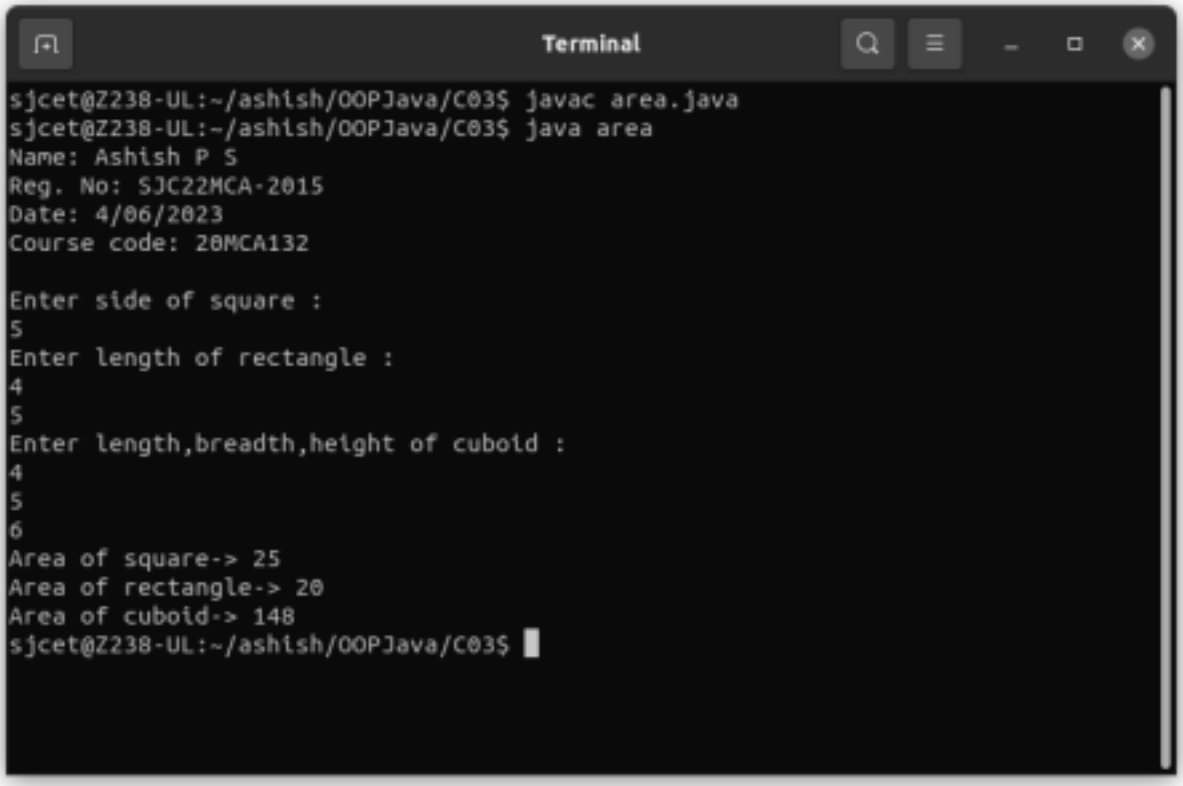
LAB CYCLE - 03

1.) Area of different shapes using overloaded functions.

```
import java.util.Scanner;

public class area{
        public static void main(String[] args){
        int s,sa,l,b,ra;
        Scanner sc= new Scanner(System.in);

        System.out.println("Enter side of square : ");
        s=sc.nextInt();
        sa=Square(s);

        System.out.println("Enter length of rectangle : ");
        l=sc.nextInt();
        b=sc.nextInt();
        ra=Square(l,b);

        System.out.println("Enter length,breadth,height of cuboid : ");
        int cl,cb,ch,ca;
        cl=sc.nextInt();
        cb=sc.nextInt();
        ch=sc.nextInt();
        ca=Square(cl,cb,ch);

        System.out.println("Area of square-> "+sa);
        System.out.println("Area of rectangle-> "+ra);
        System.out.println("Area of cuboid-> "+ca);
        }

public static int Square(int x){
int a;
        a=x*x;
        return a;
}
```

```
public static int Square(int x, int y)
{
        int a;
        a=x*y;
        return a;
}

public static int Square(int x,int y,int z)
{
        int a;
        a=2*(x*y)+2*(x*z)+2*(y*z);
        return a;
}
```



