

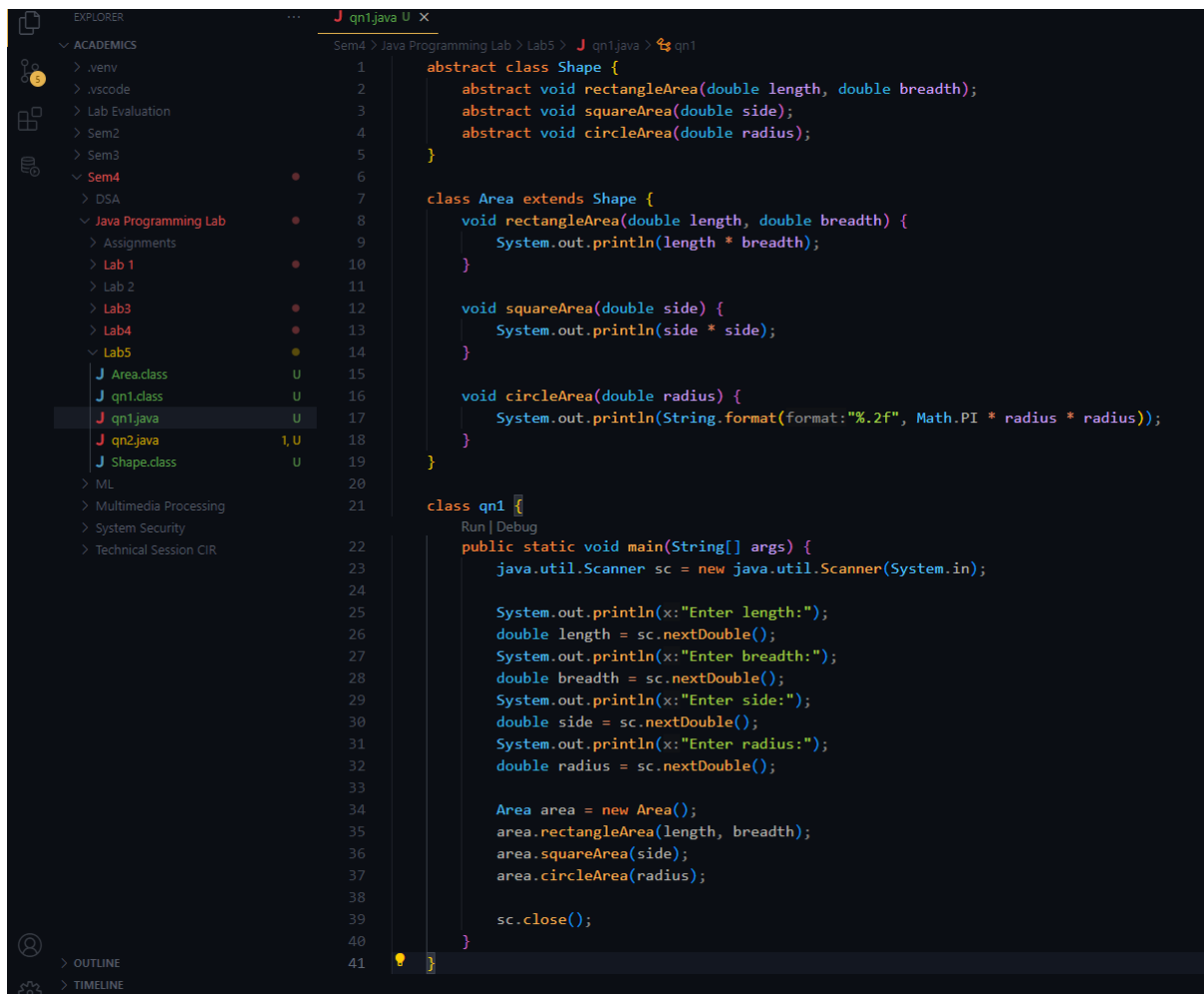
## Java Lab -5

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Qn1,

Code:



```
1  abstract class Shape {
2      abstract void rectangleArea(double length, double breadth);
3      abstract void squareArea(double side);
4      abstract void circleArea(double radius);
5  }
6
7  class Area extends Shape {
8      void rectangleArea(double length, double breadth) {
9          System.out.println(length * breadth);
10     }
11
12     void squareArea(double side) {
13         System.out.println(side * side);
14     }
15
16     void circleArea(double radius) {
17         System.out.println(String.format(format:"%.2f", Math.PI * radius * radius));
18     }
19 }
20
21 class qn1 {
22     Run | Debug
23     public static void main(String[] args) {
24         java.util.Scanner sc = new java.util.Scanner(System.in);
25
26         System.out.println(x:"Enter length:");
27         double length = sc.nextDouble();
28         System.out.println(x:"Enter breadth:");
29         double breadth = sc.nextDouble();
30         System.out.println(x:"Enter side:");
31         double side = sc.nextDouble();
32         System.out.println(x:"Enter radius:");
33         double radius = sc.nextDouble();
34
35         Area area = new Area();
36         area.rectangleArea(length, breadth);
37         area.squareArea(side);
38         area.circleArea(radius);
39
40         sc.close();
41     }
42 }
```

Output:

```
PROBLEMS 9 OUTPUT DEBUG CONSOLE TERMINAL PORTS SQL HISTORY TASK MONITOR COMMENTS
PS D:\Academics> cd "d:\Academics\Sem4\Java Programming Lab\Lab5\" ; if ($?) { javac qn1.java } ; if ($?) { java qn1 }
Enter length:
5
Enter breadth:
5
Enter side:
3
Enter radius:
5
25.0
9.0
78.54
PS D:\Academics\Sem4\Java Programming Lab\Lab5>
```

