CYCLE 3

1. Area of different shapes using overloaded functions

Code

```
import java.util.*;
public class areaoverloading {
double a;
int s;
double area()
{
Scanner sc1=new Scanner(System.in);
System.out.println("Enter value of s: ");
int s=sc1.nextInt();
a=s*s;
System.out.println("Area of square: "+a);
return a;
}
double area(int r)
{
a=3.14*r*r;
System.out.println("Area of circle: "+a);
return a;
}
double area(int b,int h)
{
a=0.5*b*h;
System.out.println("Area of triangle: "+a);
return a;
}
double area(int h1,int b1, int b2)
{
a=h1*(b1+b2)/2;
System.out.println("Area of trapezoid: "+a);
return a;
}
public static void main(String[] args) {
areaoverloading obj=new areaoverloading();
Scanner sc=new Scanner(System.in);
System.out.println("\tAditya Suresh\n\t23mca004\n\t06/04/2024");
System.out.println("Enter value of r: ");
int r=sc.nextInt();
System.out.println("Enter value of b and h: ");
```

```
int b=sc.nextInt();
int h=sc.nextInt();
System.out.println("Enter value of h1,b1 and b2: ");
int h1=sc.nextInt();
int b1=sc.nextInt();
int b2=sc.nextInt();
obj.area();
obj.area(r);
obj.area(b, h);
obj.area(h1, b1, b2);
}
}
```

OUTPUT

2. Create a class 'Employee' with data members Empid, Name, Salary, Address and constructors to initialize the data members. Create another class 'Teacher' that inherit the properties of class employee and contain its own data members department, Subjects taught and constructors to initialize these data members and also include display function to display all the data members. Use array of objects to display details of N teachers.

Code

```
import java.util.Scanner;
class Employee
{
 int Empid;
 String Name;
 double Salary;
 String Address;
 Employee(int no, String na, double sal, String add)
 {
 this.Empid = no;
 this.Name = na;
 this.Salary = sal;
 this.Address = add;
 }
}
public class Teacher extends Employee
{
String dept;
String subject;
Teacher(int no, String na, double sal, String add, String dep, String sub)
{
super(no,na,sal,add);
this.dept= dep;
this.subject=sub;
}
void display()
{
System.out.println("Employee id: "+Empid);
System.out.println("Name: "+Name);
System.out.println("Salary: "+Salary);
System.out.println("Address: "+Address);
System.out.println("Department: "+dept);
System.out.println("Subject: "+subject);
}
public static void main(String[] args)
```

```
{
System.out.println("\tAdityaSuresh\n\t23mca004\n\t06/04/2024");
System.out.println("Enter the No. of Employee's");
Scanner sc1 = new Scanner(System.in);
int num = sc1.nextInt();
Teacher arr[]=new Teacher[num];
for(int i =0;i<num;i++)
{
Scanner sc =new Scanner(System.in);
System.out.println("\nEnter Employee id: ");
int Empid=sc.nextInt();
System.out.println("Enter Employee Name: ");
String Name=sc.next();
System.out.println("Enter Salary: ");
double Salary=sc.nextDouble();
System.out.println("Enter Address: ");
String Address=sc.next();
System.out.println("Enter department: ");
String dept=sc.next();
System.out.println("Enter Subject: ");
String subject=sc.next();
arr[i]=new Teacher(Empid,Name,Salary,Address,dept,subject);
}
System.out.println("\n********Informations of all the employee's**********");
for(int i=0;i<num;i++)
{
int j=i+1;
System.out.println("\n"+j+").");
arr[i].display();
}
sc1.close();
}
}
```

OUTPUT

```
mca@Z238-UL:~/Aditya/java$ javac Teacher.java
mca@Z238-UL:~/Aditya/java$ java Teacher
        Aditya Suresh
        23mca004
        06/04/2024
Enter the No. of Employee's
3

Enter Employee id:
1
Enter Employee Name:
abhirami
Enter Salary:
25000
Enter Address:
ambalkkunnu
Enter department:
mca
Enter Subject:
oops

Enter Employee id:
2
Enter Employee Name:
abin
Enter Salary:
25000
Enter Address:
kunnungal
Enter department:
mca
Enter Subject:
cn

Enter Employee id:
3
Enter Employee Name:
afna
Enter Salary:
25000
Enter Address:
mankunnel
Enter department:
```

3. Create a class 'Person' with data members Name, Gender, Address, Age and a constructor to initialize the data members and another class 'Employee' that inherits the properties of class Person and also contains its own data members like Empid, Company_name, Qualification, Salary and its own constructor. Create another class 'Teacher' that inherits the properties of class Employee and contains its own data members like Subject, Department, Teacherid and also contain constructors and methods to display the data members. Use array of objects to display details of N teachers.