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.

```
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("Name: ASHISH P S");
System.out.println("Reg. No: SJC22MCA-2015");
System.out.println("Date: 28/03/2023");
System.out.println("Course code: 20MCA132");
System.out.println();

System.out.println("\nEnter 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("\nEnter Employee Name: ");
String Name=sc.next();
System.out.println("\nEnter Salary: ");
double Salary=sc.nextDouble();
System.out.println("\nEnter Address: ");
String Address=sc.next();
System.out.println("\nEnter department: ");
String dept=sc.next();
System.out.println("\nEnter 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();
System.out.println();

}
sc1.close();
}

}
```

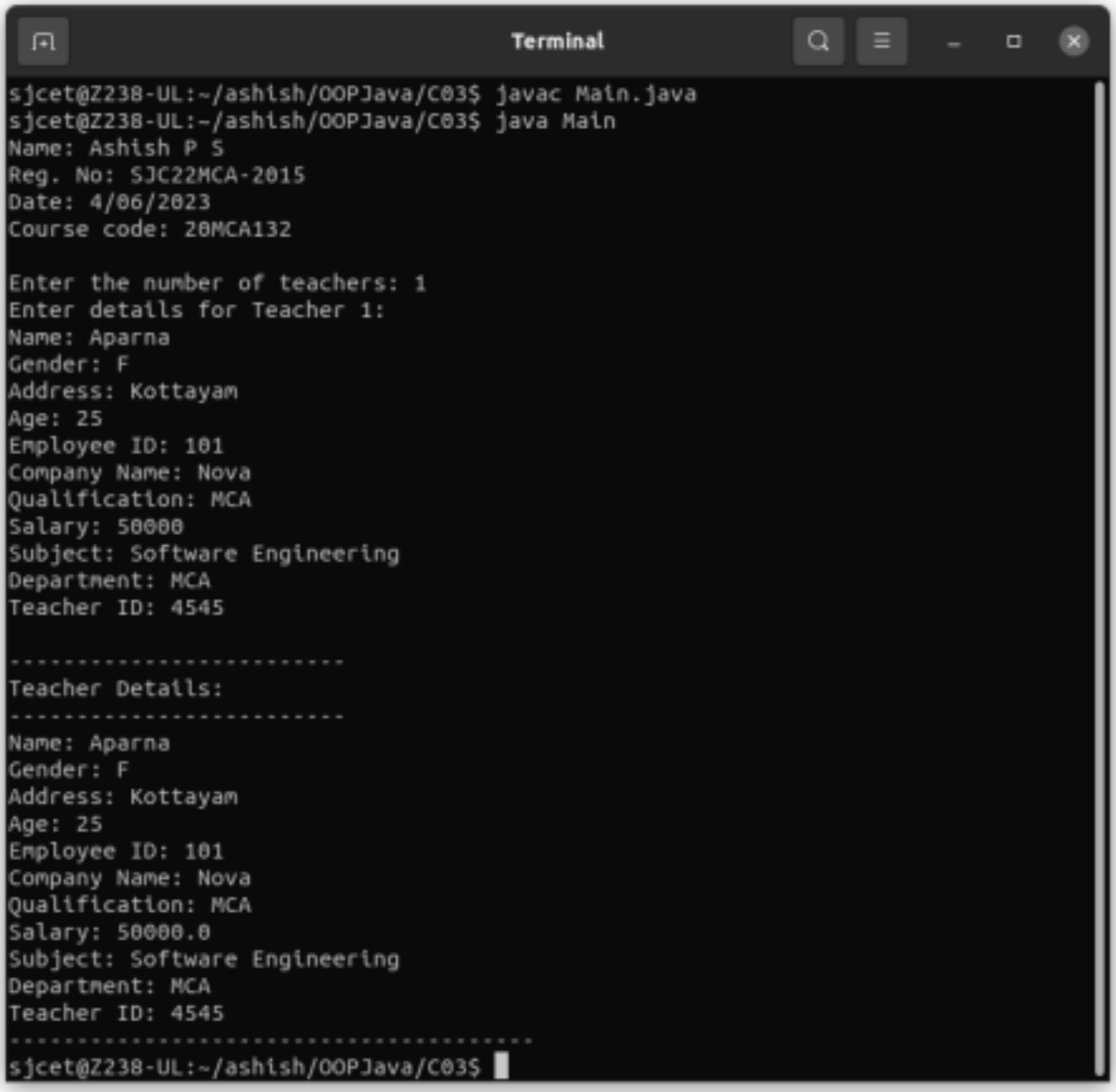

Terminal
Name: ASHISH P S
Reg. No: SJC22MCA-2015
Date: 28/03/2023
Course code: 20MCA132
Enter the No. of Employee's
1
Enter Employee id:
1001
Enter Employee Name:
Manu
Enter Salary:
50000
Enter Address:
Kottayam
Enter department:
MCA
Enter Subject:
Networking
********Informations of all the employee's************
1).
Employee id: 1001
Name: Manu
Salary: 50000.0
Address: Kottayam
Department: MCA
Subject: Networking
sjcet@Z238-UL:~/ashish/OOPJava/rough$

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.

```
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 Main {
    public static void main(String[] args) {

         System.out.println("Name: Ashish P S");
        System.out.println("Reg. No: SJC22MCA-2015");
        System.out.println("Date: 4/06/2023");
        System.out.println("Course code: 20MCA132");
        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();
        }
    }
}
```

