PROGRAM 10 :

Area of different shapes using overloaded functions.

CODE:

```
class Shapes {
public static double area(double radius) {
return 3.14 * radius * radius;
}
public static double area(double length, double width) {
return length * width;
}
public static double area(double base, double height, boolean isTriangle) {
if (isTriangle) {
return 0.5 * base * height;
} else {
return base * height;
}
}
public static void main(String[] args) {
System.out.println("\n NAME :MARTIN SIBY ");
System.out.println("\nREG NO :SJC22MCA-2038");
System.out.println("\nDATE : 07-06-2023");
System.out.println("\nCOURSE CODE : 20MCA132");
System.out.println("\nCOURSE NAME : OBJECT ORIENTED PROGRAMMING LAB");
System.out.println("-----------OUTPUT---------");
System.out.println("Area of circle with radius 2: " + Shapes.area(2));
System.out.println("Area of rectangle with length 3 and width 4: " +Shapes.area(3, 4));
System.out.println("Area of triangle with base 5 and height 6: " + Shapes.area(5,6, true));
System.out.println("Area of parallelogram with base 7 and height 8: " +Shapes.area(7, 8, false));
}
```

}

OUTPUT:

```
sjcet@sjcet:~/martin/java/cycle3$ javac Shapes.java
sjcet@sjcet:~/martin/java/cycle3$ java Shapes

 NAME :MARTIN SIBY

REG NO :SJC22MCA-2038

DATE : 07-06-2023

COURSE CODE : 20MCA132

COURSE NAME : OBJECT ORIENTED PROGRAMMING LAB
----------OUTPUT---------
Area of circle with radius 2: 12.56
Area of rectangle with length 3 and width 4: 12.0
Area of triangle with base 5 and height 6: 15.0
Area of parallelogram with base 7 and height 8: 56.0
sjcet@sjcet:~/martin/java/cycle3$
```

PROGRAM 11:

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.Arrays;
class Employee {
private int empid;
private String name;
private double salary;
private String address;
public Employee(int empid, String name, double salary, String address) {
this.empid = empid;
this.name = name;
this.salary = salary;
this.address = address;
}
public int getEmpid() {
return empid;
}
public void setEmpid(int empid) {
this.empid = empid;
}
public String getName() {
return name;
}
public void setName(String name) {
```

```
this.name = name;
}
public double getSalary() {
return salary;
}
public void setSalary(double salary) {
this.salary = salary;
}
public String getAddress() {
return address;
}
public void setAddress(String address) {
this.address = address;
}
public void display() {
System.out.println("Employee Details:");
System.out.println("Empid: " + empid);
System.out.println("Name: " + name);
System.out.println("Salary: " + salary);
System.out.println("Address: " + address);
}
}
class Teacher extends Employee {
private String department;
private String[] subjectsTaught;
public Teacher(int empid, String name, double salary, String address, String
department, String[] subjectsTaught) {
super(empid, name, salary, address);
this.department = department;
this.subjectsTaught = subjectsTaught;
}
public String getDepartment() {
```

```
return department;
}
public void setDepartment(String department) {
this.department = department;
}
public String[] getSubjectsTaught() {
return subjectsTaught;
}
public void setSubjectsTaught(String[] subjectsTaught) {
this.subjectsTaught = subjectsTaught;
}
@Override
public void display() {
super.display();
System.out.println("Department: " + department);
System.out.println("Subjects Taught: " +Arrays.toString(subjectsTaught));
}
}
public class employee1 {
public static void main(String[] args) {
int n = 5;
Teacher[] teachers = new Teacher[n];
for (int i = 0; i < n; i++) {
int empid = i + 1;
String name = "Teacher " + i;
double salary = 10000 + i * 1000;
String address = "Address " + i;
String department = "Department " + i;
String[] subjectsTaught = new String[]{"Subject " + i, "Subject " + (i + 1)};
teachers[i] = new Teacher(empid, name, salary, address, department,
subjectsTaught);
}
```

```
System.out.println("\n NAME :MARTIN SIBY ");
System.out.println("\nREG NO :SJC22MCA-2038");
System.out.println("\nDATE : 07-06-2023");
System.out.println("\nCOURSE CODE : 20MCA132");
System.out.println("\nCOURSE NAME : OBJECT ORIENTED PROGRAMMING LAB");
System.out.println("-----------OUTPUT---------");
System.out.println("Teacher Details:");
for (Teacher teacher : teachers) {
teacher.display();
}
}
}
```

OUTPUT:

```
sjcet@sjcet:~/martin/java/cycle3$ javac employee1.java
sjcet@sjcet:~/martin/java/cycle3$ java employee1

