Object Oriented Programming
ASSIGNMENT NO 9

SUBMITTED BY:

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Activity 1:

```
package LAB9;

/**
 * RegisterForExams
 */
public interface RegisterForExams {
    public void register();

}
package LAB9;

public class EmployeeTask implements RegisterForExams {
    private String name;
    private String date;
    private int salary;

    public EmployeeTask() {
        name = null;
        date = null;
        salary = 0;
    }

    public EmployeeTask(String name, String date, int salary) {
        this.name = name;
        this.date = date;
        this.salary = salary;
    }

    @Override
    public void register() {
        System.out.println("Employee is registered " + "Name " + name + "salary "
+ salary + " date " + date);
    }
}

package LAB9;

public class StudentTask implements RegisterForExams {
    private String name;
    private int age;
    private double gpa;

    public StudentTask() {
```

```
        name = null;
        age = 0;
        gpa = 0;
    }

    public StudentTask(String name, int age, double gpa) {
        this.name = name;
        this.age = age;
        this.gpa = gpa;
    }

    @Override
    public void register() {
        System.out.println("Student is registered " + "Student name " + name
                + " gpa " + gpa);
    }
}
```

Runner Class

```
package LAB9;

public class Runner {
    public static void main(String[] args) {

        EmployeeTask e = new EmployeeTask("Ahmed", "11,02,2001", 20000);
        StudentTask s = new StudentTask("Ali", 22, 3.5);
        e.register();
        s.register();
    }
}
```

Output

```
2\bin\java.exe" -XX:+ShowCodeDetailsInExceptionMessages" -cp"
Employee is registered Name Ahmedsalary 20000 date 11,02,2001
Student is registered Student name Ali gpa 3.5
PS D:\Ishtudy Material\3rd Sem\OOP\LABS\LabManual>
```

Activity 2

```java
package LAB9;

interface I1 {
    void methodI1(); // public static by default
}

interface I2 extends I1 {
    void methodI2(); // public static by default
}

class A1 {
    public String methodA1() {
        String strA1 = "I am in methodC1 of class A1";
        return strA1;
    }

    public String toString() {
        return "toString() method of class A1";
    }
}

class B1 extends A1 implements I2 {
    public void methodI1() {
        System.out.println("I am in methodI1 of class B1");
    }

    public void methodI2() {
        System.out.println("I am in methodI2 of class B1");
    }
}

class C1 implements I2 {
    public void methodI1() {
        System.out.println("I am in methodI1 of class C1");
    }

    public void methodI2() {
        System.out.println("I am in methodI2 of class C1");
    }
}

// Note that the class is declared as abstract as it does not
// satisfy the interface contract
```

```java
abstract class D1 implements I2 {
    public void methodI1() {
    }
    // This class does not implement methodI2() hence declared abstract.
}

public class InterFaceEx {
    public static void main(String[] args) {
        I1 i1 = new B1();
        i1.methodI1();
        I2 i2 = new B1();

        String var2 = ((A1) i1).methodA1();
        System.out.println("var2 : " + var2);
        String var3 = ((B1) i1).methodA1();
        System.out.println("var3 : " + var3);
        String var4 = i1.toString();
        System.out.println("var4 : " + var4);
        String var5 = i2.toString();
        System.out.println("var5 : " + var5);
        I1 i3 = new C1();
        String var6 = i3.toString();
        System.out.println("var6 : " + var6);
        Object o1 = new B1();

        ((I1) o1).methodI1(); // 1
        ((I2) o1).methodI1(); // 2
        ((B1) o1).methodI1(); // 3
    }
}
```

Output

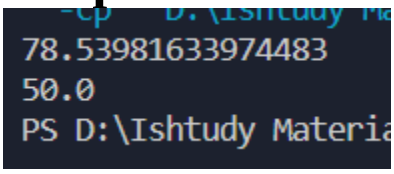
```
2\bin\java.exe" "-XX:+ShowCodeDetailsInExceptionMessage
I am in methodI1 of class B1
var2 : I am in methodC1 of class A1
var3 : I am in methodC1 of class A1
var4 : toString() method of class A1
var5 : toString() method of class A1
var6 : LAB9.C1@7a81197d
I am in methodI1 of class B1
I am in methodI1 of class B1
I am in methodI1 of class B1
PS D:\Ishtudy Material\3rd Sem\OOP\LABS\LabManual>
```

GLT1

```java
package LAB9;

/**
 *
 */
interface Shape {
    double getArea();
}

/**
 * GLT1
 */
class Circle implements Shape {
    private double radius;

    public Circle() {
        radius = 0;
    }

    public Circle(double radius) {
        this.radius = radius;
    }

    @Override
    public double getArea() {
        return Math.PI * radius * radius;
    }
}

class Rectangle implements Shape {
    private double length;
    private double width;

    public Rectangle() {
        length = 0;
        width = 0;
    }

    public Rectangle(double length, double width) {
        this.length = length;
        this.width = width;
    }
```

```
    @Override
    public double getArea() {
        return length * width;
    }
}
```

Output:



GLT2:

```
package LAB9;

interface Payable {
    Double getPaymentAmount();
}

class Invoice implements Payable {
    private String partNumber;
    private String partDescription;
    private int quantity;
    private double pricePerItem;

    public Invoice() {
        partNumber = null;
        partDescription = null;
        quantity = 0;
        pricePerItem = 0;
    }

    public Invoice(String partNumber, String partDescription, int quantity,
double pricePerItem) {
        this.partNumber = partNumber;
        this.partDescription = partDescription;
        this.quantity = quantity;
        this.pricePerItem = pricePerItem;
    }

    @Override
    public Double getPaymentAmount() {
        return quantity * pricePerItem;
```

```
    }
}

class Employee implements Payable {
    private String firstName;
    private String lastName;
    private String socialSecurityNumber;

    public Employee() {
        firstName = null;
        lastName = null;
        socialSecurityNumber = null;
    }

    public Employee(String firstName, String lastName, String
socialSecurityNumber) {
        this.firstName = firstName;
        this.lastName = lastName;
        this.socialSecurityNumber = socialSecurityNumber;
    }

    @Override
    public Double getPaymentAmount() {
        return null;
    }
}

class SalariedEmployee extends Employee {
    private double weeklySalary;

    public SalariedEmployee() {
        weeklySalary = 0;
    }

    public SalariedEmployee(double weeklySalary) {
        this.weeklySalary = weeklySalary;
    }

    public SalariedEmployee(String firstName, String lastName, String
socialSecurityNumber, double weeklySalary) {
        super(firstName, lastName, socialSecurityNumber);
        this.weeklySalary = weeklySalary;
    }

    @Override
```

```
    public Double getPaymentAmount() {
        return weeklySalary;
    }
}

public class GLT2 {
    public static void main(String[] args) {
        Payable[] payableObjects = new Payable[4];
        payableObjects[0] = new Invoice("01234", "seat", 2, 375.00);
        payableObjects[1] = new Invoice("56789", "tire", 4, 79.95);
        payableObjects[2] = new SalariedEmployee("Hasaan", "Ahmad", "111-11-
1111", 800.00);
        payableObjects[3] = new SalariedEmployee("Mujtaba", "", "888-88-8888",
1200.00);
        System.out.println("Invoices and Employees processed polymorphically:");
        for (Payable currentPayable : payableObjects) {
            System.out.printf("%n%s %n%s: $%,.2f%n", currentPayable.toString(),
"payment due",
                    currentPayable.getPaymentAmount());
        }
    }

}
```

Output:

```
Invoices and Employees processed polymorphically:

LAB9.Invoice@36baf30c
payment due: $750.00

LAB9.Invoice@5b2133b1
payment due: $319.80

LAB9.SalariedEmployee@72ea2f77
payment due: $800.00

LAB9.SalariedEmployee@33c7353a
payment due: $1,200.00
PS D:\Ishtudy Material\3rd Sem\OOP\LABS\LabManual>
```

GLT3:

```java
package LAB9;

interface Compare {
    boolean compareObjects(Object o);
}

class Inventory implements Compare {
    private String name;
    private int quantity;
    private double price;

    public Inventory() {
        name = null;
        quantity = 0;
        price = 0;
    }

    public Inventory(String name, int quantity, double price) {
        this.name = name;
        this.quantity = quantity;
        this.price = price;
    }

    @Override
    public boolean compareObjects(Object o) {
        if (o instanceof Inventory) {
            Inventory i = (Inventory) o;
            if (name.equals(i.name) && quantity == i.quantity && price ==
i.price) {
                return true;
            }
        }
        return false;
    }
}

class GLT3 {
    public static void main(String[] args) {
        Inventory i1 = new Inventory("Apple", 10, 1.5);
        Inventory i2 = new Inventory("Apple", 10, 1.5);
        Inventory i3 = new Inventory("Orange", 10, 1.5);
        System.out.println(i1.compareObjects(i2));
        System.out.println(i1.compareObjects(i3));
    }
}
```

Output:

```
true
false
```

GLT4:

```java
package LAB9;

/**
 * GLT4
 * Create constructor and abstract methods of interface in the class
 * NameCollection.
 * Then write a main method that creates a NamesCollection object with a sample
 * array of strings,
 * and then iterates through the enumeration outputting each name using the
 * getNext() method.
 */
interface Enumeration {
    public boolean hasNext(int index);

    public Object getNext(int index);

}

class NameCollection implements Enumeration {
    private String[] names; // Array of names
    private int index;

    public NameCollection() {
        names = null;
        index = 0;
    }

    public NameCollection(String[] names) {
        this.names = names;
        index = 0;
    }

    @Override
    public boolean hasNext(int index) {
        if (index < names.length) {
            return true;
```

```
        }
        return false;
    }

    @Override
    public Object getNext(int index) {
        if (hasNext(index)) {
            return names[index++];
        }
        return null;
    }

    // Method to print names
    public void printNames() {
        for (int i = 0; i < names.length; i++) {
            System.out.println(names[i]);
        }
    }

    @Override
    public String toString() {
        return "NameCollection [index=" + index + ", names=" + names + "]";
    }
}

public class GLT4 {
    public static void main(String[] args) {
        // Fill array with data
        String[] names = { "Hasaan", "Mujtaba", "Haider", "Ali", "Salman" };
        NameCollection nameCollection = new NameCollection(names);
        System.out.println(nameCollection.toString());
        // Print names
        nameCollection.printNames();
        nameCollection.toString();
    }
}
```

Output:

```
  -cp   D:\Ishtudy Material\3rd Sem\OOP\LABS\LabManual\bin   LAB9.GUI4
NameCollection [index=0, names=[Ljava.lang.String;@5acf9800]
Hasaan
Mujtaba
Haider
Ali
Salman
PS D:\Ishtudy Material\3rd Sem\OOP\LABS\LabManual>
```