

# Rajalakshmi Engineering College

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Batch: 2028  
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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 1\_MCQ

Attempt : 1  
Total Mark : 15  
Marks Obtained : 14

#### Section 1 : MCQ

1. Which of the following is not a primitive data type?

**Answer**

string

**Status : Correct**

**Marks : 1/1**

2. What is the output of the following code?

```
class TestClass {  
    public static void main(String[] args) {  
        int a = 5;  
        int b = 10;  
  
        int sum = a + b;
```

```
int bitwiseAnd = a & b;
int bitwiseOr = a | b;

System.out.println(sum);
System.out.println(bitwiseAnd);
System.out.println(bitwiseOr);
}
}
```

**Answer**

15115

**Status :** Wrong

**Marks :** 0/1

3. What is the output of the following code?

```
class TestClass {
    public static void main(String[] args) {
        int count = 8;
        count = count ^ 1;

        System.out.println(count);
    }
}
```

**Answer**

9

**Status :** Correct

**Marks :** 1/1

4. What is the output of the following program?

```
class Arithmetic {
    public static void main(String[] args) {
        char ch = 'A';
        System.out.println(ch);
    }
}
```

**Answer**

A

**Status :** Correct

**Marks :** 1/1

5. What is the output of the following code?

```
import java.util.*;

class RelationalOperatorExample {
    public static void main(String[] args) {
        int x = 8, y = 4;
        boolean result = (x != y);

        System.out.println(result);
    }
}
```

**Answer**

true

**Status :** Correct

**Marks :** 1/1

6. What is the result of the following expression?

```
import java.util.*;

class ComplexExpressionExample {
    public static void main(String[] args) {
        int a = 5, b = 2, c = 3, d = 4;
        int result = a + b * c / d - b;

        System.out.println(result);
    }
}
```

**Answer**

4

**Status :** Correct

**Marks :** 1/1

7. What will be the output of the following program?

```
class DataTypesMCQ {  
    public static void main(String[] args) {  
        int a = 10;  
        double b = 5;  
        System.out.println(a / b);  
    }  
}
```

**Answer**

2.0

**Status :** Correct

**Marks :** 1/1

8. What will be the output of the following code?

```
import java.util.*;  
  
class TernaryOperatorExample {  
    public static void main(String[] args) {  
        int a = 5, b = 10;  
        int result = (a > b) ? a : b;  
        System.out.println(result);  
    }  
}
```

**Answer**

10

**Status :** Correct

**Marks :** 1/1

9. Which of the following data types is used to store floating-point numbers with greater precision?

**Answer**

double

**Status :** Correct

**Marks :** 1/1

10. What will be the output of the following code snippet?

```
import java.util.*;

class OperatorPrecedenceExample {
    public static void main(String[] args) {
        int a = 5, b = 3, c = 2;
        int result = a + b * c;

        System.out.println(result);
    }
}
```

**Answer**

11

**Status :** Correct

**Marks :** 1/1

11. What is the output of the following code?

```
class TestClass {
    public static void main(String[] args) {
        int x = 5;
        int X = 10;

        int sum = x + X;
        int bitwiseResult = x | X;

        System.out.println(sum);
        System.out.println(bitwiseResult);
    }
}
```

**Answer**

1515

**Status :** Correct

**Marks :** 1/1

12. Which of the following data types is used to store single characters?

**Answer**

char

**Status :** Correct

**Marks :** 1/1

13. What is the output of the following code?

```
class TestClass {  
    public static void main(String[] args) {  
        int a = 10;  
        int b = 3;  
        System.out.println(a / b);  
    }  
}
```

**Answer**

3

**Status :** Correct

**Marks :** 1/1

14. What is the output of the following program?

```
class Demo {  
    public static void main(String[] args) {  
        String text = "Hello, World!";  
        System.out.println(text);  
    }  
}
```

**Answer**

Hello, World!

**Status :** Correct

**Marks :** 1/1

15. What will be the output of the following code snippet?

```
class DivisionExample {  
    public static void main(String[] args) {  
        double num1 = 10.5;  
        double num2 = 3;  
        int result = (int)(num1 / num2);  
        System.out.println(result);  
    }  
}
```

**Answer**

3

**Status :** Correct

**Marks :** 1/1

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 1\_Q1

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

Gloria is responsible for monitoring the performance of two machines in a factory. She needs to determine which of the two machines is operating closest to the optimal temperature of 100 degrees Celsius using the relational operator.

