**DAY -1 ASSIGNMENT**

**BASIC OF JAVA**

**Problem Statement 3 :**

**1.1**

**EvenNumbers Class**

**package** org.software.com;

**import** java.util.Scanner;

**public** **class** EvenNumbers {

**public** **static** **void** main(String[] args) {

Scanner sc = **new** Scanner(System.***in***);

System.***out***.print("Enter Number : ");

**int** num = sc.nextInt();

System.***out***.println("Even Numbers Less Than or Equal " + num + " are:");

**for** (**int** i = 1; i <= num; i++) {

**if** (i % 2 == 0)

System.***out***.print(i + " ");

}

}

}

**1.2**

**RectAngle Class**

**package** org.software.com;

**public** **class** RectAngle {

**double** length, breadth;

**double** area;

**public** RectAngle() {

**this**.length = 0;

**this**.breadth = 0;

}

**public** RectAngle(**double** length, **double** breadth) {

**this**.length = length;

**this**.breadth = breadth;

}

**void** calculateArea() {

area=length\*breadth;

}

**void** toDisplay() {

System.***out***.println("------------RECTANGLE------------");

System.***out***.println("Length of Rectangle : "+length);

System.***out***.println("breadth of Rectangle : "+breadth);

System.***out***.println("Area of Rectangle : "+area);

}

**public** **double** getLength() {

**return** length;

}

**public** **void** setLength(**double** length) {

**this**.length = length;

}

**public** **double** getBreadth() {

**return** breadth;

}

**public** **void** setBreadth(**double** breadth) {

**this**.breadth = breadth;

}

}

**TestRectangle Class**

**package** org.software.com;

**import** java.util.Scanner;

**public** **class** TestRectangle {

**public** **static** **void** main(String[] args) {

Scanner sc=**new** Scanner(System.***in***);

System.***out***.println("Enter length");

**double** l=sc.nextDouble();

System.***out***.println("Enter Width");

**double** b=sc.nextDouble();

RectAngle ra=**new** RectAngle(l,b);

ra.calculateArea();

ra.toDisplay();

}

}

**1.3**

**Books Class**

**package** org.software.com;

**public** **class** Books {

String book\_title;

**double** book\_price;

**public** Books() {

}

**public** String getBook\_title() {

**return** book\_title;

}

**public** **void** setBook\_title(String book\_title) {

**this**.book\_title = book\_title;

}

**public** **double** getBook\_price() {

**return** book\_price;

}

**public** **void** setBook\_price(**double** book\_price) {

**this**.book\_price = book\_price;

}

}

**TestBook Class**

**package** org.software.com;

**import** java.util.Scanner;

**public** **class** TestBook {

**private** **static** Books createBooks() {

Scanner sc = **new** Scanner(System.***in***);

Books b = **new** Books();

System.***out***.println("Enter book Title");

b.setBook\_title(sc.next());

System.***out***.println("Enter book Price");

b.setBook\_price(sc.nextDouble());

**return** b;

}

**private** **static** **void** showBooks(Books[] books) {

System.***out***.println("BOOK TITLE " + " | " + "BOOK PRICE");

**for** (**int** i = 0; i < books.length; i++) {

System.***out***.println(books[i].getBook\_title() + " | " + books[i].getBook\_price());

}

}

**public** **static** **void** main(String[] args) {

Scanner sc = **new** Scanner(System.***in***);

System.***out***.println("How May Books You Want to Enter");

**int** n = sc.nextInt();

Books books[] = **new** Books[n];

**for** (**int** i = 0; i < books.length; i++) {

Books b = *createBooks*();

books[i] = b;

}

*showBooks*(books);

}

}

**1.4**

**RectanglePerimeter Class**

**package** org.software.com;

**import** java.util.Scanner;

**public** **class** RectanglePerimeter {

**double** length = 1.0;

**double** width = 1.0;

**public** **double** getLength() {

**return** length;

}

**public** **void** setLength(**double** length) {

**if** (length > 0.0 && length < 20.0)

**this**.length = length;

}

**public** **double** getWidth() {

**return** width;

}

**public** **void** setWidth(**double** width) {

**if** (width > 0.0 && width < 20.0)

**this**.width = width;

}

**public** **void** calculatePerimeterArea() {

**double** perimeter = 2 + (length + width);

System.***out***.println("The Perimeter of a Rectangle : " + perimeter);

**double** area = length \* width;

System.***out***.println("The Area of a Rectangle : " + area);