 NAME :MARTIN SIBY

REG NO :SJC22MCA-2038

DATE : 07-06-2023

COURSE CODE : 20MCA132

COURSE NAME : OBJECT ORIENTED PROGRAMMING LAB
-----------OUTPUT---------
Teacher Details:
Employee Details:
Empid: 1
Name: Teacher 0
Salary: 10000.0
Address: Address 0
Department: Department 0
Subjects Taught: [Subject 0, Subject 1]
Employee Details:
Empid: 2
Name: Teacher 1
Salary: 11000.0
Address: Address 1
Department: Department 1
Subjects Taught: [Subject 1, Subject 2]
Employee Details:
Empid: 3
Name: Teacher 2
Salary: 12000.0
Address: Address 2
Department: Department 2
Subjects Taught: [Subject 2, Subject 3]
Employee Details:
Empid: 4
Name: Teacher 3
Salary: 13000.0
Address: Address 3
Department: Department 3
Subjects Taught: [Subject 3, Subject 4]
Employee Details:
Empid: 5
Name: Teacher 4
Salary: 14000.0
Address: Address 4
Department: Department 4
Subjects Taught: [Subject 4, Subject 5]
sjcet@sjcet:~/martin/java/cycle3$
```

PROGRAM 12:

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.Arrays;
class Person {
protected String name;
protected String gender;
protected String address;
protected 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 {
protected int empid;
protected String company_name;
protected String qualification;
protected double salary;
public Employee(String name, String gender, String address, int age, int empid,
String company_name, String qualification, double salary) {
```

```
super(name, gender, address, age);
this.empid = empid;
this.company_name = company_name;
this.qualification = qualification;
this.salary = salary;
}
}
class Teacher extends Employee {
private String subject;
private String department;
private int teacherid;
public Teacher(String name, String gender, String address, int age, int empid,
String company_name, String qualification, double salary, String subject, String
department, int teacherid) {
super(name, gender, address, age, empid, company_name, qualification, salary);
this.subject = subject;
this.department = department;
this.teacherid = teacherid;
}
public void display() {

System.out.println("----------OUTPUT---------");
System.out.println("Teacher Details:");
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);
System.out.println("----------------------------");
}
}
class Nteachers {
public static void main(String[] args) {
System.out.println("\n NAME :MARTIN SIBY ");
System.out.println("\nREG NO :SJC22MCA-2038");
System.out.println("\nDATE : 07-06-2023");
System.out.println("\nCOURSE CODE : 20MCA132");
System.out.println("\nCOURSE NAME : OBJECT ORIENTED PROGRAMMING LAB");
int n = 3;
Teacher[] teachers = new Teacher[n];
teachers[0] = new Teacher("John Doe", "Male", "123 Main St", 35, 1001, "ABC School",
"M.Ed.", 50000.0, "Mathematics", "Science", 1);
teachers[1] = new Teacher("Jane Smith", "Female", "456 Elm St", 40, 1002,"XYZ School",
"B.Ed.", 45000.0, "English", "Humanities", 2);
teachers[2] = new Teacher("Bob Johnson", "Male", "789 Oak St", 30, 1003,"PQR School",
"M.A.", 55000.0, "Physics", "Science", 3);
for (Teacher teacher : teachers) {
teacher.display();
}
}
}
```

OUTPUT:

```
sjcet@sjcet:~/martin/java/cycle3$ java Nteachers

 NAME :MARTIN SIBY

REG NO :SJC22MCA-2038

DATE : 07-06-2023

COURSE CODE : 20MCA132

COURSE NAME : OBJECT ORIENTED PROGRAMMING LAB
----------OUTPUT---------
Teacher Details:
Name: John Doe
Gender: Male
Address: 123 Main St
Age: 35
Employee ID: 1001
Company Name: ABC School
Qualification: M.Ed.
Salary: 50000.0
Subject: Mathematics
Department: Science
Teacher ID: 1
------------------------------
----------OUTPUT---------
Teacher Details:
Name: Jane Smith
Gender: Female
Address: 456 Elm St
Age: 40
Employee ID: 1002
Company Name: XYZ School
Qualification: B.Ed.
Salary: 45000.0
Subject: English
Department: Humanities
Teacher ID: 2
------------------------------
----------OUTPUT---------
Teacher Details:
Name: Bob Johnson
Gender: Male
Address: 789 Oak St
Age: 30
Employee ID: 1003
Company Name: PQR School
Qualification: M.A.
Salary: 55000.0
Subject: Physics
Department: Science
Teacher ID: 3
------------------------------
```

PROGRAM 13:

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 {
private String name;
public Publisher(String name) {
this.name = name;
}
public String getName() {
return name;
}
}
class Book {
private String title;
private Publisher publisher;
public Book(String title, Publisher publisher) {
this.title = title;
this.publisher = publisher;
}
public String getTitle() {
return title;
}
public Publisher getPublisher() {
return publisher;
}
}
class Literature extends Book {
private String author;
```