Assist Gloria in displaying the machine's temperature, which is closer to 100, and the difference from 100.

##### ***Input Format***

The first line of input consists of an integer N, representing the temperature of the first machine.

The second line consists of an integer M, representing the temperature of the second machine.



### Output Format

The output prints "The integer closer to 100 is X with a difference of Y" where X is the temperature of the closer machine and Y is the difference from 100.

Refer to the sample output for formatting specifications.

### Sample Test Case

Input: 90

80

Output: The integer closer to 100 is 90 with a difference of 10

### Answer

```
import java.util.Scanner;
class performance{
    static int a,b;
    public static void main(String[] args){
        Scanner s = new Scanner(System.in);
        a = s.nextInt();
        b = s.nextInt();
        int dif1 = Math.abs(a-100);
        int dif2 = Math.abs(b-100);
        if (dif1>dif2){
            System.out.println("The integer closer to 100 is "+ b +" with a difference of "+dif2);
        }
        else{
            System.out.println("The integer closer to 100 is "+a+ " with a difference of "+dif1);
        }
    }
}
```

Status : Correct

Marks : 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 1\_Q2

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. PROBLEM STATEMENT:

Dave got two students who want help with their doubt. Each hands out an integer and wants to find if one integer is positive while the other is not divisible by 3. Write a program to achieve this and conclude for them.

##### ***Input Format***

The first line of input represents the first integer.

The second line of input represents the second integer.

##### ***Output Format***

The output should display as "One of the integers is positive while the other is not divisible by 3." or "Neither of the integers meets the condition."

Refer to the sample output for the formatting specifications.

**Sample Test Case**

Input: 4

3

Output: One of the integers is positive while the other is not divisible by 3.

**Answer**

```
import java.util.Scanner;
public class Main{
    public static void main(String[] args){
        int a,b;
        Scanner s = new Scanner(System.in);
        a = s.nextInt();
        b = s.nextInt();
        if(a>0 && b%3!=0){
            System.out.println("One of the integers is positive while the other is not
divisible by 3.");
        }
        else if(b>0 && a%3!=0){
            System.out.println("One of the integers is positive while the other is not
divisible by 3.");
        }
        else{
            System.out.println("Neither of the integers meets the condition.");
        }
    }
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 1\_Q3

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem statement

Manoj, a developer at MoneyMatters Inc., is working on improving the company's financial system. He needs to create a program that takes an integer input, converts it into a double, and displays both the original integer and the converted double value.

##### ***Input Format***

The input consists of a single integer representing a monetary amount.

##### ***Output Format***

The first line of the output displays the "Original Integer: ", followed by an integer representation of the input value.

The second line displays the "Converted Double: ", followed by a double value representing the input as a decimal value.

Refer to the sample output for the formatting specifications.

**Sample Test Case**

Input: 20

Output: Original Integer: 20

Converted Double: 20.0

**Answer**

```
import java.util.Scanner;
public class Main{
    public static void main(String[] args){
        int a;
        Scanner s = new Scanner(System.in);
        a = s.nextInt();
        System.out.println("Original Integer: "+a);
        System.out.println("Converted Double: "+(double)a);
    }
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 1\_Q4

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

Vishal and Arun are discussing the properties of numbers. Vishal gives Arun two integers. He asks Arun to check if the sum of these two numbers is a multiple of their product.

Can you assist Arun and determine whether the sum is a multiple of the product?

##### ***Input Format***

The input consists of two space-separated integers.

##### ***Output Format***

The output prints:

1. "Sum is Multiple of Product" if the sum of the two numbers is divisible by their product.
2. "Sum is Not Multiple of Product" otherwise.

Refer to the sample output for formatting specifications.