}

}

**Test Class**

**package** org.software.com;

**import** java.util.Scanner;

**public** **class** Test {

**public** **static** **void** main(String[] args) {

Scanner sc = **new** Scanner(System.***in***);

RectanglePerimeter rp=**new** RectanglePerimeter();

System.***out***.println("Enter length");

rp.setLength(sc.nextDouble());

System.***out***.println("Enter Width");

rp.setWidth(sc.nextDouble());

**if**(rp.getLength()>1.0 && rp.getWidth()>1.0)

rp.calculatePerimeterArea();

**else**

System.***out***.println("Invalid Data Entry");

}

}

**1.5**

**Date Class**

**package** org.software.com;

**class** Date {

**public** **int** day;

**public** **int** month;

**public** **int** year;

**public** Date() {

**this**.day = 1;

**this**.month = 1;

**this**.year = 2000;

}

**public** Date(**int** day, **int** month, **int** year) {

**if** (isValid(day, month, year)) {

**this**.day = day;

**this**.month = month;

**this**.year = year;

}

**else** {

**throw** **new** IllegalArgumentException("Invalid date provided");

}

}

**private** **boolean** isValid(**int** day, **int** month, **int** year) {

**if** (year < 0 || month < 1 || month > 12 || day < 1 || day > daysInMonth(month, year)) {

**return** **false**;

}

**return** **true**;

}

**private** **boolean** isLeapYear(**int** year) {

**if** (year % 4 == 0) {

**if** (year % 100 == 0) {

**if** (year % 400 == 0) {

**return** **true**;

} **else** {

**return** **false**;

}

} **else** {

**return** **true**;

}

} **else** {

**return** **false**;

}

}

**private** **int** daysInMonth(**int** month, **int** year) {

**switch** (month) {

**case** 1: **case** 3: **case** 5: **case** 7:

**case** 8:

**case** 10:

**case** 12:

**return** 31;

**case** 4:

**case** 6:

**case** 9:

**case** 11:

**return** 30;

**case** 2:

**if** (isLeapYear(year)) {

**return** 29;

} **else** {

**return** 28;

}

**default**:

**throw** **new** IllegalArgumentException("Invalid month");

}

}

**public** Date addDays(**int** days) {

**int** newDay = **this**.day;

**int** newMonth = **this**.month;

**int** newYear = **this**.year;

newDay += days;

**while** (newDay > daysInMonth(newMonth, newYear)) {

newDay -= daysInMonth(newMonth, newYear);

newMonth++;

**if** (newMonth > 12) {

newMonth = 1;

newYear++;

}

}

**return** **new** Date(newDay, newMonth, newYear);

}

**public** String toString() {

**return** String.*format*("%02d-%02d-%04d", day, month, year);

}

}

**Employee Class**

**package** org.software.com;

**class** Employee {

**public** **int** employeeNumber;

**public** String employeeName;

**public** Date joiningDate;

**public** Employee(**int** employeeNumber, String employeeName, Date joiningDate) {

**this**. employeeNumber = employeeNumber;

**this**.employeeName = employeeName;

**this**. joiningDate = joiningDate;

}

@Override

**public** String toString() {

**return** "Employee Number: " + employeeNumber + ", Name: " + employeeName + ", Date of Joining: " + joiningDate.toString();

}

**public** **static** **void** main(String[] args) {

Date joiningDate1 = **new** Date(1, 1, 2020);

Date joiningDate2 = **new** Date(1, 1, 2021);

Date joiningDate3 = **new** Date(1, 1, 2022);

Date joiningDate4 = **new** Date(1, 1, 2023);

Date joiningDate5 = **new** Date(1, 1, 2024);

Employee employee1 = **new** Employee(1, "Sreekanth", joiningDate1);

Employee employee2 = **new** Employee(2, "Karthik", joiningDate2);

Employee employee3 = **new** Employee(3, "Sridevi", joiningDate3);

Employee employee4 = **new** Employee(4, "Raja", joiningDate4);

Employee employee5 = **new** Employee(5, "Vasantha", joiningDate5);

System.***out***.println(employee1);

System.***out***.println(employee2);

System.***out***.println(employee3);

System.***out***.println(employee4);

System.***out***.println(employee5);

Date newDate = joiningDate1.addDays(30);

System.***out***.println("New Date after adding 30 days: " + newDate);

