Program :10

Aim: Area of different shapes using overloaded functions

Source Code:

```
import java.io.*;
import java.util.Scanner;
public class area {
public static double calculateArea(double length, double width) {
return length * width;
}
public static double calculateArea(double side) {
return side * side;
}
public static double calculateArea(float radius) {
return Math.PI * radius * radius;
}
public static double calculateArea(float base, double height) {
return 0.5 * base * height;
}
public static void main(String[] args) {
Scanner scanner = new Scanner(System.in);
System.out.println(" \nName:Anna S\nRoll NO:23mca018\nprogram:Method-
Overloading\nDate:06-04-2024\n");
System.out.print("Enter length of rectangle: ");
double length = scanner.nextDouble();
System.out.print("Enter width of rectangle: ");
double width = scanner.nextDouble();
double rectangleArea = calculateArea(length, width);
System.out.println("Area of Rectangle: " + rectangleArea);
System.out.print("Enter side of square: ");
double side = scanner.nextDouble();
double squareArea = calculateArea(side);
System.out.println("Area of Square: " + squareArea);
System.out.print("Enter radius of circle: ");
float radius = scanner.nextFloat();
double circleArea = calculateArea(radius);
System.out.println("Area of Circle: " + circleArea);
System.out.print("Enter base of triangle: ");
float base = scanner.nextFloat();
System.out.print("Enter height of triangle: ");
double height = scanner.nextDouble();
double triangleArea = calculateArea(base, height);
System.out.println("Area of Triangle: " + triangleArea);
scanner.close();
}
}
```

Output:

```
mca@Z238-UL:~/annajava$ javac area.java
mca@Z238-UL:~/annajava$ java area

Name:Anna S
Roll NO:23mca018
program:Method-Overloading
Date:06-04-2024

Enter length of rectangle: 3
Enter width of rectangle: 2
Area of Rectangle: 6.0
Enter side of square: 6
Area of Square: 36.0
Enter radius of circle: 3
Area of Circle: 28.274333882308138
Enter base of triangle: 5
Enter height of triangle: 3
Area of Triangle: 7.5
mca@Z238-UL:~/annajava$
```

Program :11

Aim: Create a class 'Employee' with data members Empid, Name, Salary, Address and constructor 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 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.

Source 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(" \nName:Anna S\nRoll NO:23mca018\nprogram:array of obj\nDate:06-04-
2024\n");
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:~/annajava$ javac Teacher.java
mca@Z238-UL:~/annajava$ java Teacher

Name:Anna S
Roll NO:23mca018
program:array of obj
Date:06-04-2024

Enter the No. of Employee's
2

Enter Employee id:
23
Enter Employee Name:
anna
Enter Salary:
50000
Enter Address:
abc
Enter department:
mca
Enter Subject:
se

Enter Employee id:
24
Enter Employee Name:
sara
Enter Salary:
50000
Enter Address:
abc
Enter department:
mca
Enter Subject:
ds

********Informations of all the employee's************

1).
Employee id: 23
Name: anna
Salary: 50000.0
Address: abc
Department: mca
Subject: se

2).
Employee id: 24
Name: sara
Salary: 50000.0
Address: abc
Department: mca
Subject: ds
mca@Z238-UL:~/annajava$
```

Program :12

Aim: 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 constructors and methods to display the data members. Use array of objects to display details of N teachers.

Source code:

```
import java.util.Scanner;
class person
{
String Name;
String Gender;
String Address;
int Age;
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 Company_name;
String Qualification;
long Salary;
Employee(String name,String gender,String address, int age,int empid, String company_name,
String qualification,long salary)
{
super(name,gender,address,age);
this.Empid= empid;
this.Company_name=company_name;
this.Qualification=qualification;
this.Salary=salary;
}
}
public class Teacher2 extends Employee
{
```

```
String Subject;
String Department;
String Teacherid;
Teacher2(String name,String gender,String address, int age,int empid, String company_name,
String qualification,long salary, String subject, String department, String teacherid)
{
super(name,gender,address,age,empid,company_name,qualification,salary);
this.Subject=subject;
this.Department=department;
this.Teacherid=teacherid;
 }
 void display()
 {
 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: "+Company_name);
 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);
 }
 public static void main(String[] args)
 {
 System.out.println(" \nName:Anna S\nRoll NO:23mca018\nprogram:array of obj\nDate:06-04-
 2024\n");
 System.out.println("\nEnter the No. of Teacher's");
 Scanner sc1 = new Scanner(System.in);
 int num = sc1.nextInt();
 Teacher2 arr[]=new Teacher2[num];
 System.out.println("\n Enter the Teacher Details\n");
 int x = 0,j=0;
 Scanner sc =new Scanner(System.in);
 for(int i =0;i<num;i++)
 {
  x = i +1;
  System.out.println("\n"+x+").");
  System.out.println("\n Name: ");
  String a =sc.next();
  System.out.println("\n Gender: ");
```

```
String b =sc.next();
System.out.println("\n Address: ");
String c =sc.next();
System.out.println("\n Age: ");
int d =sc.nextInt();
System.out.println("\n Employee id: ");
int e =sc.nextInt();
System.out.println("\n Company name: ");
String f =sc.next();
System.out.println("\n Qualification: ");
String g =sc.next();
System.out.println("\n Salary: ");
long h =sc.nextLong();
System.out.println("\n Subject: ");
String k =sc.next();
System.out.println("\n Department: ");
String l =sc.next();
System.out.println("\n Teacher Id: ");
String n =sc.next();
arr[i]=new Teacher2(a,b,c,d,e,f,g,h,k,l,n);
}
sc.close();
System.out.println("\n********Informations of all the Teacher's**********");
for(int i=0;i<num;i++)
{
 j=i+1;
 System.out.println("\n"+j+").");
 arr[i].display();
 }
 sc1.close();
 }
 }
```

Output:

```
mca@Z238-UL:~/annajava$ javac Teacher2.java
mca@Z238-UL:~/annajava$ java Teacher2

Name:Anna S
Roll NO:23mca018
program:array of obj
Date:06-04-2024


Enter the No. of Teacher's
2

 Enter the Teacher Details


1).