**Sample Test Case**

Input: 1 2

Output: Sum is Not Multiple of Product

**Answer**

```
import java.util.Scanner;
public class Main{
    public static void main(String[] args){
        Scanner s = new Scanner(System.in);
        String inp = s.nextLine();
        String[] result = inp.split(" ");
        int sum=0,p=1;
        for(int i=0;i<result.length;i++){
            sum+= Integer.parseInt(result[i]);
            p*=Integer.parseInt(result[i]);
        }
        if(p%sum==0){
            System.out.println("Sum is Multiple of Product");
        }
        else{
            System.out.println("Sum is Not Multiple of Product");
        }
    }
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 1\_Q5

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement:

Emily has a beautiful circular garden in her backyard. She's interested in calculating two important measurements for her garden: the circumference and the area. To do this, she needs a program that can take the radius of her circular garden as input and provide the calculated circumference and area as output. The formulas she should use are as follows:

To calculate the circumference (C) of a circle, you can use the formula:

$$C = 2 * \pi * r$$

$$A = \pi * r^2$$

Where:



C represents the circumference.

A represents the area.

$\pi$  (pi) is approximately 3.14159.

r is the radius of the circle.

Emily is not a programmer, and she needs your help to create a program that will make these calculations for her garden.

### ***Input Format***

The first line of input contains a single double-point number radius, representing the radius of the circle.

### ***Output Format***

The output should consist of two lines:

The first line should print the circumference of the circle rounded to 2 decimal places, followed by the unit "meters".

The second line should print the area of the circle rounded to 2 decimal places, followed by the unit "square meters".

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 3.0

Output: Circumference: 18.85 meters

Area: 28.27 square meters

### ***Answer***

```
import java.util.Scanner;
public class Main{
    public static void main(String[] args){
        Scanner s = new Scanner(System.in);
        double a,c,v;
        v = s.nextDouble();
        a = 3.14159 * (v*v);
```

```
c = 2*3.14159 *v;  
System.out.printf("Circumference: %.2f meters",c);  
System.out.printf("Area: %.2f square meters",a);  
}  
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 1\_Q6

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

Joey is learning about bitwise operations and is working on a project that involves extracting specific bits from integers. He needs to write a program that takes an integer and the number of bits N as input and outputs the value of the lowest N bits of the integer.

Help Joey in his project to understand and visualize how bitwise operations work in practical scenarios.

##### ***Input Format***

The first line of input consists of an integer X, representing the given integer.

The second line consists of an integer N, representing the number of bits to extract.

### **Output Format**

The output displays "Result: " followed by an integer representing the value of the lowest N bits of the given integer.

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 85

2

Output: Result: 1

### **Answer**

```
import java.util.Scanner;

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

        int X = sc.nextInt();
        int N = sc.nextInt();

        int mask = (1 << N) - 1;
        int result = X & mask;

        System.out.println("Result: " + result);
    }
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 1\_Q7

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement:

Miles is working on a program that involves analyzing two integers. He wants to check if either one of the integers is both:

Less than or equal to zero, and Odd. Can you help him create a program that identifies whether either of the integers meets these conditions?

##### ***Input Format***

The input consists of two integers on separate lines, denoted as 'input1' and 'input2'.

##### ***Output Format***

A single line with a boolean result (either 'true' or 'false') indicating whether either 'input1' or 'input2' is both less than or equal to zero and odd.

Refer to the sample output for format specifications

**Sample Test Case**

Input: -45

10

Output: true

**Answer**

```
import java.util.Scanner;
class Main{
    public static void main(String[] args){
        Scanner s = new Scanner(System.in);
        int a,b;
        a = s.nextInt();
        b = s.nextInt();
        boolean c = cond(a)||cond(b);
        System.out.println(c);
    }
    static boolean cond(int a){
        if(a<=0 && a%2!=0){
            return true;
        }
        return false;
    }
}
```

**Status : Correct**

**Marks : 10/10**

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 1\_Q8

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

In the Kingdom of Finance, the royal treasury is managed by the treasurer, Sir Cedric. Sir Cedric tracks the daily expenses of the kingdom using an expense report that lists three major categories: food, clothing, and utilities. However, the King wants to know if the average daily expense is greater than at least two of these categories to ensure the kingdom is spending wisely.

Your task is to help Sir Cedric determine if the average daily expense is greater than two of the categories. Specifically, you need to calculate the average of the three expenses and check if it is greater than any two categories.

Note: Use the ternary operator

### **Input Format**

Three integers a, b, and c represent the daily expenses for food, clothing, and utilities. Each integer is provided on a single line.

### **Output Format**

The average of the three expenses, rounded to two decimal places.

A message indicating whether the average is greater than at least two of the expense categories.

1. If the average is greater than the two smallest monthly expenses, print "Average is greater than both X and Y," where X and Y are the two smallest expenses.
2. Otherwise, display "Average is not greater than two smallest expenses".

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 4

6

10

Output: 6.67

Average is greater than both 4 and 6

### **Answer**