}

}

**Problem Statement 2: Encapsulation and Inheritance in Java OOPs**

**Vehicle Class**

**package** org.software.com;

**import** java.sql.Date;

**class** Vehicle {

String manufacturer;

String model;

**int** year;

**void** displayDetails() {

}

**public** String getManufacturer() {

**return** manufacturer;

}

**public** **void** setManufacturer(String manufacturer) {

**this**.manufacturer = manufacturer;

}

**public** String getModel() {

**return** model;

}

**public** **void** setModel(String model) {

**this**.model = model;

}

**public** **int** getYear() {

**return** year;

}

**public** **void** setYear(**int** year) {

**this**.year = year;

}

}

**Car Class**

**package** org.software.com;

**class** Car **extends** Vehicle {

**int** seatingCapacity;

@Override

**void** displayDetails() {

System.***out***.println("getManufacturer :"+getManufacturer());

System.***out***.println("Model : "+getModel());

System.***out***.println("Capacity : "+getSeatingCapacity());

System.***out***.println("Year :"+getYear());

}

**void** accelerate() {

System.***out***.println("Accelerated");

}

**void** brake() {

System.***out***.println("Break Done");

}

**public** **int** getSeatingCapacity() {

**return** seatingCapacity;

}

**public** **void** setSeatingCapacity(**int** seatingCapacity) {

**this**.seatingCapacity = seatingCapacity;

}

}

**MotorCycle Class**

**package** org.software.com;

**class** MotorCycle **extends** Vehicle {

**double** engineCapacity;

@Override

**void** displayDetails() {

System.***out***.println("Manufacturer : "+getManufacturer());

System.***out***.println("Model : "+getModel());

System.***out***.println("Capacity : "+getEngineCapacity());

System.***out***.println("Year : "+getYear());

}

**void** startEngine() {

System.***out***.println("Engine Started Successfully");

}

**void** stopEngine() {

System.***out***.println("Engine Stopped Successfully");

}

**public** **double** getEngineCapacity() {

**return** engineCapacity;

}

**public** **void** setEngineCapacity(**double** engineCapacity) {

**this**.engineCapacity = engineCapacity;

}

}

**Truck Class**

**package** org.software.com;

**class** Truck **extends** Vehicle {

**double** cargoCapacity;

@Override

**void** displayDetails() {

System.***out***.println("Manufacturer : "+getManufacturer());

System.***out***.println("Model : "+getModel());

System.***out***.println("Capacity : "+getCargoCapacity());

System.***out***.println("Year : "+getYear());

}

**void** loadCargo() {

System.***out***.println("Cargo Loaded Successfully");

}

**void** unloadCargo() {

System.***out***.println("Cargo Unloaded Successfully");

}

**public** **double** getCargoCapacity() {

**return** cargoCapacity;

}

**public** **void** setCargoCapacity(**double** cargoCapacity) {

**this**.cargoCapacity = cargoCapacity;

}

}

**TestVehicle Class**

**package** org.software.com;

**public** **class** TestVehicle {

**public** **static** **void** main(String[] args) {

// For Car

System.***out***.println("--------------------CAR------------------------");

Car c=**new** Car();

c.setSeatingCapacity(4);

c.setModel("Mercedes-Benz C-Class");

c.setManufacturer("Mercedes-Benz");

c.setYear(2020);

c.displayDetails();

c.accelerate();

c.brake();

// For MotorCycle

System.***out***.println("---------------------MOTOR CYCLE-----------------------");

MotorCycle mc=**new** MotorCycle();

mc.setEngineCapacity(2);

mc.setModel("Harley-Davidson Street Glide");

mc.setManufacturer("Harley-Davidson");

mc.setYear(2022);

mc.displayDetails();

mc.startEngine();

mc.stopEngine();

// For Truck

System.***out***.println("----------------------TRUCK----------------------");

Truck tr=**new** Truck();

tr.setCargoCapacity(50);

tr.setModel("Ford F-150");

tr.setManufacturer("Ford");

tr.setYear(2023);

tr.displayDetails();

tr.loadCargo();

tr.unloadCargo();

}

}

**Problem Statement 3: Abstraction in Java OOPs**

**Shape Class**

**package** org.software.com;

**abstract class** Shape **{**

**abstract void** calculateArea**();**

**}**

**Circle Class**

**package** org.software.com;

**public** **class** Circle **extends** Shape {

**double** radius;

**public** Circle(**double** radius) {

**super**();

**this**.radius = radius;

}

@Override

**void** calculateArea() {

**double** area = 3.14 \* radius \* radius;

System.***out***.println("The Area of Circle is : " + area);