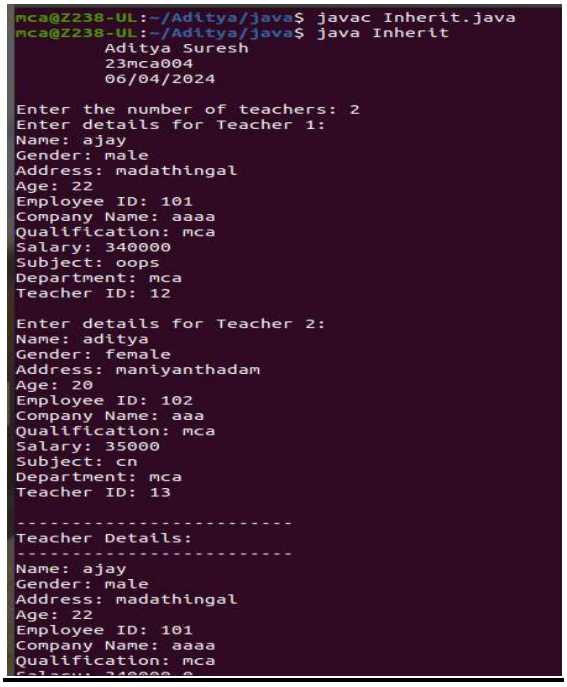
Code

```
import java.util.Scanner;
class Person {
String name;
String gender;
String address;
int age;
public Person(String name, String gender, String address, int age) {
this.name = name;
this.gender = gender;
this.address = address;
this.age = age;
}
}
class Employee extends Person {
int empId;
String companyName;
String qualification;
double salary;
public Employee(String name, String gender, String address, int age, int empId, String
companyName, String qualification, double salary) {
super(name, gender, address, age);
this.empId = empId;
this.companyName = companyName;
this.qualification = qualification;
this.salary = salary;
}
}
class Teacher extends Employee {
String subject;
String department;
int teacherId;
public Teacher(String name, String gender, String address, int age, int empId, String
companyName, String qualification, double salary, String subject, String department, int
teacherId) {
```

```
super(name, gender, address, age, empId, companyName, qualification, salary);
this.subject = subject;
this.department = department;
this.teacherId = teacherId;
}
public void displayDetails() {
System.out.println("Name: " + name);
System.out.println("Gender: " + gender);
System.out.println("Address: " + address);
System.out.println("Age: " + age);
System.out.println("Employee ID: " + empId);
System.out.println("Company Name: " + companyName);
System.out.println("Qualification: " + qualification);
System.out.println("Salary: " + salary);
System.out.println("Subject: " + subject);
System.out.println("Department: " + department);
System.out.println("Teacher ID: " + teacherId);
System.out.println("---------------------------------------");
}
}
public class Inherit {
public static void main(String[] args) {
System.out.println("\tAditya Suresh\n\t23mca004\n\t06/04/2024");
System.out.println();
Scanner scanner = new Scanner(System.in);
System.out.print("Enter the number of teachers: ");
int N = scanner.nextInt(); // Number of teachers
Teacher[] teachers = new Teacher[N];
for (int i = 0; i < N; i++) {
scanner.nextLine(); // Consume the newline character
System.out.println("Enter details for Teacher " + (i + 1) + ":");
System.out.print("Name: ");
String teacherName = scanner.nextLine();
System.out.print("Gender: ");
String gender = scanner.nextLine();
System.out.print("Address: ");
String address = scanner.nextLine();
System.out.print("Age: ");
int age = scanner.nextInt();
System.out.print("Employee ID: ");
int empId = scanner.nextInt();
scanner.nextLine(); // Consume the newline character
System.out.print("Company Name: ");
String companyName = scanner.nextLine();
System.out.print("Qualification: ");
```

```
String qualification = scanner.nextLine();
System.out.print("Salary: ");
double salary = scanner.nextDouble();
scanner.nextLine(); // Consume the newline character
System.out.print("Subject: ");
String subject = scanner.nextLine();
System.out.print("Department: ");
String department = scanner.nextLine();
System.out.print("Teacher ID: ");
int teacherId = scanner.nextInt();
teachers[i] = new Teacher(teacherName, gender, address, age, empId,
companyName, qualification, salary, subject, department, teacherId);
System.out.println();
}
System.out.println("-------------------------");
System.out.println("Teacher Details:");
System.out.println("-------------------------"); for
(Teacher teacher : teachers) {
teacher.displayDetails();
}
}
}
```