```
import java.util.*;
class Main{
    public static void main(String[] args){
        int a,b,c;
        double avg;
        Scanner s = new Scanner(System.in);
        a = s.nextInt();
        b = s.nextInt();
        c = s.nextInt();
        avg= (a+b+c)/3.0;
        System.out.printf("%.2f",avg);
        if(avg > a && avg > b){
            System.out.println("Average is greater than both " + a + " and " + b);
```



```
}  
else if(avg > b && avg > c){  
    System.out.println("Average is greater than both " + b + " and " + c);  
}  
else if(avg > a && avg > c){  
    System.out.println("Average is greater than both " + a + " and " + c);  
}  
else{  
    System.out.println("Average is not greater than two smallest expenses");  
}  
}  
}
```

**Status :** Correct

**Marks : 10/10**

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 1\_Q9

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

Phill is a quality control manager at a manufacturing plant. He needs to verify if a sensor reading at a midpoint station (S2) falls exactly halfway between the readings of the previous station (S1) and the next station (S3). Help him by developing a program that checks if the second sensor reading is the average (midpoint) of the first and third sensor readings.

Use the relational operator to solve the program.

##### ***Input Format***

The first line of input consists of an integer S1, representing the sensor reading of the first station.

The second line consists of an integer S2, representing the sensor reading of the midpoint station.

The third line consists of an integer S3, representing the sensor reading of the next station.

### **Output Format**

The first line of output displays a boolean value representing whether the sensor reading at the midpoint station is halfway between the readings of the first and the next stations.

The second line displays one of the following:

1. If the result is true, print "The second integer is halfway between the first and third integers."
2. Otherwise, print "The second integer is not halfway between the first and third integers."

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 1

7

10

Output: false

The second integer is not halfway between the first and third integers.

### **Answer**

```
import java.util.*;
class Main{
    public static void main(String[] args){
        int a,b,c;
        Scanner s = new Scanner(System.in);
        a = s.nextInt();
        b = s.nextInt();
        c = s.nextInt();
        if(b != (a+c)/2){
            System.out.println("false");
            System.out.println("The second integer is not halfway between the first
and third integers.");
        }
    }
}
```

```
else{
    System.out.println("true");
    System.out.println("The second integer is halfway between the first and
third integers.");
}
}
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 1\_Q10

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

Aishu is supervising a construction project that needs to be completed with the help of three workers: A, B, and C.

She knows how many days each of them would take to complete the entire project individually:

A can complete it in x days, B in y days, C in z days.

Initially, all three workers (A, B, and C) work together for d1 days.

After that, C leaves, and only A and B continue for another d2 days.

Then B also leaves, and A works alone to finish the remaining work.

Your task is to help aishu to implement this functionality using the class WorkDistribution and Method calculateWork(int x, int y, int z, int d1, int d2)

Calculate the total work completed in the first  $d_1$  days by A, B, and C. Calculate the work completed in the next  $d_2$  days by A and B. Determine the remaining work after these  $d_1 + d_2$  days.

**Input Format**

The first line of input contains five space-separated integers:  $x$   $y$   $z$   $d_1$   $d_2$

where:

$x$  represents the Days A takes to complete the work alone

$y$  represents the Days B takes to complete the work alone

$z$  represents the Days C takes to complete the work alone

$d_1$  represents the Days A, B, and C work together

$d_2$  represents the Days A and B work together (after C leaves)

**Output Format**

The first line of output prints "Work done in first  $d_1$  days (A+B+C): " followed by a double value rounded to 2 decimal places.

The second line of output prints "Work done in next  $d_2$  days (A+B): " followed by a double value rounded to 2 decimal places.

The third line prints "Remaining work: " followed by a double value rounded to 2 decimal places.

Refer to the sample output for formatting specifications.

