ASSIGNMENT – 5

1. Write a program that creates a class Account that have members customer name, account number. Account has constructor to initialize its members and method display() to show the result. Create a child class Savings_Account that is derived from Account class. Savings_Account have members min_bal and saving_bal. Use show() to display its details. Then create another child class Account_details from Savings_Account class have members deposit, withdrawl and a method show1() to show its details. Child classes have constructors of their own. Create a driver class that creates a record of customer and display all its details.

```java
import java.util.Scanner;
class Account {
        String custName;
        int accNumber;
        Account(String custName, int accNumber) {
                this.custName = custName;
                this.accNumber = accNumber;
        }
        void display() {
                System.out.println("Customer Name: "+custName);
                System.out.println("Account number: "+accNumber);
        }
}
class Savings_account extends Account {
        double min_bal;
        double saving_bal;
        Savings_account(String custName, int accNumber, double min_bal, double saving_bal) {
                super(custName, accNumber);
                this.min_bal = min_bal;
                this.saving_bal = saving_bal;
        }
        void show() {
                super.display();
                System.out.println("Minimum balance: "+min_bal);
                System.out.println("Saving balance: "+saving_bal);
        }
}
class Account_details extends Savings_account {
        double deposit;
        double withdrawal;
        Account_details(String custName, int accNumber, double min_bal, double saving_bal, double
        deposit, double withdrawal) {
                super(custName, accNumber, min_bal, saving_bal);
                this.deposit = deposit;
                this.withdrawal = withdrawal;
        }
void show1() {
                super.show();
                System.out.println("Deposit Amount: " + deposit);
                System.out.println("Withdrawal Amount: " + withdrawal);
```

Name –MANOJNYA HARICHANDAN

SIC – 24BCSA08

Roll No. – 10

```java
                double updatedBalance = saving_bal + deposit - withdrawal;
                System.out.println("Updated Balance: " + updatedBalance);
        }
}
class BankRecords {
        public static void main(String args[]) {
                Scanner sc = new Scanner(System.in);
                System.out.print("Enter the customer name: ");
                String name = sc.nextLine();
                System.out.print("Enter Account Number: ");
        int accNo = sc.nextInt();
                System.out.print("Enter Minimum Balance: ");
                double minBal = sc.nextDouble();
                System.out.print("Enter Saving Balance: ");
                double savBal = sc.nextDouble();
                System.out.print("Enter Deposit Amount: ");
                double deposit = sc.nextDouble();
                System.out.print("Enter Withdrawal Amount: ");
                double withdrawal = sc.nextDouble();
                Account_details acc = new Account_details(name, accNo, minBal, savBal, deposit,
withdrawal);
                System.out.println("\n----- Customer Account Details -----");
                acc.show1();
        }
}
```

```
C:\24BCSA08\ASSIGNMENT5>javaC q1.java

C:\24BCSA08\ASSIGNMENT5>java BankRecords
Enter the customer name: manojnya
Enter Account Number: 12233445
Enter Minimum Balance: 500
Enter Saving Balance: 1000
Enter Deposit Amount: 300
Enter Withdrawal Amount: 200

----- Customer Account Details -----
Customer Name: manojnya
Account number: 12233445
Minimum balance: 500.0
Saving balance: 1000.0
Deposit Amount: 300.0
Withdrawal Amount: 200.0
Updated Balance: 1100.0
```

2. Create a class Figure with instance members dim1 and dim2. Use constructor and area() that returns the area of figure. Create a derived class Rectangle derived from Figure and area() that returns the area of rectangle. Create another derived class Triangle and Square that has area() which