Qn 2,

Code:

```
ACADEMICS Sem4 > Java Programming Lab > Lab5 > J qn2.java > ...
> .envv 1
> .vscode 2
> Lab Evaluation 3
> Sem2 4
> Sem3 5
> Sem4 6
> DSA 7
> Java Programming Lab 8
> Assignments 9
> Lab 1 10
> Lab 2 11
> Lab3 12
> Lab4 13
> Lab5 14
J AbstractClass.class U 15
J Area.class U 16
J Calculator.class U 17
J qn1.class U 18
J qn1.java U 19
J qn2.class U 20
J qn2.java U 21
J Shape.class U 22
> ML 23
> Multimedia Processing 24
> System Security 25
> Technical Session CIR 26

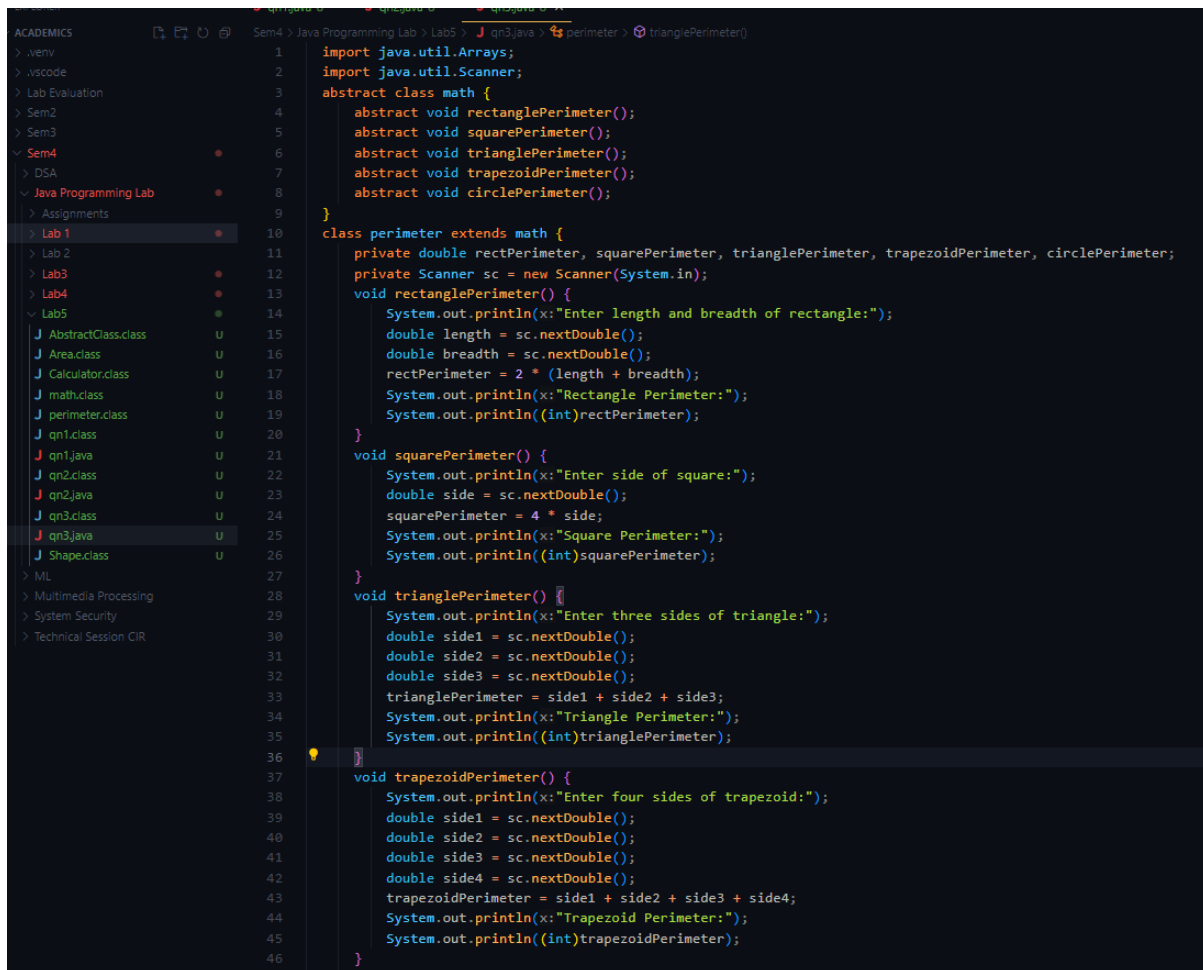
1
import java.util.Scanner;
2
3
abstract class AbstractClass {
4
5     abstract int getValue();
6     abstract int divisorSum(int n);
7 }
8
9 class Calculator extends AbstractClass {
10     int getValue() {
11         try (Scanner sc = new Scanner(System.in)) {
12             return sc.nextInt();
13         }
14     }
15
16     int divisorSum(int n) {
17         int sum = 0;
18         for(int i = 1; i <= n; i++) {
19             if(n % i == 0) {
20                 sum += i;
21             }
22         }
23         return sum;
24     }
25 }
26
27 class qn2 {
28     Run | Debug
29     public static void main(String[] args) {
30         Calculator calc = new Calculator();
31         System.out.print(s:"Enter a number: ");
32         int n = calc.getValue();
33         System.out.println("Sum of divisors: " + calc.divisorSum(n));
34     }
35 }
```

Output:

```
PROBLEMS 8 OUTPUT DEBUG CONSOLE TERMINAL PORTS SQL HISTORY TASK MONITOR COMMENTS
PS D:\Academics> cd "d:\Academics\Sem4\Java Programming Lab\Lab5\" ; if ($?) { javac qn2.java } ; if ($?) { java qn2 }
Enter a number: 500
Sum of divisors: 1092
PS D:\Academics\Sem4\Java Programming Lab\Lab5>
```

