal = bal;
    }
    public void CashWithdraw(int id, int cash) {
        bal = bal - cash;
        System.out.println("ID # " + id + " has withdrawn " + cash + " PKR");
    }
    public void CashDeposit(int id, int cash) {
        bal = bal + cash;
        System.out.println("ID # " + id + " has deposited " + cash + " PKR");
    }
}
```

Output:

```
Your account has been created in UBL bank successfully...
Searching account details for id # 2
ID # 2 has withdrawn 1100 PKR
ID # 2 has deposited 1200 PKR
Your account has been created in UBL bank successfully...
Searching account details for id # 1
ID # 1 has withdrawn 2000 PKR
ID # 1 has deposited 5000 PKR
------------------------------------------------------------
BUILD SUCCESS
------------------------------------------------------------
```