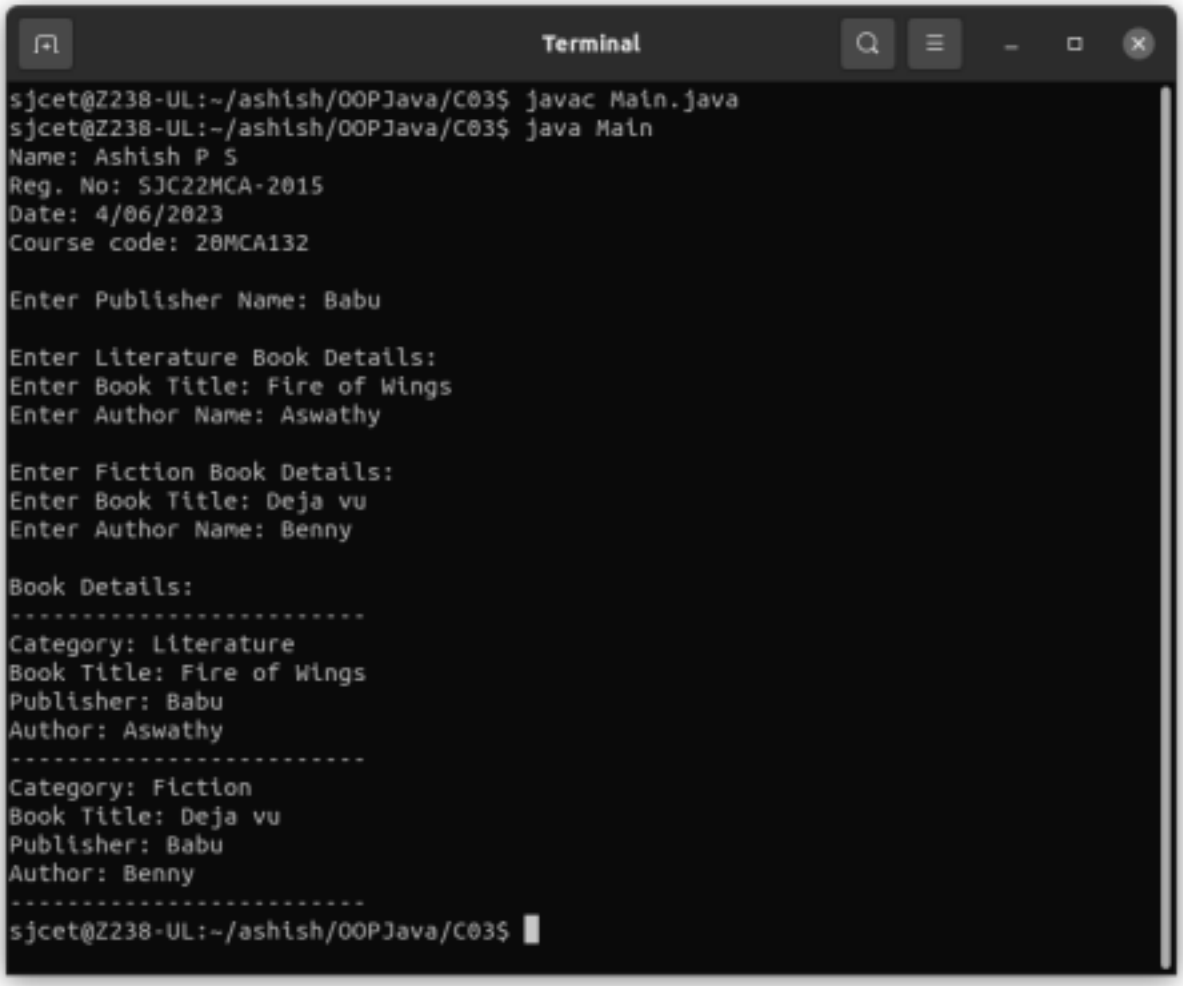

Terminal
sjcet@Z238-UL:~/ashish/OOPJava/C03$ javac Main.java
sjcet@Z238-UL:~/ashish/OOPJava/C03$ java Main
Name: Ashish P S
Reg. No: SJC22MCA-2015
Date: 4/06/2023
Course code: 20MCA132
Enter the number of teachers: 1
Enter details for Teacher 1:
Name: Aparna
Gender: F
Address: Kottayam
Age: 25
Employee ID: 101
Company Name: Nova
Qualification: MCA
Salary: 50000
Subject: Software Engineering
Department: MCA
Teacher ID: 4545
Teacher Details:
Name: Aparna
Gender: F
Address: Kottayam
Age: 25
Employee ID: 101
Company Name: Nova
Qualification: MCA
Salary: 50000.0
Subject: Software Engineering
Department: MCA
Teacher ID: 4545
sjcet@Z238-UL:~/ashish/OOPJava/C03$

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.

```
import java.util.Scanner;

class Publisher {
   String publisherName;

   public Publisher(String publisherName) {
      this.publisherName = publisherName;
   }
}

class Book {
   String bookTitle;
   Publisher publisher;

   public Book(String bookTitle, Publisher publisher) {
      this.bookTitle = bookTitle;
      this.publisher = publisher;
   }
}

class Literature extends Book {
   String author;

   public Literature(String bookTitle, Publisher publisher, String author)
      { super(bookTitle, publisher);
      this.author = author;
   }

   public void displayDetails() {
      System.out.println("Category: Literature");
      System.out.println("Book Title: " + bookTitle);
      System.out.println("Publisher: " + publisher.publisherName);
      System.out.println("Author: " + author);
      System.out.println("-------------------------");
   }
}
```

```
class Fiction extends Book {
    String author;

    public Fiction(String bookTitle, Publisher publisher, String author)
        { super(bookTitle, publisher);
        this.author = author;
    }
    public void displayDetails() {
        System.out.println("Category: Fiction");