Qn3,

Code:



```
1  import java.util.Arrays;
2  import java.util.Scanner;
3  abstract class math {
4      abstract void rectanglePerimeter();
5      abstract void squarePerimeter();
6      abstract void trianglePerimeter();
7      abstract void trapezoidPerimeter();
8      abstract void circlePerimeter();
9  }
10 class perimeter extends math {
11     private double rectPerimeter, squarePerimeter, trianglePerimeter, trapezoidPerimeter, circlePerimeter;
12     private Scanner sc = new Scanner(System.in);
13     void rectanglePerimeter() {
14         System.out.println(x:"Enter length and breadth of rectangle:");
15         double length = sc.nextDouble();
16         double breadth = sc.nextDouble();
17         rectPerimeter = 2 * (length + breadth);
18         System.out.println(x:"Rectangle Perimeter:");
19         System.out.println((int)rectPerimeter);
20     }
21     void squarePerimeter() {
22         System.out.println(x:"Enter side of square:");
23         double side = sc.nextDouble();
24         squarePerimeter = 4 * side;
25         System.out.println(x:"Square Perimeter:");
26         System.out.println((int)squarePerimeter);
27     }
28     void trianglePerimeter() {
29         System.out.println(x:"Enter three sides of triangle:");
30         double side1 = sc.nextDouble();
31         double side2 = sc.nextDouble();
32         double side3 = sc.nextDouble();
33         trianglePerimeter = side1 + side2 + side3;
34         System.out.println(x:"Triangle Perimeter:");
35         System.out.println((int)trianglePerimeter);
36     }
37     void trapezoidPerimeter() {
38         System.out.println(x:"Enter four sides of trapezoid:");
39         double side1 = sc.nextDouble();
40         double side2 = sc.nextDouble();
41         double side3 = sc.nextDouble();
42         double side4 = sc.nextDouble();
43         trapezoidPerimeter = side1 + side2 + side3 + side4;
44         System.out.println(x:"Trapezoid Perimeter:");
45         System.out.println((int)trapezoidPerimeter);
46     }
}
```

```

class perimeter extends math {
}

void circlePerimeter() {
    System.out.println(x:"Enter radius of circle:");
    double radius = sc.nextDouble();
    circlePerimeter = 2 * Math.PI * radius;
    System.out.println(x:"Circle Perimeter:");
    System.out.println((int)circlePerimeter);
}

void calculateSum() {
    double sum = rectPerimeter + squarePerimeter + trianglePerimeter + trapezoidPerimeter + circlePerimeter;
    System.out.println(x:"Sum of all perimeters:");
    System.out.println((int)sum);
}

void sortPerimeter() {
    double[] perimeters = {rectPerimeter, squarePerimeter, trianglePerimeter, trapezoidPerimeter, circlePerimeter};
    Arrays.sort(perimeters);
    System.out.println(x:"Sorted perimeters:");
    for(int i = 0; i < perimeters.length; i++) {
        System.out.print((int)perimeters[i] + " ");
    }
}

public class qn3 {
    Run | Debug
    public static void main(String[] args) {
        perimeter p = new perimeter();
        p.rectanglePerimeter();
        p.squarePerimeter();
        p.trianglePerimeter();
        p.trapezoidPerimeter();
        p.circlePerimeter();
        p.calculateSum();
        p.sortPerimeter();
    }
}

```

## Output:

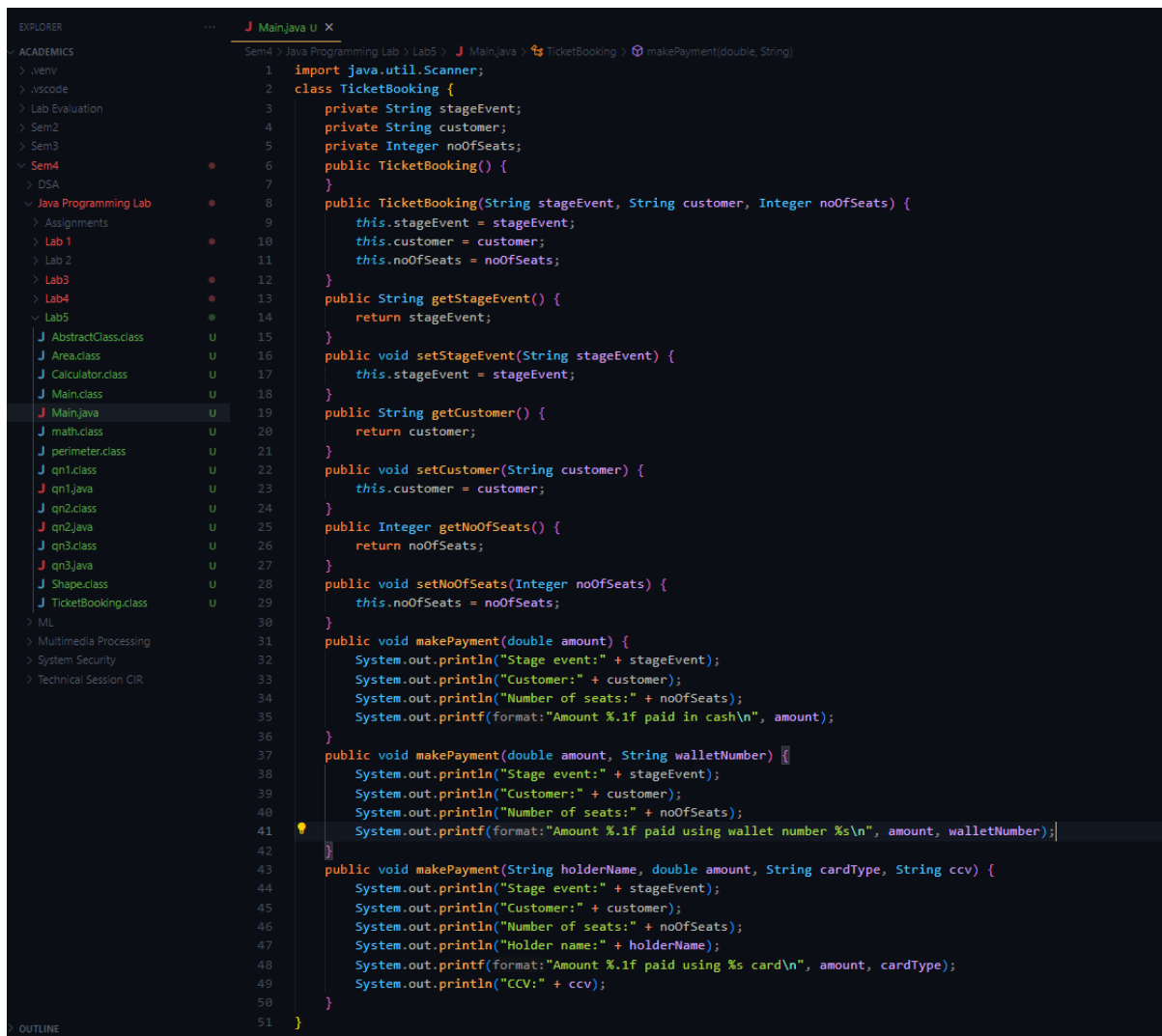
```

PS D:\Academics\Sem4\Java Programming Lab\Lab5> cd "d:\Academics\Sem4\Java Programming Lab\Lab5\" ; if ($?) { javac qn3.java } ; if ($?) { java qn3 }
Enter length and breadth of rectangle:
20
20
Rectangle Perimeter:
80
Enter side of square:
10
Square Perimeter:
40
Enter three sides of triangle:
3
4
5
Triangle Perimeter:
12
Enter four sides of trapezoid:
1
3
5
4
Trapezoid Perimeter:
13
Enter radius of circle:
5
Circle Perimeter:
31
Sum of all perimeters:
176
Sorted perimeters:
12 13 31 40 80
PS D:\Academics\Sem4\Java Programming Lab\Lab5>