Name –MANOJNYA HARICHANDAN

SIC – 24BCSA08

Roll No. – 10

returns area of Triangle and Square respectively. Derived class have appropriate constructor. Using method overriding concept test the functionalities of derived class by creating objects and super class memory references in Driver class.

```java
import java.util.Scanner;
class Figure {
        double dim1, dim2;

        Figure(double dim1, double dim2) {
                this.dim1 = dim1;
                this.dim2 = dim2;
        }
        double getArea() {
                System.out.print("Area can be determined for undefined figure!");
                return 0;
        }
}
class Rectangle extends Figure {
        Rectangle(double length, double width) {
                super(length, width);
        }
        double getArea() {
                return dim1 * dim2;
        }
}
class Triangle extends Figure {
        Triangle(double base, double height) {
                super(base, height);
        }

        double getArea() {
                return 0.5 * dim1 * dim2;
        }
}
class Square extends Figure {
        Square(double side) {
                super(side, side);
        }

        double getArea() {
                return dim1 * dim2;
        }
}

class FigureArea {
        public static void main(String args[]) {
                Scanner sc = new Scanner(System.in);
                Figure fig;
                System.out.print("Enter the length: ");
                double l = sc.nextDouble();
```

Name –MANOJNYA HARICHANDAN

SIC – 24BCSA08

Roll No. – 10

```
            System.out.print("Enter the width: ");
            double w = sc.nextDouble();
            fig = new Rectangle(l, w);
            System.out.println("The area of rectangle is: "+fig.getArea());
            System.out.print("Enter the base: ");
            double b = sc.nextDouble();
            System.out.print("Enter the height: ");
            double h = sc.nextDouble();
            fig = new Triangle(b, h);
            System.out.println("The area of rectangle is: "+fig.getArea());
            System.out.print("Enter the side: ");
            double s = sc.nextDouble();
            fig = new Square(s);
            System.out.println("The area of rectangle is: "+fig.getArea());
        }
}
```

```
C:\24BCSA08\ASSIGNMENT5>javaC q2.java

C:\24BCSA08\ASSIGNMENT5>java FigureArea
Enter the length: 4
Enter the width: 5
The area of rectangle is: 20.0
Enter the base: 3
Enter the height: 5
The area of rectangle is: 7.5
Enter the side: 6
The area of rectangle is: 36.0
```

3. Write a program to create a class named Shape. It should contain two methods, draw() and erase() that prints "Drawing Shape" and "Erasing Shape" respectively. For this class, create three sub classes, Circle, Triangle and Squareand each class should override the parent class functions - draw () and erase (). The draw() method should print "Drawing Circle", "Drawing Triangle" and "Drawing Square" respectively. The erase() method should print "Erasing Circle", "Erasing Triangle" and "Erasing Square" respectively. Create objects of Circle, Triangle and Square, assign each to Shape variable(reference) and call draw() and erase() method using each object.

```
class Shape {
        void draw() {
                System.out.println("Drawing Shape");
        }

        void erase() {
                System.out.println("Erasing Shape");
        }
}

class Circle extends Shape {
        void draw() {
                System.out.println("Drawing Circle");
        }

        void erase() {
                System.out.println("Erasing Circle");
```

Name –MANOJNYA HARICHANDAN
SIC – 24BCSA08
Roll No. – 10

```
        }
}

class Triangle extends Shape {
        void draw() {
                System.out.println("Drawing Triangle");
        }

        void erase() {
                System.out.println("Erasing Triangle");
        }
}

class Square extends Shape {
        void draw() {
                System.out.println("Drawing Square");
        }

        void erase() {
                System.out.println("Erasing Square");
        }
}

class DrawShape {
        public static void main(String[] args) {
                Shape shape;

                shape = new Circle();
                shape.draw();
                shape.erase();

                shape = new Triangle();
                shape.draw();
                shape.erase();

                shape = new Square();
                shape.draw();
                shape.erase();
        }
}
```

```
C:\24BCSA08\ASSIGNMENT5>javaC q3.java

C:\24BCSA08\ASSIGNMENT5>java DrawShape
Drawing Circle
Erasing Circle
Drawing Triangle
Erasing Triangle
Drawing Square
Erasing Square
```