OUTPUT



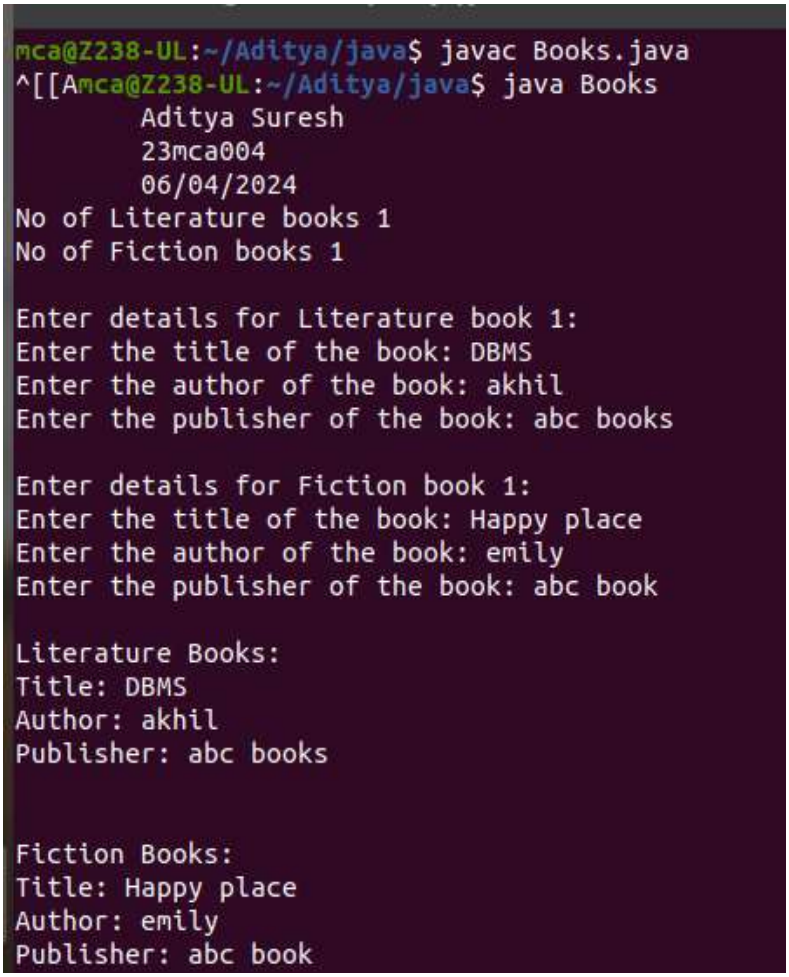
4. Write a program has class Publisher, Book, Literature and Fiction. Read the information and print the details of books from either the category, using inheritance.

Code

```
import java.util.Scanner;
class Publisher {
String name;
Publisher(String name) {
this.name = name;
}}
class Book extends Publisher {
String title;
String author;
Book(String title, String author, String publisher) {
super(publisher);
this.title = title;
this.author = author;
}
void display() {
 System.out.println("Title: " + title);
 System.out.println("Author: " + author);
 System.out.println("Publisher: " + name);
 }}
class Literature extends Book {
Literature(String title, String author, String publisher) {
super(title, author, publisher);
}}
class Fiction extends Book {
Fiction(String title, String author, String publisher) {
super(title, author, publisher);
}}
public class Books {
public static void main(String[] args) {
System.out.println("\tAditya Suresh\n\t23mca004\n\t06/04/2024");
Scanner scanner = new Scanner(System.in);
System.out.print("No of Literature books ");
int numLiteratureBooks = scanner.nextInt();
scanner.nextLine();
System.out.print("No of Fiction books ");
int numFictionBooks = scanner.nextInt();
scanner.nextLine();
Book[] literatureBooks = new Book[numLiteratureBooks];
Book[] fictionBooks = new Book[numFictionBooks];
```

```
for (int i = 0; i < numLiteratureBooks; i++) {
System.out.println("\nEnter details for Literature book " + (i + 1) +":");
literatureBooks[i] = createBook(scanner, "Literature");
}
for (int i = 0; i < numFictionBooks; i++) {
System.out.println("\nEnter details for Fiction book " + (i + 1) + ":");
fictionBooks[i] = createBook(scanner, "Fiction");
}
System.out.println("\nLiterature Books:");
displayBooks(literatureBooks);
System.out.println("\nFiction Books:");
displayBooks(fictionBooks);
scanner.close();
}
private static Book createBook(Scanner scanner, String type) {
System.out.print("Enter the title of the book: ");
String title = scanner.nextLine();
System.out.print("Enter the author of the book: ");
String author = scanner.nextLine();
System.out.print("Enter the publisher of the book: ");
String publisher = scanner.nextLine();
if (type.equals("Literature")) {
return new Literature(title, author, publisher);
} else if (type.equals("Fiction")) {
return new Fiction(title, author, publisher);
} else {
return null;
}
}
private static void displayBooks(Book[] books) {
for (Book book : books) {
book.display();
System.out.println();
}
}
}
```