```

Qn4,

Code:



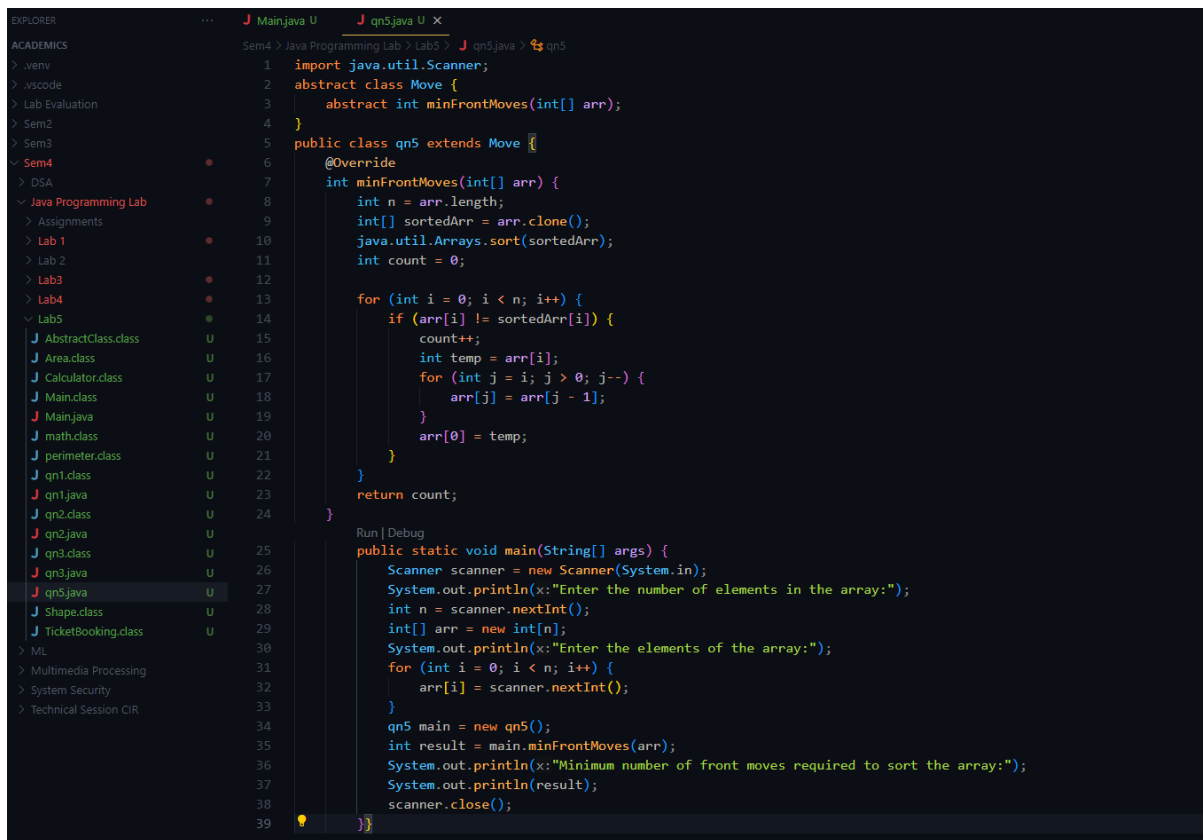
```
1  import java.util.Scanner;
2  class TicketBooking {
3      private String stageEvent;
4      private String customer;
5      private Integer noOfSeats;
6      public TicketBooking() {
7      }
8      public TicketBooking(String stageEvent, String customer, Integer noOfSeats) {
9          this.stageEvent = stageEvent;
10         this.customer = customer;
11         this.noOfSeats = noOfSeats;
12     }
13     public String getStageEvent() {
14         return stageEvent;
15     }
16     public void setStageEvent(String stageEvent) {
17         this.stageEvent = stageEvent;
18     }
19     public String getCustomer() {
20         return customer;
21     }
22     public void setCustomer(String customer) {
23         this.customer = customer;
24     }
25     public Integer getNoOfSeats() {
26         return noOfSeats;
27     }
28     public void setNoOfSeats(Integer noOfSeats) {
29         this.noOfSeats = noOfSeats;
30     }
31     public void makePayment(double amount) {
32         System.out.println("Stage event:" + stageEvent);
33         System.out.println("Customer:" + customer);
34         System.out.println("Number of seats:" + noOfSeats);
35         System.out.printf(format:"Amount %.1f paid in cash\n", amount);
36     }
37     public void makePayment(double amount, String walletNumber) {
38         System.out.println("Stage event:" + stageEvent);
39         System.out.println("Customer:" + customer);
40         System.out.println("Number of seats:" + noOfSeats);
41         System.out.printf(format:"Amount %.1f paid using wallet number %s\n", amount, walletNumber);
42     }
43     public void makePayment(String holderName, double amount, String cardType, String ccv) {
44         System.out.println("Stage event:" + stageEvent);
45         System.out.println("Customer:" + customer);
46         System.out.println("Number of seats:" + noOfSeats);
47         System.out.println("Holder name:" + holderName);
48         System.out.printf(format:"Amount %.1f paid using %s card\n", amount, cardType);
49         System.out.println("CCV:" + ccv);
50     }
51 }
```