        System.out.println("Book Title: " + bookTitle);
        System.out.println("Publisher: " +
        publisher.publisherName); System.out.println("Author: " +
        author);
        System.out.println("------------------------");
    }
}

public class Main {
    public static void main(String[] args) {

    System.out.println("Name: Ashish P S");
        System.out.println("Reg. No: SJC22MCA-2015");
        System.out.println("Date: 4/06/2023");
        System.out.println("Course code: 20MCA132");
        System.out.println();

        Scanner scanner = new Scanner(System.in);
        // Create publisher
        System.out.print("Enter Publisher Name: ");
        String publisherName = scanner.nextLine();
        Publisher publisher = new Publisher(publisherName);
        System.out.println();
        // Create literature book
        System.out.println("Enter Literature Book Details:");
        System.out.print("Enter Book Title: ");
        String literatureBookTitle = scanner.nextLine();
        System.out.print("Enter Author Name: ");
        String literatureAuthor = scanner.nextLine();
        Literature literatureBook = new Literature(literatureBookTitle,publisher,
        literatureAuthor);
        System.out.println();
```

```
        // Create fiction book
        System.out.println("Enter Fiction Book Details:");
        System.out.print("Enter Book Title: ");
        String fictionBookTitle = scanner.nextLine();
        System.out.print("Enter Author Name: ");
        String fictionAuthor = scanner.nextLine();
        Fiction fictionBook = new Fiction(fictionBookTitle, publisher,
        fictionAuthor); System.out.println();

        // Display book details
        System.out.println("Book Details:");
        System.out.println("------------------------");
        literatureBook.displayDetails();
        fictionBook.displayDetails();
    }
}
```