```
public Literature(String title, Publisher publisher, String author) {
super(title, publisher);
this.author = author;
}
public String getAuthor() {
return author;
}
}
class Fiction extends Book {
private String genre;
public Fiction(String title, Publisher publisher, String genre) {
super(title, publisher);
this.genre = genre;
}
public String getGenre() {
return genre;
}
}
public class publisher {
public static void main(String[] args) {
Scanner scanner = new Scanner(System.in);
Book[] books = new Book[3];
Publisher publisher1 = new Publisher("Publisher A");
Publisher publisher2 = new Publisher("Publisher B");
Literature literature = new Literature("Book A", publisher1, "Author A");
Fiction fiction1 = new Fiction("Book B", publisher2, "Genre A");
Fiction fiction2 = new Fiction("Book C", publisher1, "Genre B");
books[0] = literature;
books[1] = fiction1;
books[2] = fiction2;
System.out.println("\n NAME :MARTIN SIBY ");
System.out.println("\nREG NO :SJC22MCA-2038");
```

```
System.out.println("\nDATE : 07-06-2023");
System.out.println("\nCOURSE CODE : 20MCA132");
System.out.println("\nCOURSE NAME : OBJECT ORIENTED PROGRAMMING LAB");
System.out.println("-----------OUTPUT---------");
System.out.println("Select a category:");
System.out.println("1. Literature");
System.out.println("2. Fiction");
int choice = scanner.nextInt();
switch (choice) {
case 1:
System.out.println("Literature Books:");
for (Book book : books) {
if (book instanceof Literature) {
Literature literatureBook = (Literature) book;
System.out.println("Title: " + literatureBook.getTitle());
System.out.println("Author: " + literatureBook.getAuthor());
System.out.println("Publisher: " +
literatureBook.getPublisher().getName());
System.out.println();
}
}
break;
case 2:
System.out.println("Fiction Books:");
for (Book book : books) {
if (book instanceof Fiction) {
Fiction fictionBook = (Fiction) book;
System.out.println("Title: " + fictionBook.getTitle());
System.out.println("Genre: " + fictionBook.getGenre());
System.out.println("Publisher: " +
fictionBook.getPublisher().getName());
System.out.println();
```

```
}
}
break;
default:
System.out.println("Invalid choice.");
}
}
}
```

OUTPUT:

```
sjcet@sjcet:~/martin/java/cycle3$ javac publisher.java
sjcet@sjcet:~/martin/java/cycle3$ java publisher

 NAME :MARTIN SIBY

REG NO :SJC22MCA-2038

DATE : 07-06-2023

COURSE CODE : 20MCA132

COURSE NAME : OBJECT ORIENTED PROGRAMMING LAB
----------OUTPUT---------
Select a category:
1. Literature
2. Fiction
1
Literature Books:
Title: Book A
Author: Author A
Publisher: Publisher A
```

PROGRAM 14:

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

CODE:

```
class Student {
protected String name;
protected int rollNumber;
protected double academicScore;
public Student(String name, int rollNumber, double academicScore) {
this.name = name;
this.rollNumber = rollNumber;
this.academicScore = academicScore;
}
public void displayAcademicScore() {
System.out.println("\n NAME :MARTIN SIBY ");
System.out.println("\nREG NO :SJC22MCA-2038");
System.out.println("\nDATE : 07-06-2023");
System.out.println("\nCOURSE CODE : 20MCA132");
System.out.println("\nCOURSE NAME : OBJECT ORIENTED PROGRAMMING LAB");
System.out.println("-----------OUTPUT---------");
System.out.println("Academic Score of Student:");
System.out.println("Name: " + name);
System.out.println("Roll Number: " + rollNumber);
System.out.println("Academic Score: " + academicScore);
}
}
class Sports {
protected double sportsScore;
public Sports(double sportsScore) {
this.sportsScore = sportsScore;
```

```
}
public void displaySportsScore() {
System.out.println("Sports Score of Student:");
System.out.println("Sports Score: " + sportsScore);
}
}
class Result {
private Student student;
private Sports sports;
public Result(String name, int rollNumber, double academicScore, double
sportsScore) {
this.student = new Student(name, rollNumber, academicScore);
this.sports = new Sports(sportsScore);
}
public void displayResult() {
student.displayAcademicScore();
sports.displaySportsScore();
}
}
class Sports1 {
public static void main(String[] args) {
Result result = new Result("John Doe", 1, 85.5, 9.5);
result.displayResult();
}
}
```

OUTPUT:

```
sjcet@sjcet:~/martin/java/cycle3$ javac Sports1.java
sjcet@sjcet:~/martin/java/cycle3$ java Sports1