 Name:
anna

 Gender:
female

 Address:
abc

 Age:
20

 Employee id:
23

 Company name:
abc

 Qualification:
mca

 Salary:
50000

 Subject:
ds
```

```
 Department:
mca

 Teacher Id:
12

2).

 Name:
sara

 Gender:
female

 Address:
abc

 Age:
20

 Employee id:
13

 Company name:
abc

 Qualification:
mca

 Salary:
50000

 Subject:
se

 Department:
mca

 Teacher Id:
35
```

```
********Informations of all the Teacher's************

1).
Name: anna
Gender: female
Address: abc
Age: 20
Employee id: 23
Company Name: abc
Qualification: mca
Salary: 50000
Subject: ds
Department: mca
Teacher id: 12

2).
Name: sara
Gender: female
Address: abc
Age: 20
Employee id: 13
Company Name: abc
Qualification: mca
Salary: 50000
Subject: se
Department: mca
Teacher id: 35
mca@Z238-UL:~/annajava$
```

Program:13

Aim: 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**.**

Source 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 Bookdetails {
public static void main(String[] args) {
System.out.println("Name: Anna S\nRollno:23mca018\nTitle: Book (Inheritance)\nDate: 06-04-
2024\n");
Scanner scanner = new Scanner(System.in);
System.out.print("Enter the number of Literature books do you want to add? ");
int numLiteratureBooks = scanner.nextInt();
scanner.nextLine();
System.out.print("enter the number of Fiction books do you want to add? ");
```

```
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:~$ cd annajava
mca@Z238-UL:~/annajava$ javac Bookdetails.java
mca@Z238-UL:~/annajava$ java Bookdetails
Name: Anna S
Rollno:23mca018
Title: Book (Inheritance)
Date: 06-04-2024

Enter the number of Literature books do you want to add? 2
enter the number of Fiction books do you want to add? 1

Enter details for Literature book 1:
Enter the title of the book: aba
Enter the author of the book: abc
Enter the publisher of the book: abc

Enter details for Literature book 2:
Enter the title of the book: ert
Enter the author of the book: dfg
Enter the publisher of the book: wwwer

Enter details for Fiction book 1:
Enter the title of the book: wwwwe
Enter the author of the book: er
Enter the publisher of the book: tt

Literature Books:
Title: aba
Author: abc
Publisher: abc

Title: ert
Author: dfg
Publisher: wwwer


Fiction Books:
Title: wwwwe
Author: er
Publisher: tt

mca@Z238-UL:~/annajava$
```

Program:14

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

Source 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("\nSports 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("Name:Anna S\nRollno: 23mca018\nTitle: Student-Result(Inheritance)\nDate:
08-04-2024\n");
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("Enter the Academic 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:

```
mca@Z238-UL:~/annajava$ javac result.java
mca@Z238-UL:~/annajava$ java result
Name:Anna S
Rollno: 23mca018
Title: Student-Result(Inheritance)
Date: 08-04-2024

Enter the Sports Details of Student
Sport:
football
sport Rating out of 10:
9
Enter the Academic Details of Student
Academic Grade:
A
Overall percentage:
90

Sports Details of Student
Sport :football
Rating :9

Academic Details of Student
Academic Grade :A
Overall percentage :90.0
mca@Z238-UL:~/annajava$
```

Program:15

Aim: 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.

Source 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: Anna S\nRollno: 23mca018\nTitle:Shape
Calculator(Interface)\nDate:08-04-2024\n");
```

```
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:~/annajava$ javac shape.java
mca@Z238-UL:~/annajava$ java shape
Name: Anna S
Rollno: 23mca018
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: 2
Area of the circle: 12.566370614359172
Perimeter of the circle: 12.566370614359172

Menu:
1. Circle
2. Rectangle
3. Exit
Enter your choice: 2
Enter the length of the rectangle: 3
Enter the width of the rectangle: 4
Area of the rectangle: 12.0
Perimeter of the rectangle: 14.0

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

mca@Z238-UL:~/annajava$
```

Program:16

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

Source 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:Anna S\nRollno:23mca018\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:~/annajava$ javac bill.java
mca@Z238-UL:~/annajava$ java bill
Name:Anna S
Rollno:23mca018
Title:Bill Calculator(Interface)
Date:08-04-2024


Enter the order number: 3
Enter the date: 24/4/24
Enter the number of products: 3
Enter details for Product 1
Product ID: 2
Name: abc
Quantity: 34
Unit Price: 123
Enter details for Product 2
Product ID: 4
Name: dfg
Quantity: 34
Unit Price: 145
Enter details for Product 3
Product ID: 4
Name: mno
Quantity: 56
Unit Price: 234

Order No.: 3    Date: 24/4/24

Product Id      Name            Quantity        Unit Price      Total
--------------------------------------------------------------------------------
2               abc             34              123.00          4182.00
4               dfg             34              145.00          4930.00
4               mno             56              234.00          13104.00
--------------------------------------------------------------------------------
                                        Net. Amount     22216.00
mca@Z238-UL:~/annajava$
```