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

```
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: Ashish P S");
System.out.println("Reg. No: SJC22MCA-2015");
System.out.println("Date: 13/06/2023");
System.out.println("Course code: 20MCA132");
System.out.println();
```

```
System.out.println("\nEnter the Sports Details of Student");
System.out.println("\n Sport: ");
String a =sc.next();
System.out.println("\n Sport Rating out of 10: ");
int b =sc.nextInt();
System.out.println("\nEnter the Sports Details of Student");
System.out.println("\n Academic Grade: ");
String c =sc.next();
System.out.println("\n Overall percentage: ");
double d =sc.nextDouble();
sc.close();
result obj= new result(a,b,c,d);
obj.display();
}
}
```

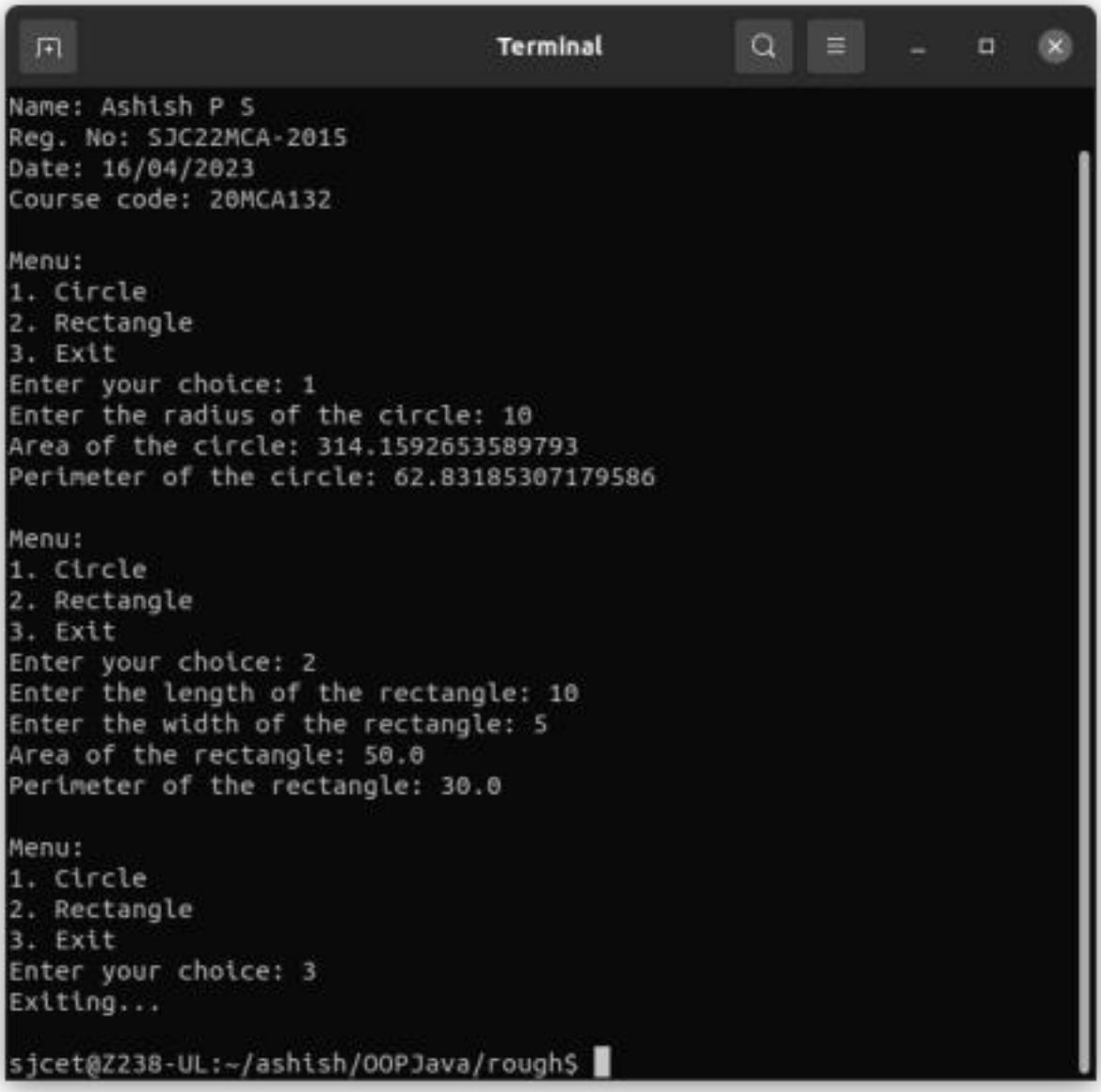

Terminal
sjcet@Z238-UL:~/ashish/OOPJava/rough$ javac result.java
sjcet@Z238-UL:~/ashish/OOPJava/rough$ java result
Name: Ashish P S
Reg. No: SJC22MCA-2015
Date: 13/06/2023
Course code: 20MCA132
Enter the Sports Details of Student
Sport:
FOOTBALL
Sport Rating out of 10:
10
Enter the Sports Details of Student
Academic Grade:
A
Overall percentage:
90
Sports Details of Student
Sport :FOOTBALL
Rating :10
Academic Details of Student
Academic Grade :A
Overall percentage :90.0
sjcet@Z238-UL:~/ashish/OOPJava/rough$

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.

```
import java.util.Scanner;

// Interface with prototypes of area() and perimeter() functions
interface Shape {
    double area();
    double perimeter();
}

// Circle class implementing Shape interface
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;
    }
}

// Rectangle class implementing Shape interface
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 ShapeCalculator {
    public static void main(String[] args) {
    Scanner scanner = new Scanner(System.in);
        System.out.println("Name: Ashish P S");
        System.out.println("Reg. No: SJC22MCA-2015");
        System.out.println("Date: 16/04/2023");
        System.out.println("Course code: 20MCA132");
        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("Exiting...");
                    break;
                default:
                    System.out.println("Invalid choice! Please try again.");
                    break;
            }
            System.out.println();
        } while (choice != 3);

        scanner.close();
    }
}
```