**Sample Test Case**

Input: 10 20 30 2 2

Output: Work done in first  $d_1$  days (A+B+C): 0.37

Work done in next  $d_2$  days (A+B): 0.30

Remaining work: 0.33

**Answer**

```
import java.util.Scanner;

class WorkDistribution {
    public void calculateWork(int x, int y, int z, int d1, int d2) {
        double rateA = 1.0 / x;
        double rateB = 1.0 / y;
        double rateC = 1.0 / z;
        double work1 = (rateA + rateB + rateC) * d1;
        double work2 = (rateA + rateB) * d2;
        double remaining = 1.0 - (work1 + work2);
        if (remaining < 0) remaining = 0;
        System.out.printf("Work done in first d1 days (A+B+C): %.2f%n", work1);
        System.out.printf("Work done in next d2 days (A+B): %.2f%n", work2);
        System.out.printf("Remaining work: %.2f%n", remaining);
    }

    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int x = sc.nextInt();
        int y = sc.nextInt();
        int z = sc.nextInt();
        int d1 = sc.nextInt();
        int d2 = sc.nextInt();
        WorkDistribution wd = new WorkDistribution();
        wd.calculateWork(x, y, z, d1, d2);
    }
}
```

**Status :** Correct

**Marks :** 10/10

# Rajalakshmi Engineering College

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 1\_PAH

Attempt : 1  
Total Mark : 40  
Marks Obtained : 40

#### Section 1 : Coding

##### 1. Problem Statement

Mickey and Miney are walking through a magical forest. The forest is full of enchanted stones, each with a unique number. There is a legend that says the magic power of the stones can be revealed by using a special operation. To determine the magic power of a given stone, you need to perform a bitwise AND operation with the number 15.

Each stone's number is represented by an integer, and Mickey needs to find the magic power of each stone by applying this operation.

Your task is to help Mickey compute the result of the bitwise AND operation of the given stone number with 15, and print the result.

##### **Input Format**



The input consists of a single integer.

### **Output Format**

The output should display a single integer, which is the result of the bitwise AND operation between input and 15.

Refer to the sample output for format specifications.

### **Sample Test Case**

Input: 25

Output: 9

### **Answer**

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        System.out.println(n & 15);
    }
}
```

**Status :** Correct

**Marks : 10/10**

## **2. Problem Statement**

In the Kingdom of Delivery Logistics, there is a giant truck used for transporting packages across the kingdom. The truck has a maximum capacity represented by an integer, and each package also has a specific weight. The truck's efficiency and safety depend on whether the weight of the package is below a certain threshold.

The kingdom's delivery service has a rule: if the weight of a package is less than one-third of the truck's total capacity, the package is eligible for quick processing and dispatch. However, if the weight is too heavy, the package will require special handling.

As a logistics manager, you need to check whether the weight of the package is less than one-third of the truck's total capacity.

Write a program using a ternary operator that helps determine whether the package weight meets the requirement for quick processing or if it needs special handling.

### ***Input Format***

The first line of input consists of an integer  $p$ , representing the weight of the package.

The second line consists of an integer  $w$ , representing the total weight capacity of the truck.

### ***Output Format***

The first line of output prints "One-third of Truck:  $X$ ," where  $X$  is one-third of the truck's total weight capacity as a double value with two decimal places.

The second line of output displays one of the following:

1. If  $p$  is less than one-third of the truck's total weight capacity, print "Package weight is less than one-third of the truck's capacity".
2. Otherwise, print "Package weight is not less than one-third of the truck's capacity".

Refer to the sample output for the formatting specifications.

### ***Sample Test Case***

Input: 13  
60

Output: One-third of Truck: 20.00  
Package weight is less than one-third of truck's capacity

### ***Answer***

