JAVA PROGRAMMING

ASSESSMENT – 2

INHERITANCE AND POLYMORPHISM

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Slot: L23 + L24

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I.   SINGLE INHERITANCE

```java
class Bank{
    String name;
    int AccNo;
    double balance;
    void insertBankRecord(String n, int a, double b){
        name = n;
        AccNo = a;
        balance = b;
    }
    void displayBankRecord(){
        System.out.println("Name = " + name);
        System.out.println("AccNo = " + AccNo);
        System.out.println("Balance = " + balance);
    }
}
class Insurance extends Bank{
    String insName;
    int insAccNo;
    int policyNo;
    double maturityAmt;
    int maturityTime;
    void insertInsRecord(String n, int a, int p, int ma, int mt){
        insName = n;
        insAccNo = a;
        policyNo = p;
        maturityAmt = ma;
        maturityTime = mt;
    }
    void displayInsRecord(){
        System.out.println("InsName = " + insName);
        System.out.println("InsAccNo = " + insAccNo);
```

```java
        System.out.println("PolicyNo = " + policyNo);
        System.out.println("MaturityAmt = " + maturityAmt);
        System.out.println("MaturityTime = " + maturityTime + " years");
    }
}
public class SingleInheritance {
    public static void main(String[] args) {
        Insurance i1 = new Insurance();
        i1.insertBankRecord("Kishore", 123, 10000);
        i1.insertInsRecord("ABCD", 987 ,574, 5000, 2);
        i1.displayBankRecord();
        i1.displayInsRecord();
        System.out.println();
    }
}
```

OUTPUT:

```
PS C:\Users\N Kishore Kumar\Desktop\Java_Programs>  c:; cd 'c:\User
-debug-0.31.0\scripts\launcher.bat' 'C:\Program Files\Java\jdk-14.0
 Kumar\AppData\Roaming\Code\User\workspaceStorage\b332b045a5e54b453
Name = Kishore
AccNo = 123
Balance = 10000.0
InsName = ABCD
InsAccNo = 987
PolicyNo = 574
MaturityAmt = 5000.0
MaturityTime = 2 years

PS C:\Users\N Kishore Kumar\Desktop\Java_Programs> []
```

II.   MULTILEVEL INHERITANCE

```java
class Student{
    String name;
    String regNo;
    int year;
    void insStuRec(String n, String r, int y){
        name = n;
```

```java
            regNo = r;
            year = y;
        }
        void disStuRec(){
            System.out.println("Name = " + name);
            System.out.println("RegNo = " + regNo);
            System.out.println("Year = " + year);
        }
}
class Department extends Student{
    String school;
    String course;
    void insDepRec(String s, String c){
        school = s;
        course = c;
    }
    void disDepRec(){
        System.out.println("School = " + school);
        System.out.println("Course = " + course);
    }
}
class Library extends Department{
    int dueAmt;
    void insDueAmt(int d){
        dueAmt = d;
    }
    void disDueAmt(){
        System.out.println("Due Amount = " + dueAmt);
    }
}
public class MultilevelInheritance {
    public static void main(String[] args) {
        Library l1 = new Library();
        l1.insStuRec("Kishore", "18BCE2106", 3);
        l1.insDepRec("SCOPE","CSE");
        l1.insDueAmt(0);
        l1.disStuRec();
        l1.disDepRec();
        l1.disDueAmt();
        System.out.println();
    }
}
```

OUTPUT:

```
PS C:\Users\N Kishore Kumar\Desktop\Java_Programs> c:; cd '
-debug-0.31.0\scripts\launcher.bat' 'C:\Program Files\Java\j
 Kumar\AppData\Roaming\Code\User\workspaceStorage\b332b045a5
Name = Kishore
RegNo = 18BCE2106
Year = 3
School = SCOPE
Course = CSE
Due Amount = 0

PS C:\Users\N Kishore Kumar\Desktop\Java_Programs> []
```

III.   HIERARCHICAL INHERITANCE

```java
class Shape{
    void printShape(){
        System.out.print("Geometry shape: ");
    }
}
class Rectangle extends Shape{
    void printRect(int l, int b){
        System.out.println("Rectangle Area = " + l*b);
    }
}
class Square extends Shape{
    void printSq(int a){
        System.out.println("Square Area = " + a*a);
    }
}
class Triangle extends Shape{
    void printTri(int h, int b){
        System.out.println("Triangle Area = " + 0.5*b*h);
    }
}
class Circle extends Shape{
    void printCir(int r){
        System.out.println("Circle Area = " + 3.14*r*r);
    }
}
```

```java
public class HierarchicalInheritance {
    public static void main(String[] args) {
        Rectangle r1 = new Rectangle();
        Square s1 = new Square();
        Circle c1 = new Circle();
        Triangle t1 = new Triangle();
        r1.printShape();
        r1.printRect(5,4);
        s1.printShape();
        s1.printSq(4);
        t1.printShape();
        t1.printTri(10, 10);
        c1.printShape();
        c1.printCir(2);
        System.out.println();
    }
}
```