## Output:

```
PS D:\Academics> cd "d:\Academics\Sem4\Java Programming Lab\Lab5\" ; if ($?) { javac Main.java } ; if ($?) { java Main }
Enter ticket booking details (stageEvent,customer,noOfSeats):
Movie Shadow 2
Invalid input. Please enter details in the format: stageEvent,customer,noOfSeats
Movie,Shadow,2
Enter payment mode (1-Cash, 2-Wallet, 3-Credit Card):
2
Enter amount:
1000
Enter wallet number:
2
Stage event:Movie
Customer:Shadow
Number of seats:2
Amount 1000.0 paid using wallet number 2
PS D:\Academics\Sem4\Java Programming Lab\Lab5>
```


Qn5,

Code:



```
1 import java.util.Scanner;
2 abstract class Move {
3     abstract int minFrontMoves(int[] arr);
4 }
5 public class qn5 extends Move {
6     @Override
7     int minFrontMoves(int[] arr) {
8         int n = arr.length;
9         int[] sortedArr = arr.clone();
10        java.util.Arrays.sort(sortedArr);
11        int count = 0;
12
13        for (int i = 0; i < n; i++) {
14            if (arr[i] != sortedArr[i]) {
15                count++;
16                int temp = arr[i];
17                for (int j = i; j > 0; j--) {
18                    arr[j] = arr[j - 1];
19                }
20                arr[0] = temp;
21            }
22        }
23        return count;
24    }
25
26    public static void main(String[] args) {
27        Scanner scanner = new Scanner(System.in);
28        System.out.println(x:"Enter the number of elements in the array:");
29        int n = scanner.nextInt();
30        int[] arr = new int[n];
31        System.out.println(x:"Enter the elements of the array:");
32        for (int i = 0; i < n; i++) {
33            arr[i] = scanner.nextInt();
34        }
35        qn5 main = new qn5();
36        int result = main.minFrontMoves(arr);
37        System.out.println(x:"Minimum number of front moves required to sort the array:");
38        System.out.println(result);
39        scanner.close();
40    }
41 }
```

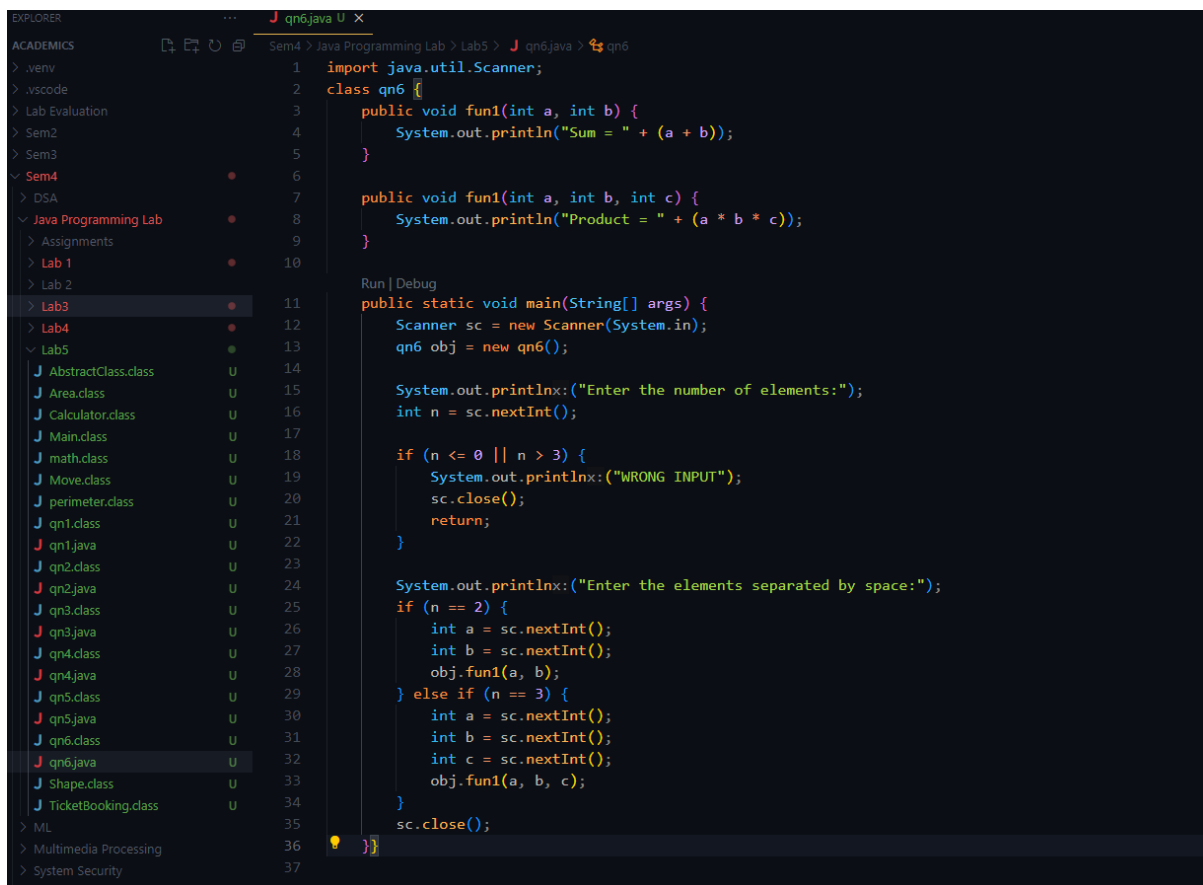
Output:



```
PS D:\Academics> cd "d:\Academics\Sem4\Java Programming Lab\Lab5\" ; if ($?) { javac qn5.java } ; if ($?) { java qn5 }
Enter the number of elements in the array:
5
Enter the elements of the array:
1
7
3
2
8
Minimum number of front moves required to sort the array:
2
PS D:\Academics\Sem4\Java Programming Lab\Lab5>
```