OUTPUT


mca@Z238-UL:~/Aditya/java$ javac Books.java
^[[Amca@Z238-UL:~/Aditya/java$ java Books
Aditya Suresh
23mca004
06/04/2024
No of Literature books 1
No of Fiction books 1
Enter details for Literature book 1:
Enter the title of the book: DBMS
Enter the author of the book: akhil
Enter the publisher of the book: abc books
Enter details for Fiction book 1:
Enter the title of the book: Happy place
Enter the author of the book: emily
Enter the publisher of the book: abc book
Literature Books:
Title: DBMS
Author: akhil
Publisher: abc books
Fiction Books:
Title: Happy place
Author: emily
Publisher: abc book

5. Create classes Student and Sports. Create another class Result inherited from Student and Sports. Display the academic and sports score of a student

Code

```
import java.util.Scanner;
class sports{
String sport;
int Rating;
sports(String spo, int ra){
sport = spo;
Rating = ra;
}
}
class student extends sports{
String Grade;
double Overall_per;
student(String spo, int ra,String gd, double per ){
super(spo, ra);
Grade = gd;
Overall_per = per;
}
}
public class result extends student {
result(String spo, int ra,String gd, double per ){
super(spo, ra, gd, per);
}
void display(){
System.out.println("Sports Details of Student");
System.out.println("Sport :"+sport);
System.out.println("Rating :"+Rating);
System.out.println("\nAcademic Details of Student");
System.out.println("Academic Grade :"+Grade);
System.out.println("Overall percentage :"+Overall_per);
}
public static void main(String[] args) {
Scanner sc =new Scanner(System.in);
System.out.println("\tAditya Suresh\n\t23mca004\n\t08/04/2024\nTitle: Sports (Inheritance)");
System.out.println();
System.out.println("Enter the Sports Details of Student");
System.out.println("Sport: ");
String a =sc.next();
System.out.println("Sport Rating out of 10: "); int
b =sc.nextInt();
System.out.println("\nEnter the Sports Details of Student");
```

```
System.out.println("Academic Grade: ");
String c =sc.next();
System.out.println("Overall percentage: ");
double d =sc.nextDouble();
sc.close();
result obj= new result(a,b,c,d);
obj.display();
}
}
```

OUTPUT

6. Create an interface having prototypes of functions area() and perimeter(). Create two classes Circle and Rectangle which implements the above interface. Create a menu driven program to find area and perimeter of objects.

Code

```
import java.util.Scanner;

interface Shape {
double area();
double perimeter();
}

class Circle implements Shape {
private double radius;
public Circle(double radius) {
this.radius = radius;
}
public double area() {
return Math.PI * radius * radius;
}
public double perimeter() {
return 2 * Math.PI * radius;
}
}

class Rectangle implements Shape {
private double length;
private double width;
public Rectangle(double length, double width) {
this.length = length;
this.width = width;
}
public double area() {
return length * width;
}
public double perimeter() {
return 2 * (length + width);
}
}
public class shape {
public static void main(String[] args) {
Scanner scanner = new Scanner(System.in);
```

```
System.out.println("Name: Aditya Suresh\nRollno: 23mca004\nTitle: Shape Calculator
(Interface)\nDate: 08-04-2024\n");
System.out.println();
int choice;
do {
System.out.println("Menu:");
System.out.println("1. Circle");
System.out.println("2. Rectangle");
System.out.println("3. Exit");
System.out.print("Enter your choice: ");
choice = scanner.nextInt();
switch (choice) {
case 1:
System.out.print("Enter the radius of the circle: ");
double radius = scanner.nextDouble();
Circle circle = new Circle(radius);
System.out.println("Area of the circle: " + circle.area());
System.out.println("Perimeter of the circle: " + circle.perimeter());
break;
case 2:
System.out.print("Enter the length of the rectangle: ");
double length = scanner.nextDouble();
System.out.print("Enter the width of the rectangle: ");
double width = scanner.nextDouble();
Rectangle rectangle = new Rectangle(length, width);
System.out.println("Area of the rectangle: " + rectangle.area());
System.out.println("Perimeter of the rectangle: " + rectangle.perimeter());
break;

case 3:
System.out.println("Exit");
break;
default:
System.out.println("Invalid choice! Please try again.");
break;
}
System.out.println();
} while (choice != 3);
scanner.close();
}
}
```