OUTPUT:

```
PS C:\Users\N Kishore Kumar\Desktop\Java_Programs>  c:; cd 'c:\Users
-debug-0.31.0\scripts\launcher.bat' 'C:\Program Files\Java\jdk-14.0.
 Kumar\AppData\Roaming\Code\User\workspaceStorage\b332b045a5e54b453c
Geometry shape: Rectangle Area = 20
Geometry shape: Square Area = 16
Geometry shape: Triangle Area = 50.0
Geometry shape: Circle Area = 12.56

PS C:\Users\N Kishore Kumar\Desktop\Java_Programs> []
```

IV.   HYBRID INHERITANCE

```java
class Theatre{
    int screenNo;
    String showTime;
    String date;
    void getDetails(int s, String t, String d){
        screenNo = s;
        showTime = t;
        date = d;
```

```java
        }
    void printDetails(){
        System.out.println("Screen No: " + screenNo);
        System.out.println("Show Time: " + showTime);
        System.out.println("Date: " + date);
    }
}
class EnglishMovie extends Theatre{
    String name;
    boolean subs;
    String runTime;
    String certificate;
    String actors;
    String director;
    String language;
    void getEngMovieDetails(String n, boolean s, String r, String c, String a, String d){
        name = n;
        subs = s;
        runTime = r;
        certificate = c;
        actors = a;
        director = d;
        language = "English";
    }
    void printEngMovieDetails(){
        System.out.println("Movie Name: " + name);
        System.out.println("Subtitles: " + subs);
        System.out.println("Run Time: " + runTime);
        System.out.println("Certificate: " + certificate);
        System.out.println("Actors: " + actors);
        System.out.println("Director: " + director);
        System.out.println("Language: " + language);
    }
}
class TamilMovie extends Theatre{
    String name;
    boolean subs;
    String runTime;
    String certificate;
    String actors;
    String director;
    String language;
    void getTamilMovieDetails(String n, boolean s, String r, String c, String a, String d){
        name = n;
        subs = s;
        runTime = r;
        certificate = c;
        actors = a;
```

```java
        director = d;
        language = "Tamil";
    }
    void printTamilMovieDetails(){
        System.out.println("Movie Name: " + name);
        System.out.println("Subtitles: " + subs);
        System.out.println("Run Time: " + runTime);
        System.out.println("Certificate: " + certificate);
        System.out.println("Actors: " + actors);
        System.out.println("Director: " + director);
        System.out.println("Language: " + language);
    }
}
class PrintEngTicket extends EnglishMovie{
    int numOfTickets;
    float ticketCost;
    float totalCost;
    void getEngTicket(int n, float t){
        numOfTickets = n;
        ticketCost = t;
        totalCost = numOfTickets*ticketCost;
    }
    void printEngTicket(){
        System.out.println("Number of Tickets: " + numOfTickets);
        System.out.println("Total Cost: " + totalCost);
    }
}
class PrintTamilTicket extends TamilMovie{
    int numOfTickets;
    float ticketCost;
    float totalCost;
    void getTamTicket(int n, float t){
        numOfTickets = n;
        ticketCost = t;
        totalCost = numOfTickets*ticketCost;
    }
    void printTamTicket(){
        System.out.println("Number of Tickets: " + numOfTickets);
        System.out.println("Total Cost: " + totalCost);
    }
}
public class HybridInheritance {
    public static void main(String[] args) {
        PrintTamilTicket pe = new PrintTamilTicket();
        pe.getDetails(1, "19:00", "19-02-2021");
        pe.getTamilMovieDetails("Master", false, "178.31", "U/A", "Vijay, Vijay Sethupathi",
 "Lokesh Kanagaraj");
        pe.getTamTicket(3, 150);
```

```java
        pe.printTamTicket();
        pe.printDetails();
        pe.printTamilMovieDetails();
        System.out.println();
        PrintEngTicket pe1 = new PrintEngTicket();
        pe1.getDetails(2, "15:00", "19-02-2021");
        pe1.getEngMovieDetails("Tenet", true, "150.0", "U", "John David WasTamgton", "Christ
opher Nolan");
        pe1.getEngTicket(1, 150);
        pe1.printEngTicket();
        pe1.printDetails();
        pe1.printEngMovieDetails();
        System.out.println();
    }
}
```