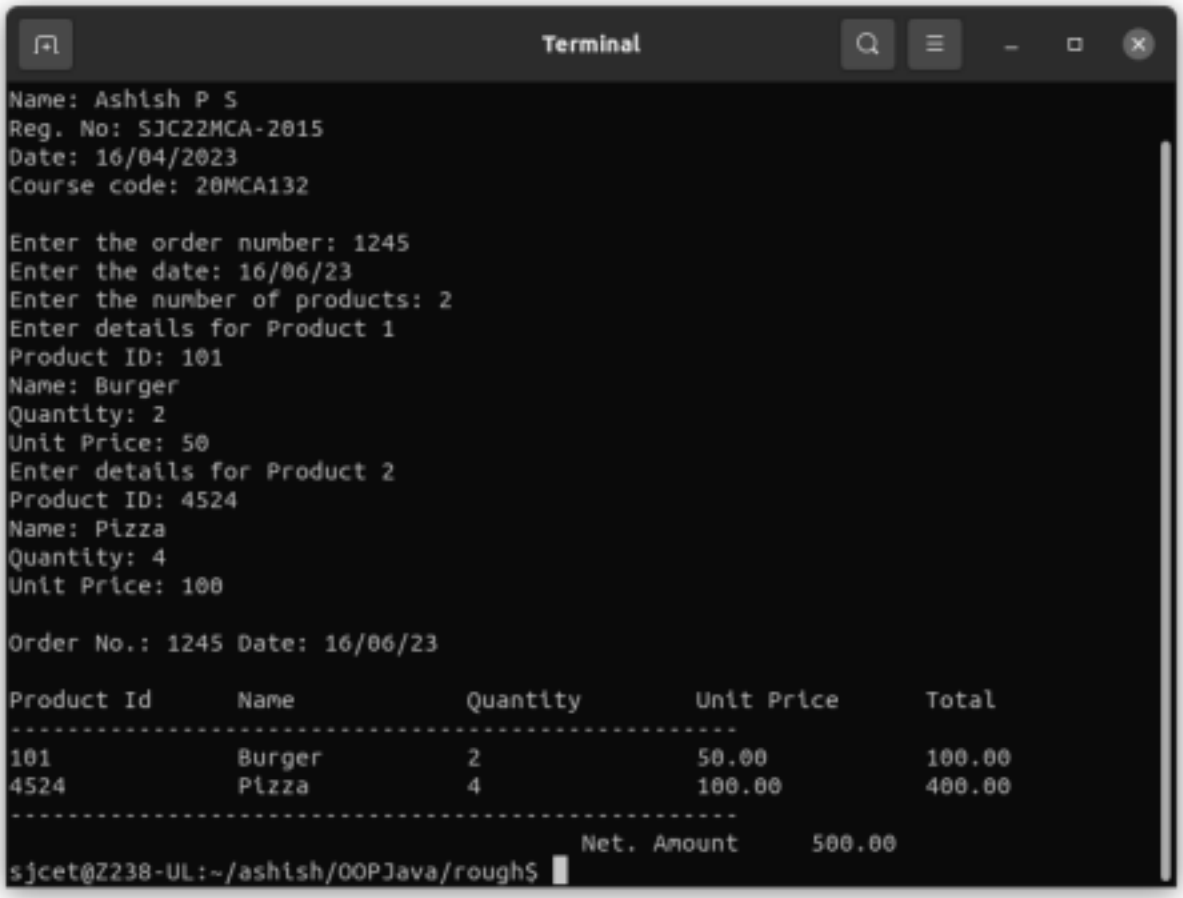
7) Prepare bill with the given format using calculate method from interface. Order No. Date :

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

```
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\t\tNet. Amount\t%.2f\n", netAmount); }
}

public class BillCalculator {
    public static void main(String[] args) {

        System.out.println("Name: Ashish P S");
        System.out.println("Reg. No: SJC22MCA-2015");
        System.out.println("Date: 16/04/2023");
        System.out.println("Course code: 20MCA132");
        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(); // Consume newline character

            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();
    }
}
```


Terminal
Name: Ashish P S
Reg. No: SJC22MCA-2015
Date: 16/04/2023
Course code: 20MCA132
Enter the order number: 1245
Enter the date: 16/06/23
Enter the number of products: 2
Enter details for Product 1
Product ID: 101
Name: Burger
Quantity: 2
Unit Price: 50
Enter details for Product 2
Product ID: 4524
Name: Pizza
Quantity: 4
Unit Price: 100
Order No.: 1245 Date: 16/06/23
Product Id Name Quantity Unit Price Total
101 Burger 2 50.00 100.00
4524 Pizza 4 100.00 400.00
Net. Amount 500.00
sjcet@Z238-UL:~/ashish/OOPJava/rough$