OUTPUT

```
mca@Z238-UL:~/Aditya/java$ javac shape.java
mca@Z238-UL:~/Aditya/java$ java shape
Name: Aditya Suresh
Rollno: 23mca004
Title: Shape Calculator (Interface)
Date: 08-04-2024


Menu:
1. Circle
2. Rectangle
3. Exit
Enter your choice: 1
Enter the radius of the circle: 3
Area of the circle: 28.274333882308138
Perimeter of the circle: 18.84955592153876

Menu:
1. Circle
2. Rectangle
3. Exit
Enter your choice: 2
Enter the length of the rectangle: 2
Enter the width of the rectangle: 3
Area of the rectangle: 6.0
Perimeter of the rectangle: 10.0

Menu:
1. Circle
2. Rectangle
3. Exit
Enter your choice: 3
Exit
```

7. Prepare bill with the given format using calculate method from interface.

Order No.

Date :

Product Id	Name	Quantity	unit price	Total
101	A	2	25	50
102	B	1	100	100

Net. Amount 150

Code

```
import java.util.Scanner;
interface Bill {
void calculate();
}
class Order implements Bill {
private int orderNo;
private String date;
private int[] productId;
private String[] name;
private int[] quantity;
private double[] unitPrice;
public Order(int orderNo, String date, int[] productId, String[] name, int[] quantity,
double[] unitPrice) {
this.orderNo = orderNo;
this.date = date;
this.productId = productId;
this.name = name;
this.quantity = quantity;
this.unitPrice = unitPrice;
}
public void calculate() {
double netAmount = 0.0;
System.out.println();
System.out.println("Order No.: " + orderNo + "\tDate: " + date);
System.out.println();
System.out.println("Product Id\tName\t\tQuantity\tUnit Price\tTotal");
System.out.println("-------------------------------------------------");
```

```
for (int i = 0; i < productId.length; i++) {
double total = quantity[i] * unitPrice[i];
netAmount += total;
System.out.printf("%d\t\t%s\t\t%d\t\t%.2f\t\t%.2f\n",
productId[i], name[i], quantity[i], unitPrice[i], total);

}
System.out.println("-------------------------------------------------");
System.out.printf("\t\t\t\tNet. Amount\t%.2f\n", netAmount); }
}
public class bill {
public static void main(String[] args) {
System.out.println("Name: Aditya Suresh\nRollno: 23mca004\nTitle: Bill Calculator
(Interface)\nDate: 08-04-2024\n");
System.out.println();
Scanner scanner = new Scanner(System.in);
System.out.print("Enter the order number: ");
int orderNo = scanner.nextInt();
System.out.print("Enter the date: ");
String date = scanner.next();
System.out.print("Enter the number of products: ");
int numProducts = scanner.nextInt();
int[] productId = new int[numProducts];
String[] name = new String[numProducts];
int[] quantity = new int[numProducts];
double[] unitPrice = new double[numProducts];
for (int i = 0; i < numProducts; i++) {
System.out.println("Enter details for Product " + (i + 1));
System.out.print("Product ID: ");
productId[i] = scanner.nextInt();
scanner.nextLine();
System.out.print("Name: ");
name[i] = scanner.nextLine();
System.out.print("Quantity: ");
quantity[i] = scanner.nextInt();
System.out.print("Unit Price: ");
unitPrice[i] = scanner.nextDouble();
}
Order order = new Order(orderNo, date, productId, name, quantity, unitPrice);
order.calculate();
scanner.close();
}
}
```

OUTPUT

```
mca@Z238-UL:~/Aditya/java$ javac bill.java
mca@Z238-UL:~/Aditya/java$ java bill
Name: Aditya Suresh
Rollno: 23mca004
Title: Bill Calculator (Interface)
Date: 08-04-2024


Enter the order number: 101
Enter the date: 08-04-2024
Enter the number of products: 1
Enter details for Product 1
Product ID: 1001
Name: phone
Quantity: 2
Unit Price: 25000

Order No.: 101  Date: 08-04-2024

Product Id      Name            Quantity        Unit Price      Total
-------------------------------------------------
1001            phone           2               25000.00                50000.00
-------------------------------------------------
                                        Net. Amount     50000.00
mca@Z238-UL:~/Aditya/java$
```