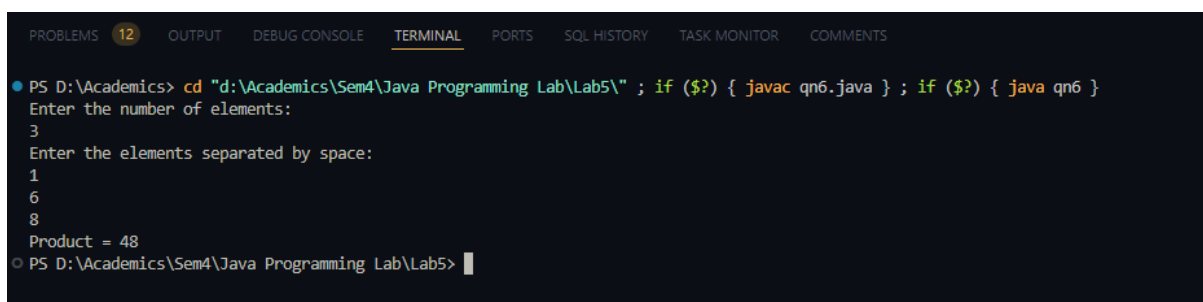
Qn6,

Code:



```
1 import java.util.Scanner;
2 class qn6 {
3     public void fun1(int a, int b) {
4         System.out.println("Sum = " + (a + b));
5     }
6
7     public void fun1(int a, int b, int c) {
8         System.out.println("Product = " + (a * b * c));
9     }
10
11     public static void main(String[] args) {
12         Scanner sc = new Scanner(System.in);
13         qn6 obj = new qn6();
14
15         System.out.println("Enter the number of elements:");
16         int n = sc.nextInt();
17
18         if (n <= 0 || n > 3) {
19             System.out.println("WRONG INPUT");
20             sc.close();
21             return;
22         }
23
24         System.out.println("Enter the elements separated by space:");
25         if (n == 2) {
26             int a = sc.nextInt();
27             int b = sc.nextInt();
28             obj.fun1(a, b);
29         } else if (n == 3) {
30             int a = sc.nextInt();
31             int b = sc.nextInt();
32             int c = sc.nextInt();
33             obj.fun1(a, b, c);
34         }
35         sc.close();
36     }
37 }
```

Output:

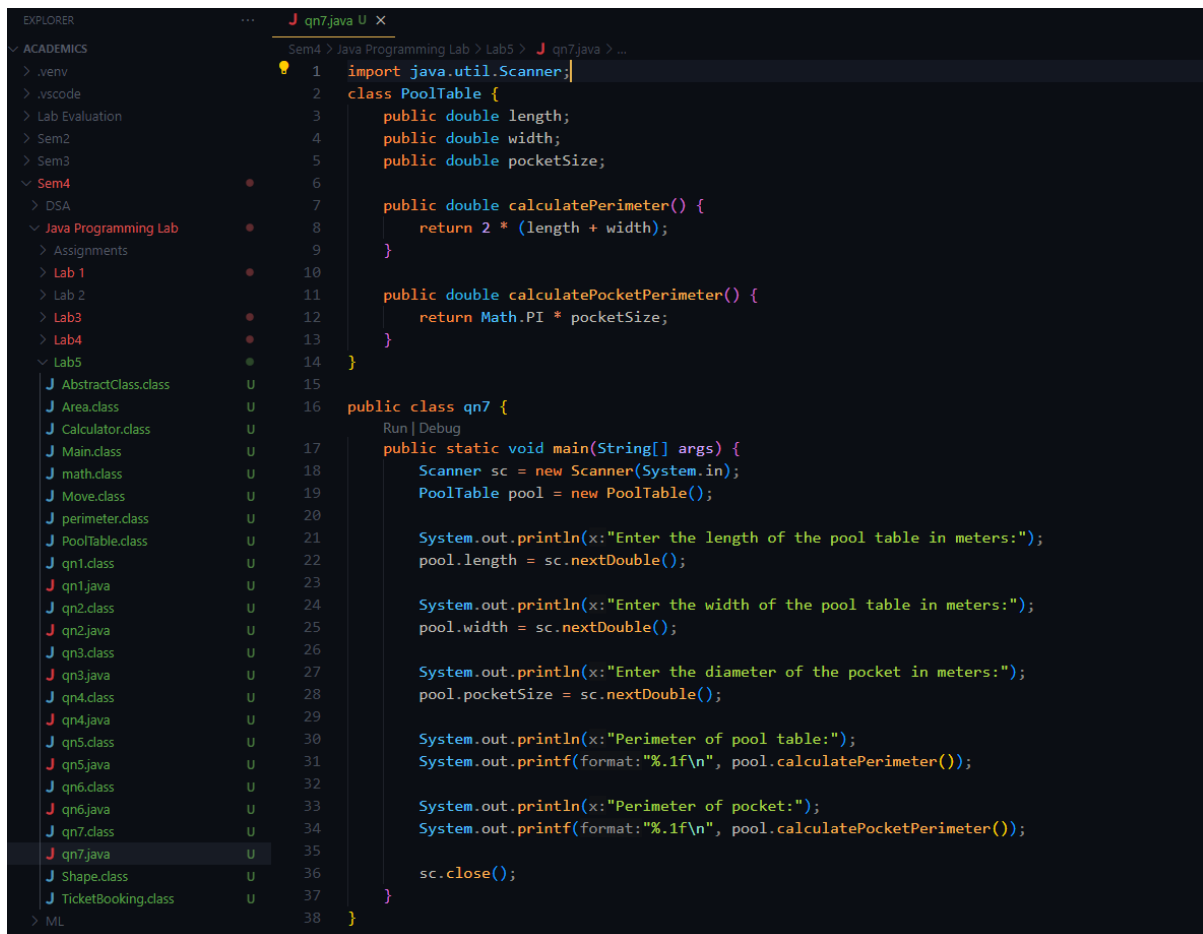


```
PS D:\Academics> cd "d:\Academics\Sem4\Java Programming Lab\Lab5\" ; if ($?) { javac qn6.java } ; if ($?) { java qn6 }
Enter the number of elements:
3
Enter the elements separated by space:
1
6
8
Product = 48
PS D:\Academics\Sem4\Java Programming Lab\Lab5>
```



Qn7,

Code:



The screenshot shows an IDE with a file explorer on the left and a code editor on the right. The file explorer lists files under 'Sem4' > 'Java Programming Lab' > 'Lab5', including 'qn7.java'. The code editor displays the following Java code:

```
1 import java.util.Scanner;
2 class PoolTable {
3     public double length;
4     public double width;
5     public double pocketSize;
6
7     public double calculatePerimeter() {
8         return 2 * (length + width);
9     }
10
11     public double calculatePocketPerimeter() {
12         return Math.PI * pocketSize;
13     }
14 }
15
16 public class qn7 {
17     Run | Debug
18     public static void main(String[] args) {
19         Scanner sc = new Scanner(System.in);
20         PoolTable pool = new PoolTable();
21
22         System.out.println(x:"Enter the length of the pool table in meters:");
23         pool.length = sc.nextDouble();
24
25         System.out.println(x:"Enter the width of the pool table in meters:");
26         pool.width = sc.nextDouble();
27
28         System.out.println(x:"Enter the diameter of the pocket in meters:");
29         pool.pocketSize = sc.nextDouble();
30
31         System.out.println(x:"Perimeter of pool table:");
32         System.out.printf(format:"%.1f\n", pool.calculatePerimeter());
33
34         System.out.println(x:"Perimeter of pocket:");
35         System.out.printf(format:"%.1f\n", pool.calculatePocketPerimeter());
36
37         sc.close();
38     }
39 }
```

Output:



The screenshot shows a terminal window with the following output:

```
PS D:\Academics> cd "d:\Academics\Sem4\Java Programming Lab\Lab5\" ; if ($?) { javac qn7.java } ; if ($?) { java qn7 }
Enter the length of the pool table in meters:
7
Enter the width of the pool table in meters:
5
Enter the diameter of the pocket in meters:
2
Perimeter of pool table:
24.0
Perimeter of pocket:
6.3
PS D:\Academics\Sem4\Java Programming Lab\Lab5> |
```

Qn8,

Code:

```
1  import java.util.Scanner;
2  class Employee {
3      protected String name;
4      protected double basicSalary;
5
6      public Employee(String name, double basicSalary) {
7          this.name = name;
8          this.basicSalary = basicSalary;
9      }
10
11     public double calculateSalary() {
12         return basicSalary;
13     }
14 }
15
16 class Manager extends Employee {
17     private double bonus;
18
19     public Manager(String name, double basicSalary, double bonus) {
20         super(name, basicSalary);
21         this.bonus = bonus;
22     }
23
24     @Override
25     public double calculateSalary() {
26         return basicSalary + bonus;
27     }
28 }
29
30 class Engineer extends Employee {
31     private double overtimePay;
32
33     public Engineer(String name, double basicSalary, double overtimePay) {
34         super(name, basicSalary);
35         this.overtimePay = overtimePay;
36     }
37
38     @Override
39     public double calculateSalary() {
40         return basicSalary + overtimePay;
41     }
42 }
43
```

```
44 public class qn8 {
45     public static void main(String[] args) {
46         Scanner scanner = new Scanner(System.in);
47
48         System.out.println(x:"Enter Manager Details:");
49         System.out.print(s:"Enter Manager name: ");
50         String managerName = scanner.nextLine();
51
52         System.out.print(s:"Enter Manager basic salary: ");
53         double managerBasicSalary = scanner.nextDouble();
54
55         System.out.print(s:"Enter Manager bonus: ");
56         double managerBonus = scanner.nextDouble();
57         scanner.nextLine();
58
59         System.out.println(x:"\nEnter Engineer Details:");
60         System.out.print(s:"Enter Engineer name: ");
61         String engineerName = scanner.nextLine();
62
63         System.out.print(s:"Enter Engineer basic salary: ");
64         double engineerBasicSalary = scanner.nextDouble();
65
66         System.out.print(s:"Enter Engineer overtime pay: ");
67         double engineerOvertimePay = scanner.nextDouble();
68
69         Manager manager = new Manager(managerName, managerBasicSalary, managerBonus);
70         Engineer engineer = new Engineer(engineerName, engineerBasicSalary, engineerOvertimePay);
71
72         System.out.println(x:"\nCalculated Salaries:");
73         System.out.printf(format:"Manager Salary: %.1f%n", manager.calculateSalary());
74         System.out.printf(format:"Engineer Salary: %.1f%n", engineer.calculateSalary());
75
76         scanner.close();
77     }
78 }
79
```

