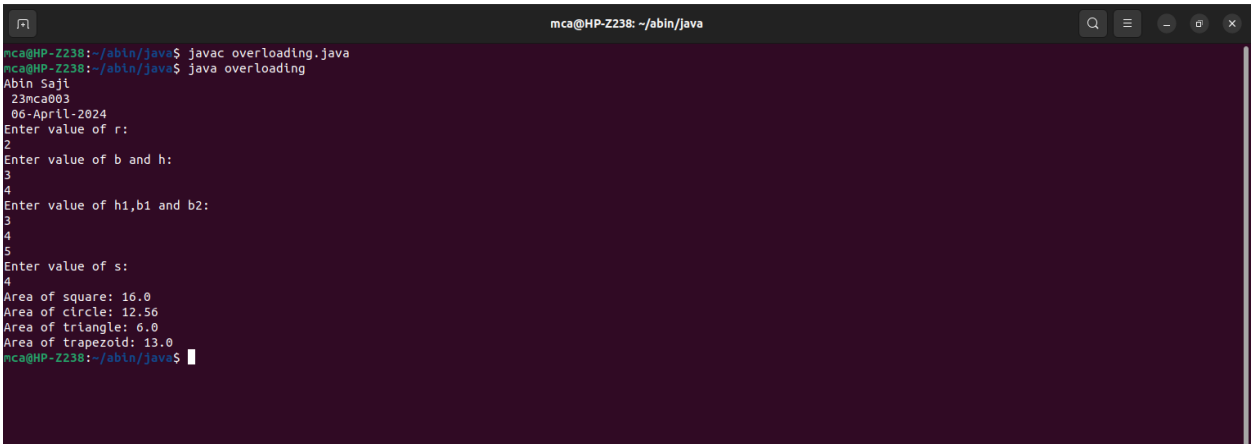
10. Area of different shapes using overloaded functions

Program:

```
import java.util.Scanner;
public class AreaS{
     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);
       // Rectangle
       System.out.println("Abin Saji \n 23MCA003 \n 2-04-2024");
       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);

       // Square
       System.out.print("Enter side of square: ");
       double side = scanner.nextDouble();
       double squareArea = calculateArea(side);
       System.out.println("Area of Square: " + squareArea);

       // Circle
       System.out.print("Enter radius of circle: ");
       float radius = scanner.nextFloat();
       double circleArea = calculateArea(radius);
```

```
            System.out.println("Area of Circle: " + circleArea);

        // Triangle
        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:



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.

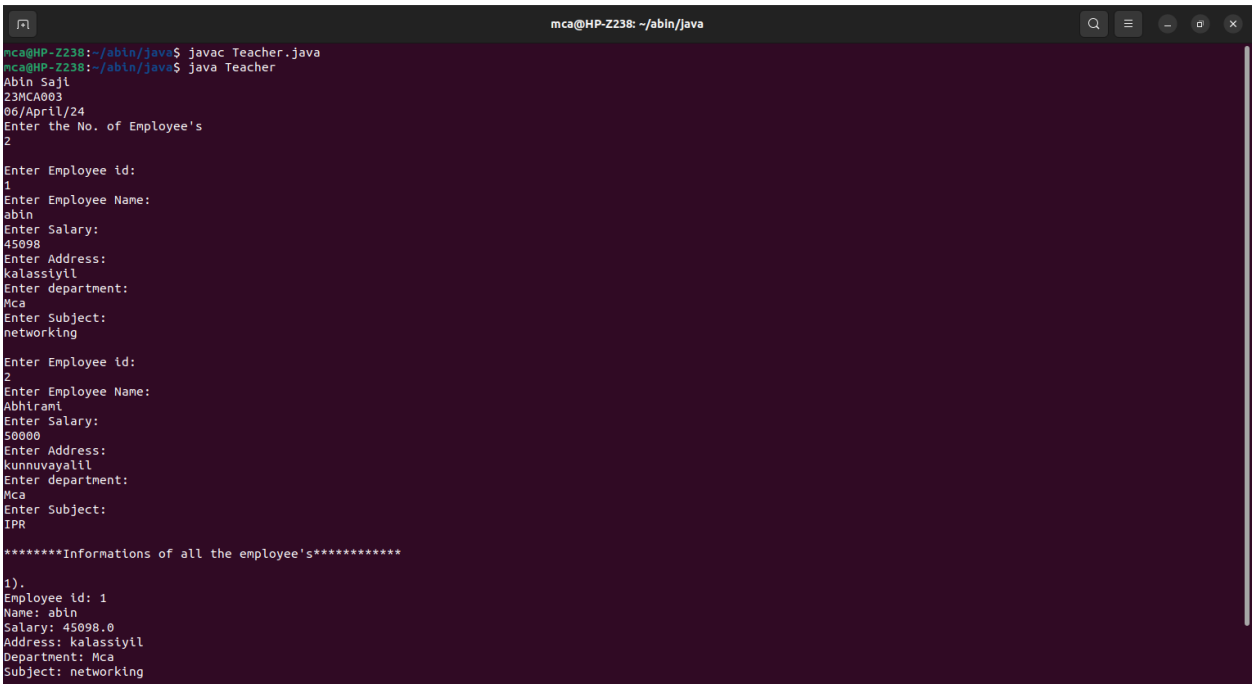
Program:

```
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("Abin Saji");
        System.out.println("23MCA003");
        System.out.println("02/04/24");
        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:



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.

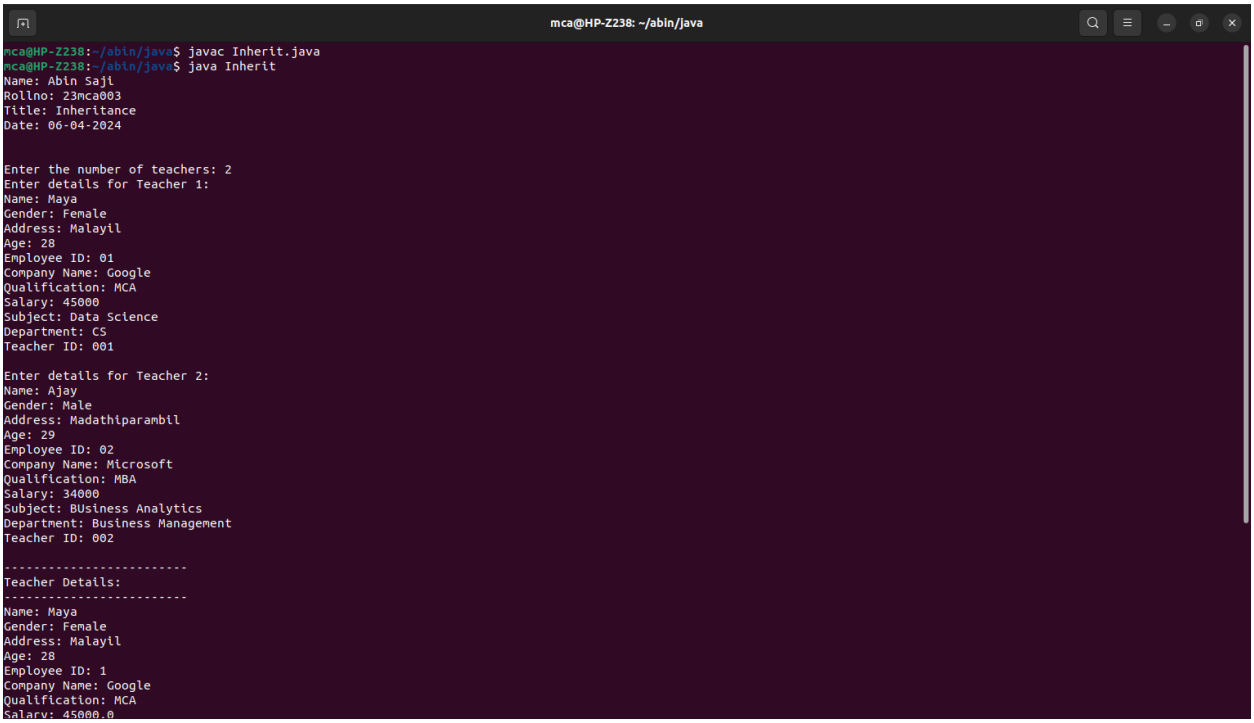
Program:

```
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("Name: Abin Saji \nRollno: 23mca003\nTitle: Inheritance\n
   Date: 06-04-2024\n");
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:


mca@HP-Z238: ~/abin/java
mca@HP-Z238:~/abin/java$ javac Inherit.java
mca@HP-Z238:~/abin/java$ java Inherit
Name: Abin Saji
Rollno: 23mca003
Title: Inheritance
Date: 06-04-2024