```
import java.util.Scanner;  
  
class Main {
```

```

public static void main(String[] args) {
    Scanner sc = new Scanner(System.in);
    int p = sc.nextInt();
    int w = sc.nextInt();
    double oneThird = w / 3.0;
    System.out.printf("One-third of Truck: %.2f ", oneThird);
    System.out.println(p < oneThird
        ? "Package weight is less than one-third of truck's capacity"
        : "Package weight is not less than one-third of truck's capacity");
}
}

```

**Status :** Correct

**Marks :** 10/10

### 3. PROBLEM STATEMENT:

Maria, a software developer, is working on a program to determine if two given integers which can be either positive or negative integers have the same parity (both even or both odd). She needs your help in writing this program.

Write a program that takes two integers as input and checks if both integers are either even or odd.

#### ***Input Format***

The input consists of two lines:

The first line consists of an integer (input1) which can be either positive or negative.

The second line consists of an integer (input2) which can be either positive or negative.

#### ***Output Format***

The output is displayed in the following format:

If both integers have the same parity (i.e., both even or both odd), print:

"Both integers are either even or odd"

Otherwise, print:

"The integers have different parities"

Refer to the sample output for the formatting specifications.

**Sample Test Case**

Input: 2

-4

Output: Both integers are either even or odd

**Answer**

```
import java.util.Scanner;
```

```
class ParityCheck {  
    public static void main(String[] args) {  
        Scanner sc = new Scanner(System.in);  
        int input1 = sc.nextInt();  
        int input2 = sc.nextInt();  
        if (input1 % 2 == input2 % 2)  
            System.out.println("Both integers are either even or odd");  
        else  
            System.out.println("The integers have different parities");  
    }  
}
```

**Status :** Correct

**Marks :** 10/10

**4. PROBLEM STATEMENT:**

Maria, a software developer, is working on a project to create a simple

program to determine which of two integers is closest to zero. The integers can be either positive or negative. The program needs to take two integer inputs and calculate which one is closer to zero. If both integers are equidistant from zero, the program should return 0.

### ***Input Format***

The input contains two lines:

The first line of the input contains an integer, which can be either a positive or a negative integer.

The second line of the input contains an integer, which can be either a positive or a negative integer.

### ***Output Format***

The output displays the integer that is closest to zero in the following format:

"The integer closest to zero is: [closest\_integer]"

Here, [closest\_integer] should be replaced with the integer that is closer to zero based on its absolute value.

Refer to the sample output for the formatting specifications.

### ***Sample Test Case***

Input: 5

8

Output: The integer closest to zero is: 5

### ***Answer***

```
import java.util.Scanner;
```

```
class Main {  
    public static void main(String[] args) {  
        Scanner sc = new Scanner(System.in);  
        int num1 = sc.nextInt();  
        int num2 = sc.nextInt();  
        int result;  
        if (Math.abs(num1) < Math.abs(num2))  
            result = num1;  
        else if (Math.abs(num2) < Math.abs(num1))  
            result = num2;  
        else  
            result = 0;  
        System.out.println("The integer closest to zero is: " + result);  
    }  
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 1\_CY

Attempt : 1  
Total Mark : 40  
Marks Obtained : 38.5

#### Section 1 : Coding

##### 1. Problem Statement:

Tom is tasked with writing a program that determines whether a given integer is the square of another integer. A perfect square is a number that can be expressed as the square of an integer. The program should take an integer as input and determine if it is a perfect square or not.

The task is to implement the logic to check if the provided integer is the square of an integer and return the result.

##### ***Input Format***

The first line of the input contains an integer, "input", where |input| represents the absolute value of the integer.

##### ***Output Format***

The output should display a boolean value, "result," which should be set to true if the input is a perfect square (the square of an integer), and false if it is not.

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 16

Output: Is the integer a perfect square? true

### **Answer**

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        long input = sc.nextLong();
        boolean result;
        if (input < 0) {
            result = false;
        } else {
            long sqrt = (long) Math.sqrt(input);
            result = sqrt * sqrt == input;
        }
        System.out.println("Is the integer a perfect square? " + result);
    }
}
```

**Status :** Correct

**Marks :** 10/10

## **2. Problem Statement**

Mandy is a software engineer working on a program to analyze two integers based on specific conditions using a logical operator. She needs to determine if both integers are odd or if at least one of them is divisible by 7.

Depending on the result, she wants to print different messages.



If the condition is met, the program should identify and print the first number that is divisible by 7 or indicate that both numbers are odd. If the condition is not met, the program should print a message indicating the condition was not met, along with the input numbers.

### ***Input Format***

The first line of input consists of an integer representing the first input number.

The second line consists of an integer representing the second input number.

### ***Output Format***

The output displays "Condition met: " followed by an integer representing the first number divisible by 7, or prints "Both numbers are odd" if the two inputs are odd.

If the condition is not met, it displays "Conditions not met: " followed by the two input integers, separated by a space.

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 7

14

Output: Condition met: 7

### ***Answer***