OUTPUT:

```
PS C:\Users\N Kishore Kumar\Desktop\Java_Programs>  c:; cd 'c:\User
-debug-0.31.0\scripts\launcher.bat' 'C:\Program Files\Java\jdk-14.0
 Kumar\AppData\Roaming\Code\User\workspaceStorage\b332b045a5e54b453
Number of Tickets: 3
Total Cost: 450.0
Screen No: 1
Show Time: 19:00
Date: 19-02-2021
Movie Name: Master
Subtitles: false
Run Time: 178.31
Certificate: U/A
Actors: Vijay, Vijay Sethupathi
Director: Lokesh Kanagaraj
Language: Tamil

Number of Tickets: 1
Total Cost: 150.0
Screen No: 2
Show Time: 15:00
Date: 19-02-2021
Movie Name: Tenet
Subtitles: true
Run Time: 150.0
Certificate: U
Actors: John David WasTamgton
Director: Christopher Nolan
Language: English

PS C:\Users\N Kishore Kumar\Desktop\Java_Programs> []
```

V. __METHOD OVERLOADING__

```java
class Ticket{
    void BookTicket(int n, String flight, double price, String time, String date){
        System.out.println("Book Flight Tickets");
        System.out.println("\tNumber of Tickets: " + n);
        System.out.println("\tFlight Name: " + flight);
        System.out.println("\tTotal Cost: " + n*price);
        System.out.println("\tTime: " + time);
        System.out.println("\tDate: " + date);
    }
    void BookTicket(int n, String movie, double price, int scno, String time, String date){
        System.out.println("Book Movie Tickets");
        System.out.println("\tNumber of Tickets: " + n);
        System.out.println("\tMovie Name: " + movie);
        System.out.println("\tTotal Cost: " + n*price);
        System.out.println("\tScreen Number: " + scno);
        System.out.println("\tTime: " + time);
        System.out.println("\tDate: " + date);
    }
}
public class MethodOverloading {
    public static void main(String[] args){
        Ticket t = new Ticket();
        t.BookTicket(3, "Indigo", 3999, "19:00", "25-02-2021");
        System.out.println();
        t.BookTicket(3, "Master", 200, 3, "18:00", "25-02-2021");
        System.out.println();
    }
}
```

__OUTPUT:__

```
PS C:\Users\N Kishore Kumar\Desktop\Java_Programs>  c:;
-debug-0.31.0\scripts\launcher.bat' 'C:\Program Files\Ja
 Kumar\AppData\Roaming\Code\User\workspaceStorage\b332b0-
Book Flight Tickets
         Number of Tickets: 3
         Flight Name: Indigo
         Total Cost: 11997.0
         Time: 19:00
         Date: 25-02-2021

Book Movie Tickets
         Number of Tickets: 3
         Movie Name: Master
         Total Cost: 600.0
         Screen Number: 3
         Time: 18:00
         Date: 25-02-2021

PS C:\Users\N Kishore Kumar\Desktop\Java_Programs> []
```

VI. METHOD OVERRIDING

```java
class GeometryShape{
    double getArea(){
        return 0;
    }
}
class Rectangle1 extends GeometryShape{
    double getArea(int l, int b){
        return l*b;
    }
}
class Square1 extends GeometryShape{
    double getArea(int a){
        return a*a;
    }
}
class Triangle1 extends GeometryShape{
    double getArea(int h, int b){
        return 0.5*b*h;
    }
}
class Circle1 extends GeometryShape{
```

```java
    double getArea(int r){
        return 3.14*r*r;
    }
}
class Rhombus1 extends GeometryShape{
    double getArea(int d1, int d2){
        return  0.5*d1*d2;
    }
}
public class MethodOverriding {
    public static void main(String[] args){
        Rectangle1 r = new Rectangle1();
        Square1 s = new Square1();
        Triangle1 t = new Triangle1();
        Circle1 c = new Circle1();
        Rhombus1 rh = new Rhombus1();
        System.out.println("Area of Rectangle = " + r.getArea(8,10));
        System.out.println("Area of Square = " + s.getArea(5));
        System.out.println("Area of Triangle = " + t.getArea(8, 9));
        System.out.println("Area of Circle = " + c.getArea(3));
        System.out.println("Area of Rhombus = " + rh.getArea(4,7));
        System.out.println();
    }
}
```

OUTPUT:

```
PS C:\Users\N Kishore Kumar\Desktop\Java_Programs>  c:; cd 'c:'
-debug-0.31.0\scripts\launcher.bat' 'C:\Program Files\Java\jdk
 Kumar\AppData\Roaming\Code\User\workspaceStorage\b332b045a5e5
Area of Rectangle = 80.0
Area of Square = 25.0
Area of Triangle = 36.0
Area of Circle = 28.259999999999998
Area of Rhombus = 14.0

PS C:\Users\N Kishore Kumar\Desktop\Java_Programs> []
```