}

}

**Rectangle Class**

**package** org.software.com;

**public** **class** Rectangle **extends** Shape {

**double** length, breadth;

**public** Rectangle(**double** length, **double** breadth) {

**super**();

**this**.length = length;

**this**.breadth = breadth;

}

@Override

**void** calculateArea() {

**double** area = length \* breadth;

System.***out***.println("The Area of Rectangle is : " + area);

}

}

**Triangle Class**

**package** org.software.com;

**public** **class** Triangle **extends** Shape{

**double** height, base;

**public** Triangle(**double** height, **double** base) {

**super**();

**this**.height = height;

**this**.base = base;

}

@Override

**void** calculateArea() {

**double** area=(height\*base)/2;

System.***out***.println("The Area of Triangle is : " + area);

}

}

**FindArea Class**

**package** org.software.com;

**public** **class** FindArea {

**public** **static** **void** main(String[] args) {

System.***out***.println("--------------------CIRCLE------------------------");

Circle c = **new** Circle(10);

c.calculateArea();

System.***out***.println("--------------------RECTANGLE------------------------");

Rectangle rc = **new** Rectangle(10, 20);

rc.calculateArea();

System.***out***.println("--------------------TRIANGLE------------------------");

Triangle tr = **new** Triangle(13, 15);

tr.calculateArea();

}

}

**Problem Statement 4: Implement the Static Classes and Methods in Java**

**Employee Class**

**package** org.software.com;

**public** **class** Employee {

**private** String name;

**private** **int** points;

**static** **int** *empCount* = 0;

**public** Employee() {

*empCount*++;

}

**public** String getName() {

**return** name;

}

**public** **void** setName(String name) {

**this**.name = name;

}

**public** **int** getPoints() {

**return** points;

}

**public** **void** setPoints(**int** points) {

**this**.points = points;

}

}

**PerformanceRating Class**

**package** org.software.com;

**public** **class** PerformanceRating {

**static** **final** **int** outstanding = 5;

**static** **final** **int** good = 4;

**static** **final** **int** avarage = 3;

**static** **final** **int** poor = 2;

**public** **static** **int** isPerformance(Employee e) {

**int** points = e.getPoints();

**if** (points >= 80 && points<=100) {

**return** outstanding;

} **else** **if** (points >= 60 && points<=79) {

**return** good;

} **else** **if** (points >= 50 && points<=59) {

**return** avarage;

} **else** **if** (points >= 1 && points<=49) {

**return** poor;

}

**return** 0;

}

}

**PerformanceCalculato Class**

**package** org.software.com;

**public** **class** PerformanceCalculato {

**public** **static** **void** main(String[] args) {

PerformanceRating pf = **new** PerformanceRating();

Employee emp1 = **new** Employee();

Employee emp2 = **new** Employee();

Employee emp3 = **new** Employee();

Employee emp4 = **new** Employee();

Employee emp5 = **new** Employee();

System.***err***.println("Total Number Of Employee : " + Employee.*empCount* + " and Their Ratings are");

System.***out***.println("------------------------------------------------------------------------");

emp1.setName("Sreekanth");

emp1.setPoints(40);

System.***out***.println(emp1.getName() + " Has Performed With a Rating " + pf.*isPerformance*(emp1));

System.***out***.println("------------------------------------------------------------------------");

emp2.setName("Karthik");

emp2.setPoints(65);

System.***out***.println(emp2.getName() + " Has Performed With a Rating " + pf.*isPerformance*(emp2));

System.***out***.println("------------------------------------------------------------------------");

emp3.setName("Raja");

emp3.setPoints(73);

System.***out***.println(emp3.getName() + " Has Performed With a Rating " + pf.*isPerformance*(emp3));

System.***out***.println("------------------------------------------------------------------------");

emp4.setName("Sridevi");

emp4.setPoints(89);

System.***out***.println(emp4.getName() + " Has Performed With a Rating " + pf.*isPerformance*(emp4));

System.***out***.println("------------------------------------------------------------------------");

emp5.setName("Vasantha");

emp5.setPoints(95);

System.***out***.println(emp5.getName() + " Has Performed With a Rating " + pf.*isPerformance*(emp5));

System.***out***.println("------------------------------------------------------------------------");

}

}