

Develop a Java program to create an abstract class named Shape that contains two integers and an empty method named printArea(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contain only the method printArea() that prints the area of the given shape.

```
import java.util.Scanner;

abstract class Shape {
    double a, b;
    abstract void printArea();
}

class Rectangle extends Shape {
    void printArea() {
        System.out.println("Area of rectangle is " + (a * b));
    }
}

class Triangle extends Shape {
    void printArea() {
        System.out.println("Area of triangle is " + (0.5 * a * b));
    }
}

class Circle extends Shape {
    void printArea() {
        System.out.println("Area of circle is " + (3.14 * a * a));
    }
}

class p4 {
    public static void main(String args[]) {
        int n;
        Rectangle r = new Rectangle();
        Triangle t = new Triangle();
        Circle c = new Circle();
        Scanner s1 = new Scanner(System.in);

        while (true) {
            System.out.println("\nMAIN MENU");
            System.out.println("1. Rectangle");

```

```
System.out.println("2. Triangle");
System.out.println("3. Circle");
System.out.print("Enter choice: ");
n = s1.nextInt();

switch (n) {
    case 1:
        System.out.print("Enter length: ");
        r.a = s1.nextDouble();
        System.out.print("Enter breadth: ");
        r.b = s1.nextDouble();
        r.printArea();
        break;

    case 2:
        System.out.print("Enter base: ");
        t.a = s1.nextDouble();
        System.out.print("Enter height: ");
        t.b = s1.nextDouble();
        t.printArea();
        break;

    case 3:
        System.out.print("Enter radius: ");
        c.a = s1.nextDouble();
        c.printArea();
        break;

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

OUTPUT:-

```
Usage: javac <options> <source files>
use --help for a list of possible options
PS C:\Users\student\Desktop\pandajavalab> javac p4.java
PS C:\Users\student\Desktop\pandajavalab> java p4

MAIN MENU
1. Rectangle
2. Triangle
3. Circle
Enter choice: 1
Enter length: 3
Enter breadth: 2
Area of rectangle is 6.0

MAIN MENU
1. Rectangle
2. Triangle
3. Circle
Enter choice: 2
Enter base: 4
Enter height: 5
Area of triangle is 10.0

MAIN MENU
1. Rectangle
2. Triangle
3. Circle
Enter choice: 3
Enter radius: 5
Area of circle is 78.5

MAIN MENU
1. Rectangle
2. Triangle
3. Circle
Enter choice: ■
```

Program 3:-

```
import java.util.Scanner;

class Book {
    String name;
    String author;
    double price;
    int numPages;

    Book(String name, String author, double price, int numPages) {
        this.name = name;
        this.author = author;
        this.price = price;
        this.numPages = numPages;
    }

    void setDetails(Scanner scanner) {
        scanner.nextLine();
```

```
System.out.print("Enter book name: ");
this.name = scanner.nextLine();

System.out.print("Enter author name: ");
this.author = scanner.nextLine();

System.out.print("Enter price: ");
this.price = scanner.nextDouble();

System.out.print("Enter number of pages: ");
this.numPages = scanner.nextInt();
}

void getDetails() {
    System.out.printf("Book Name: %s\n", name);
    System.out.printf("Author: %s\n", author);
    System.out.printf("Price: Rs%.2f\n", price);
    System.out.printf("Number of Pages: %d\n", numPages);
}

public String toString() {
    return String.format("Book Details:\nName: %s\nAuthor: %s\nPrice: Rs%.2f\nNumber
of Pages: %d",
        name, author, price, numPages);
}

public class Books {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter the number of books: ");
        int n = scanner.nextInt();

        Book[] books = new Book[n];

        for (int i = 0; i < n; i++) {
            System.out.println("\nEnter details for Book " + (i + 1) + ":");
            books[i] = new Book("", "", 0.0, 0);
            books[i].setDetails(scanner);
        }
    }
}
```

```

    }

System.out.println("\nDetails of all books:");
for (int i = 0; i < n; i++) {
    System.out.println("\nBook " + (i + 1) + ":");

    books[i].getDetails();
}

System.out.println("\nComplete details of all books (using toString):");
for (int i = 0; i < n; i++) {
    System.out.println("\nBook " + (i + 1) + ":" + books[i]);
}

scanner.close();
}
}

```

OUTPUT:-

```

        (actual and formal argument lists differ in length)
4 errors
PS C:\Users\student\Desktop\ppp> javac Books.java
PS C:\Users\student\Desktop\ppp> java Books.java
Enter the number of books: 1

Enter details for Book 1:
Enter book name: piece
Enter author name: panda
Enter price: 20000
Enter number of pages: 5

Details of all books:

Book 1:
Book Name: piece
Author: panda
Price: Rs20000.00
Number of Pages: 5

Complete details of all books (using toString):

Book 1:
Book Details:
Name: piece
Author: panda
Price: Rs20000.00
Number of Pages: 5
PS C:\Users\student\Desktop\ppp>

```