Name –MANOJNYA HARICHANDAN
SIC – 24BCSA08
Roll No. – 10

4. Define an abstract class named "Figure", having data members dim1 and dim2. Extend this class to create two concrete classes named Rectangle and Triangle. Override the getArea() method in the sub classes. Invoke the getArea() method in the main method of another Driver class through the abstract class reference variable.

```java
import java.util.Scanner;

abstract class Figure {
        double dim1;
        double dim2;

        Figure(double dim1, double dim2) {
                this.dim1 = dim1;
                this.dim2 = dim2;
        }

        abstract double getArea();
}

class Rectangle extends Figure {
        Rectangle(double length, double width) {
                super(length, width);
        }

        double getArea() {
                return dim1 * dim2;
        }
}

class Triangle extends Figure {
        Triangle(double base, double height) {
                super(base, height);
        }

        double getArea() {
                return 0.5 * dim1 * dim2;
        }
}

class AbsFigArea {
        public static void main(String args[]) {
                Scanner sc = new Scanner(System.in);

                Figure fig;

                System.out.print("Enter the length: ");
                double l = sc.nextDouble();
                System.out.print("Enter the width: ");
```

Name –MANOJNYA HARICHANDAN

SIC – 24BCSA08

Roll No. – 10

```java
                double w = sc.nextDouble();
                fig = new Rectangle(l, w);
                System.out.println("The area of rectangle is: " + fig.getArea());

                System.out.print("Enter the base: ");
                double b = sc.nextDouble();
                System.out.print("Enter the height: ");
                double h = sc.nextDouble();
                fig = new Triangle(b, h);
                System.out.println("The area of triangle is: " + fig.getArea());
        }
}
```

```
C:\24BCSA08\ASSIGNMENT5>javaC q4.java

C:\24BCSA08\ASSIGNMENT5>java AbsFigArea
Enter the length: 4
Enter the width: 5
The area of rectangle is: 20.0
Enter the base: 3
Enter the height: 8
The area of triangle is: 12.0
```

5. Create a class Point2D with the data member x and y coordinate. Use default and parameterised constructor to set the coordinate values and display() to show the coordinates. Create a subclass called Point3D which is derived from the superclass Point2D with data members z coordinate and has constructor to initialize the input and show() method to display the coordinates. Test the methods of both the classes by creating objects in the main method of driver class.

```java
import java.util.Scanner;

class Point2D {
        int x, y;

        Point2D() {
                this.x = 0;
                this.y = 0;
        }

        Point2D(int x, int y) {
                this.x = x;
                this.y = y;
        }

        void display() {
            System.out.println("Point2D Coordinates: (" + x + ", " + y + ")");
        }
}

class Point3D extends Point2D {
        int z;
```

Name –MANOJNYA HARICHANDAN
SIC – 24BCSA08
Roll No. – 10

```java
        Point3D(int x, int y, int z) {
                super(x, y);
                this.z = z;
        }

        void show() {
                System.out.println("Point3D Coordinates: (" + x + ", " + y + ", " + z + ")");
        }
}

class Distance {
        public static void main(String[] args) {
                Scanner sc = new Scanner(System.in);

                System.out.println("Enter coordinates for Point2D:");
                System.out.print("x: ");
                int x2d = sc.nextInt();
                System.out.print("y: ");
                int y2d = sc.nextInt();

                Point2D p1 = new Point2D(x2d, y2d);

                p1.display();

                System.out.println("\nEnter coordinates for Point3D:");
                System.out.print("x: ");
                int x3d = sc.nextInt();
                System.out.print("y: ");
                int y3d = sc.nextInt();
                System.out.print("z: ");
                int z3d = sc.nextInt();

                Point3D p2 = new Point3D(x3d, y3d, z3d);

                p2.show();
        }
}
```

```
C:\24BCSA08\ASSIGNMENT5>javaC q5.java

C:\24BCSA08\ASSIGNMENT5>java Distance
Enter coordinates for Point2D:
x: 5
y: 6
Point2D Coordinates: (5, 6)

Enter coordinates for Point3D:
x: 3
y: 6
z: 9
Point3D Coordinates: (3, 6, 9)
```