## Output:

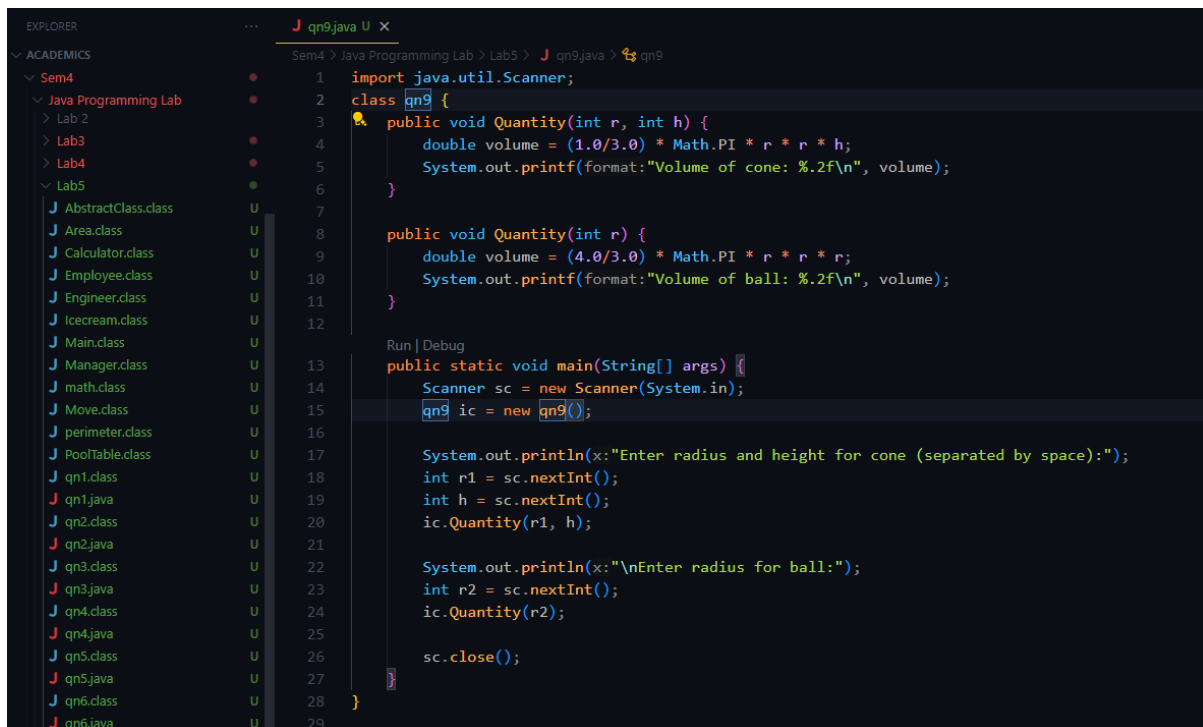
```
PS D:\Academics> cd "d:\Academics\Sem4\Java Programming Lab\Lab5\" ; if ($?) { javac qn8.java } ; if ($?) { java qn8 }
Enter Manager Details:
Enter Manager name: Ravi
Enter Manager basic salary: 100000
Enter Manager bonus: 500000

Enter Engineer Details:
Enter Engineer name: Rajesh
Enter Engineer basic salary: 75000
Enter Engineer overtime pay: 10000

Calculated Salaries:
Manager Salary: 600000.0
Engineer Salary: 85000.0
PS D:\Academics\Sem4\Java Programming Lab\Lab5>
```

Qn9,

Code:



```
1 import java.util.Scanner;
2 class qn9 {
3     public void Quantity(int r, int h) {
4         double volume = (1.0/3.0) * Math.PI * r * r * h;
5         System.out.printf(format:"Volume of cone: %.2f\n", volume);
6     }
7
8     public void Quantity(int r) {
9         double volume = (4.0/3.0) * Math.PI * r * r * r;
10        System.out.printf(format:"Volume of ball: %.2f\n", volume);
11    }
12
13    Run | Debug
14    public static void main(String[] args) {
15        Scanner sc = new Scanner(System.in);
16        qn9 ic = new qn9();
17
18        System.out.println(x:"Enter radius and height for cone (separated by space):");
19        int r1 = sc.nextInt();
20        int h = sc.nextInt();
21        ic.Quantity(r1, h);
22
23        System.out.println(x:"\nEnter radius for ball:");
24        int r2 = sc.nextInt();
25        ic.Quantity(r2);
26
27        sc.close();
28    }
29 }
```

Output:



```
PS D:\Academics> cd "d:\Academics\Sem4\Java Programming Lab\Lab5\" ; if ($?) { javac qn9.java } ; if ($?) { java qn9 }
Enter radius and height for cone (separated by space):
3
5
Volume of cone: 47.12

Enter radius for ball:
3
Volume of ball: 113.10
PS D:\Academics\Sem4\Java Programming Lab\Lab5>
```