Enter the number of teachers: 2
Enter details for Teacher 1:
Name: Maya
Gender: Female
Address: Malayil
Age: 28
Employee ID: 01
Company Name: Google
Qualification: MCA
Salary: 45000
Subject: Data Science
Department: CS
Teacher ID: 001
Enter details for Teacher 2:
Name: Ajay
Gender: Male
Address: Madathiparambil
Age: 29
Employee ID: 02
Company Name: Microsoft
Qualification: MBA
Salary: 34000
Subject: BUsiness Analytics
Department: Business Management
Teacher ID: 002
Teacher Details:
Name: Maya
Gender: Female
Address: Malayil
Age: 28
Employee ID: 1
Company Name: Google
Qualification: MCA
Salary: 45000.0

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.

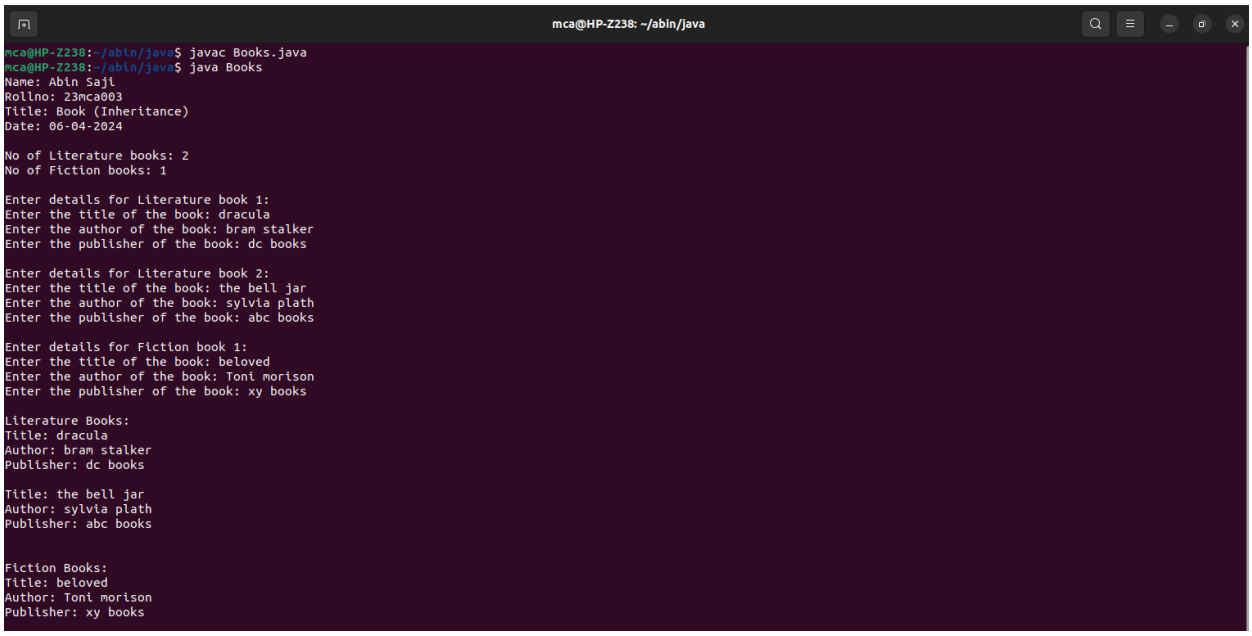
Program:

```
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("Name: Abin Saji \nRollno: 23mca003\nTitle:book (Inheritance)\n
        Date: 06-04-2024\n");
    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:



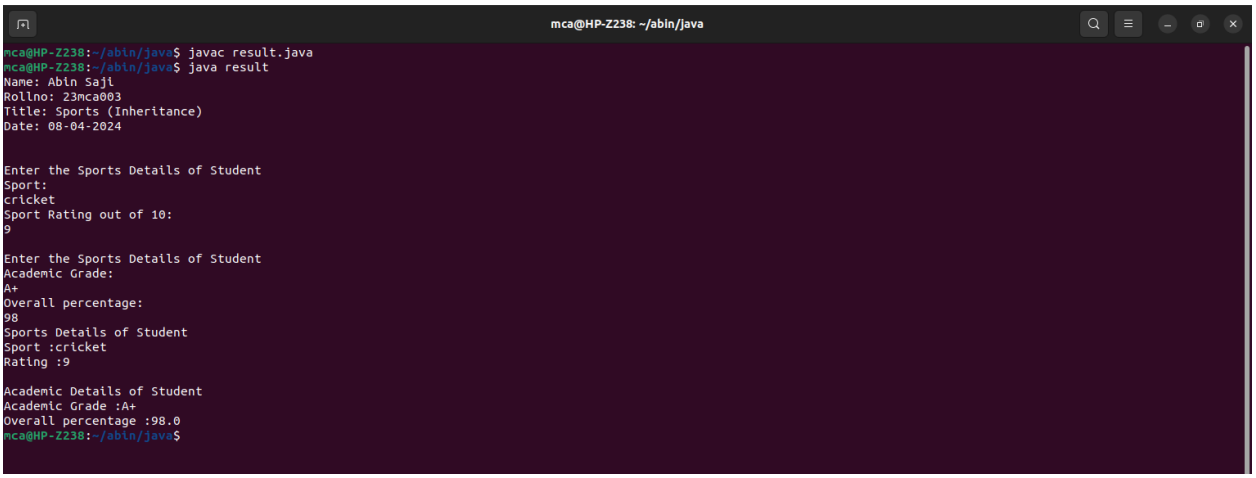
14. Create classes Student and Sports. Create another class Result inherited from Student and Sports. Display the academic and sports score of a student.

Program:

```
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();
```

```
System.out.println("Name: Abin Saji \nRollno: 23mca003\nTitle:Sports (Inheritance)\n
        Date: 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("\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:



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.

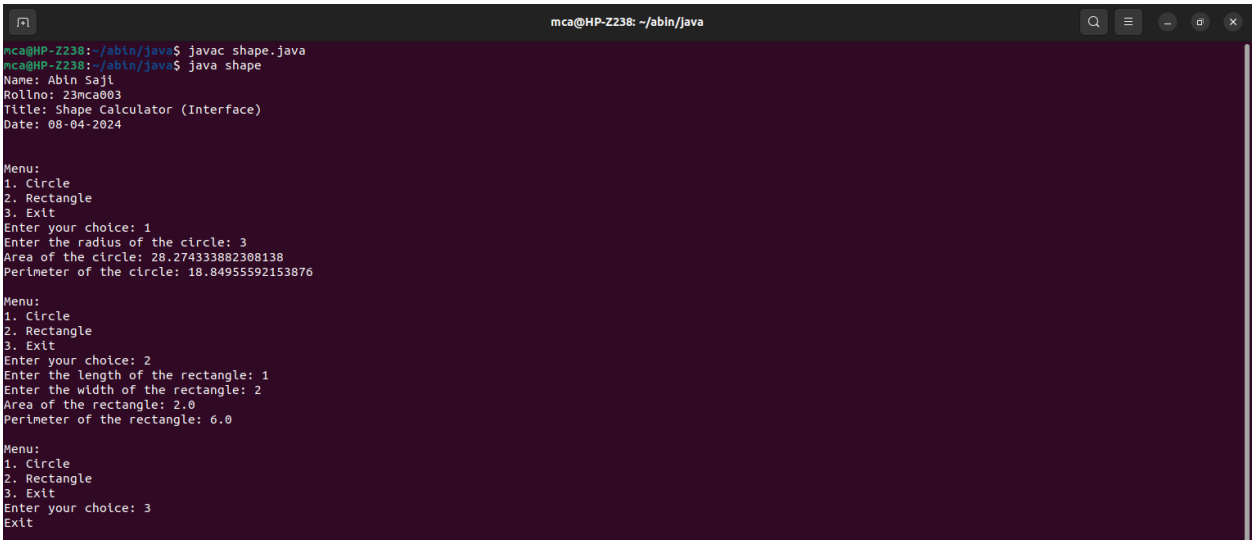
Program:

```
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: Abin Saji \nRollno: 23mca003\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:



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

Order No : 1 Date : 09-05-2024

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

Net. Amount 150

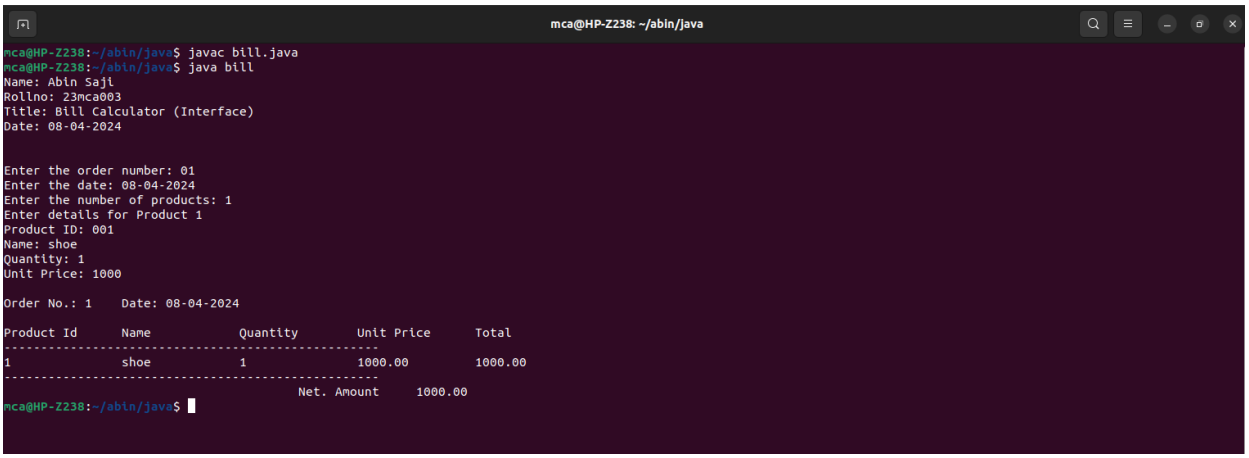
Program:

```
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: Abin Saji\nRollno: 23mca003\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@HP-Z238: ~/abin/java
mca@HP-Z238:~/abin/java$ javac bill.java
mca@HP-Z238:~/abin/java$ java bill
Name: Abin Saji
Rollno: 23mca003
Title: Bill Calculator (Interface)
Date: 08-04-2024
Enter the order number: 01
Enter the date: 08-04-2024
Enter the number of products: 1
Enter details for Product 1
Product ID: 001
Name: shoe
Quantity: 1
Unit Price: 1000
Order No.: 1 Date: 08-04-2024
Product Id Name Quantity Unit Price Total
1 shoe 1 1000.00 1000.00
Net. Amount 1000.00
mca@HP-Z238:~/abin/java$