Name –MANOJNYA HARICHANDAN
SIC – 24BCSA08
Roll No. – 10

6. Create the classes as given in the below figure. Display the interest rate in the following format:
SBI Rate of Interest : 8
ICICI Rate of Interest : 7
AXIS Rate of Interest : 9

```java
class Bank {
        int getRateOfInterest() {
        return 0;
        }
}

class SBI extends Bank {
        int getRateOfInterest() {
                return 8;
        }
}

class ICICI extends Bank {
        int getRateOfInterest() {
                return 7;
        }
}

class AXIS extends Bank {
        int getRateOfInterest() {
                return 9;
        }
}

class BankROI {
        public static void main(String[] args) {
                Bank b;

                b = new SBI();
                System.out.println("SBI Rate of Interest : " + b.getRateOfInterest());

                b = new ICICI();
                System.out.println("ICICI Rate of Interest : " + b.getRateOfInterest());

                b = new AXIS();
                System.out.println("AXIS Rate of Interest : " + b.getRateOfInterest());
        }
}
```

Name –MANOJNYA HARICHANDAN
SIC – 24BCSA08
Roll No. – 10

```
C:\24BCSA08\ASSIGNMENT5>javaC q6.java

C:\24BCSA08\ASSIGNMENT5>java BankROI
SBI Rate of Interest : 8
ICICI Rate of Interest : 7
AXIS Rate of Interest : 9
```

7. Create a class Person that has data member name. Use constructor to initialize name and display() to display name. Create a derived class Employee from Person class having private members empid. Using constructor initialize empid and have method display() to display empid. Create another derivedclass HourlyEmployee from Employee with private members hourlyRate and hoursWorked. Use constructor to initialize input and methods getGrossPay() that computes and returns the gross pay of the employee and display() to display the hourlyRate, hoursWorked and gross pay. Create a driver class to test the functionalities of the above classes and display output in the following format
Name : John Smith
EmpID : 7569
Hourly Rate : 100
Hours worked : 2000
Gross pay : 200000

```java
import java.util.Scanner;
class Person {
        String name;

        Person(String name) {
                this.name = name;
        }

        void display() {
                System.out.println("Name : " + name);
        }
}

class Employee extends Person {
        private int empid;

        Employee(String name, int empid) {
                super(name);
                this.empid = empid;
        }

        void display() {
                super.display();
                System.out.println("EmpID : " + empid);
        }

        int getEmpId() {
                return empid;
        }
}

class HourlyEmployee extends Employee {
```

Name –MANOJNYA HARICHANDAN
SIC – 24BCSA08
Roll No. – 10

```
        private double hourlyRate;
        private int hoursWorked;

        HourlyEmployee(String name, int empid, double hourlyRate, int hoursWorked) {
                super(name, empid);
                this.hourlyRate = hourlyRate;
                this.hoursWorked = hoursWorked;
        }

        double getGrossPay() {
                return hourlyRate * hoursWorked;
        }

        void display() {
                super.display();
                System.out.println("Hourly Rate : " + hourlyRate);
                System.out.println("Hours worked : " + hoursWorked);
                System.out.println("Gross pay : " + getGrossPay());
        }
}
class EmpRecord {
    public static void main(String[] args) {
                Scanner sc = new Scanner(System.in);
                System.out.print("Enter Employee Name: ");
                String name = sc.nextLine();
                System.out.print("Enter Employee ID: ");
                int empid = sc.nextInt();
                System.out.print("Enter Hourly Rate: ");
                double hourlyRate = sc.nextDouble();
                System.out.print("Enter Hours Worked: ");
                int hoursWorked = sc.nextInt();
                HourlyEmployee he = new HourlyEmployee(name, empid, hourlyRate, hoursWorked);
                System.out.println("\n--- Employee Details ---");
                he.display();
        }
}
```

```
C:\24BCSA08\ASSIGNMENT5>javaC q7.java

C:\24BCSA08\ASSIGNMENT5>java EmpRecord
Enter Employee Name: manojnya
Enter Employee ID: 25789
Enter Hourly Rate: 1999
Enter Hours Worked: 2

--- Employee Details ---
Name : manojnya
EmpID : 25789
Hourly Rate : 1999.0
Hours worked : 2
Gross pay : 3998.0
```

Name –MANOJNYA HARICHANDAN
SIC – 24BCSA08
Roll No. – 10