 NAME :MARTIN SIBY

REG NO :SJC22MCA-2038

DATE : 07-06-2023

COURSE CODE : 20MCA132

COURSE NAME : OBJECT ORIENTED PROGRAMMING LAB
----------OUTPUT---------
Academic Score of Student:
Name: John Doe
Roll Number: 1
Academic Score: 85.5
Sports Score of Student:
Sports Score: 9.5
```

PROGRAM 15:

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;
}
@Override
public double area() {
return Math.PI * radius * radius;
}
@Override
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;
```

```
}
@Override
public double area() {
return length * width;
}
@Override
public double perimeter() {
return 2 * (length + width);
}
}
class Area {
public static void main(String[] args) {
System.out.println("\n NAME :MARTIN SIBY ");
System.out.println("\nREG NO :SJC22MCA-2038");
System.out.println("\nDATE : 12-06-2023");
System.out.println("\nCOURSE CODE : 20MCA132");
System.out.println("\nCOURSE NAME : OBJECT ORIENTED PROGRAMMING LAB");
Scanner scanner = new Scanner(System.in);
int choice;
do {

System.out.println("-----------OUTPUT---------");
System.out.println("Select a shape:");
System.out.println("1. Circle");
System.out.println("2. Rectangle");
System.out.println("0. 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: " + circle.area());
System.out.println("Perimeter: " + 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: " + rectangle.area());
System.out.println("Perimeter: " + rectangle.perimeter());
break;
case 0:
System.out.println("Exiting the program...");
break;
default:
System.out.println("Invalid choice! Please try again.");
break;
}
System.out.println();
} while (choice != 0);
scanner.close();
}
}
```

OUTPUT:

```
sjcet@sjcet:~/martin/java/cycle3$ javac Area.java
sjcet@sjcet:~/martin/java/cycle3$ java Area

 NAME :MARTIN SIBY

REG NO :SJC22MCA-2038

DATE : 12-06-2023

COURSE CODE : 20MCA132

COURSE NAME : OBJECT ORIENTED PROGRAMMING LAB
-----------OUTPUT---------
Select a shape:
1. Circle
2. Rectangle
0. Exit
Enter your choice: 1
Enter the radius of the circle: 2
Area: 12.566370614359172
Perimeter: 12.566370614359172

-----------OUTPUT---------
Select a shape:
1. Circle
2. Rectangle
0. Exit
Enter your choice: 2
Enter the length of the rectangle: 3
Enter the width of the rectangle: 4
Area: 12.0
Perimeter: 14.0

-----------OUTPUT---------
Select a shape:
1. Circle
2. Rectangle
0. Exit
Enter your choice:
```

PROGRAM 16

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.text.SimpleDateFormat;
import java.util.Date;
interface bill{
void cal();
}
class details1 implements bill{
int pid=101,q=2,uprice=25,t1;
String name1="A";
public void cal(){
t1=q*uprice;
}
}
class details2 extends details1 {
int pid2=102,q2=1,uprice2=100,t2;
String name2="B";
SimpleDateFormat f=new SimpleDateFormat("dd/MM/yy");
Date d= new Date();
public void cal(){
super.cal();
t2=q2*uprice2;
}
public void display(){
```

```
System.out.println("\n NAME :MARTIN SIBY ");
System.out.println("\nREG NO :SJC22MCA-2038");
System.out.println("\nDATE : 12-06-2023");
System.out.println("\nCOURSE CODE : 20MCA132");
System.out.println("\nCOURSE NAME : OBJECT ORIENTED PROGRAMMING LAB");
System.out.println("-----------OUTPUT---------");
System.out.println("Order No.384\n");
System.out.println("Date: "+f.format(d));
System.out.println("\nProduct Id\tName\t\tQuantity\tunit price\tTotal");
System.out.println("_____
_____");
System.out.println(pid+"\t\t"+name1+"\t\t"+q+"\t\t"+uprice+"\t\t"+t1);
System.out.println(pid2+"\t\t"+name2+"\t\t"+q2+"\t\t"+uprice2+"\t\t"+t2);
System.out.println("_____
_____");
System.out.println("\t\t\t\t\t\tNet.Amount"+"\t"+(t1+t2));
}
}
public class Electricitybill{
public static void main(String[] args) {
details2 obj2=new details2();
obj2.cal();
obj2.display();
}
}
```

OUTPUT:

```
sjcet@sjcet:~/martin/java/cycle3$ javac Electricitybill.java
sjcet@sjcet:~/martin/java/cycle3$ java Electricitybill

 NAME :MARTIN SIBY

REG NO :SJC22MCA-2038

DATE : 12-06-2023

COURSE CODE : 20MCA132

COURSE NAME : OBJECT ORIENTED PROGRAMMING LAB
-----------OUTPUT---------
Order No.384

Date: 29/06/23

Product Id      Name            Quantity        unit price      Total
_____________________________________________________________________
101             A               2               25              50
102             B               1               100             100
_____________________________________________________________________
                                                Net.Amount      150
```