```
import java.util.Scanner;
```

```
class Main {
```

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

```
        Scanner sc = new Scanner(System.in);
```

```
        int num1 = sc.nextInt();
```

```
        int num2 = sc.nextInt();
```

```
        if (num1 % 2 != 0 && num2 % 2 != 0) {
```

```
            System.out.println("Condition met: Both numbers are odd");
```

```
        } else if (num1 % 7 == 0 || num2 % 7 == 0) {
```

```
            if (num1 % 7 == 0)
```

```

        System.out.println("Condition met: " + num1);
    else
        System.out.println("Condition met: " + num2);
    } else {
        System.out.println("Conditions not met: " + num1 + " " + num2);
    }
}
}
}

```

**Status :** Partially correct

**Marks :** 8.5/10

### 3. Problem Statement:

"Write a program that helps identify the type of a triangle based on the lengths of its three sides. The program prompts the user to input the lengths of sides 'a', 'b', and 'c', and then it classifies the triangle as 'Equilateral' if all sides are equal, 'Isosceles' if two sides are equal, or 'Scalene' if all sides are different. Can you provide the Java code for this task?"

#### **Input Format**

The first line of the input is an integer 'a' representing the length of side 'a.'

The second line of the input is an integer 'b' representing the length of side 'b.'

The third line of the input is an integer 'c' representing the length of side 'c.'

#### **Output Format**

The program outputs a single line that specifies the type of the triangle: "Equilateral," "Isosceles," or "Scalene."

#### **Sample Test Case**

Input: 3

4

5

Output: The triangle is Scalene

#### **Answer**

```
import java.util.Scanner;
```

```

class TriangleType {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int a = sc.nextInt();
        int b = sc.nextInt();
        int c = sc.nextInt();

        if (a == b && b == c) {
            System.out.println("The triangle is Equilateral");
        } else if (a == b || b == c || a == c) {
            System.out.println("The triangle is Isosceles");
        } else {
            System.out.println("The triangle is Scalene");
        }
    }
}

```

**Status :** Correct

**Marks :** 10/10

#### 4. Problem Statement:

Gilbert is tasked with writing a program that checks whether a given integer is an odd number. An odd number is one that cannot be exactly divided by 2. The program should take an integer as input and determine if it is an odd number or not. The task is to implement the logic to check if the provided integer is odd and return the result.

##### **Input Format**

The first line of the input contains an integer, "input".

##### **Output Format**

The output should display a boolean value, "result," which should be set to true if the input integer is an odd number and false if it is even.

Refer to the sample output for formatting specifications.

### Sample Test Case

Input: 0

Output: Is the integer odd? false

### Answer

```
import java.util.Scanner;
```

```
class Main {  
    public static void main(String[] args) {  
        Scanner sc = new Scanner(System.in);  
        long input = sc.nextLong();  
        boolean result = (input % 2 != 0);  
        System.out.println("Is the integer odd? " + result);  
    }  
}
```

Status : Correct

Marks : 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 2\_MCQ

Attempt : 1  
Total Mark : 15  
Marks Obtained : 14

#### Section 1 : MCQ

1. What will be the output of the following code?

```
public class Main {  
    public static void main(String[] args) {  
        int i = 10;  
        do {  
            System.out.print(i + " ");  
            i -= 3;  
        } while(i > 0);  
    }  
}
```

**Answer**

10 7 4 1

**Status : Correct**

**Marks : 1/1**

2. What will be the output of the following code?

```
class Test {  
    public static void main(String[] args) {  
        int a = 4, b = 5;  
        if ((a + b) % 2 == 0)  
            System.out.print("Even");  
        else  
            System.out.print("Odd");  
    }  
}
```

**Answer**

Odd

**Status :** Correct

**Marks :** 1/1

3. What will be the output of the following code?

```
class Test {  
    public static void main(String[] args) {  
        int x = 5, y = 2;  
        if (x + y == 10)  
            System.out.print("Ten");  
        else if (x - y == 3)  
            System.out.print("Three");  
        else  
            System.out.print("None");  
    }  
}
```

**Answer**

Three

**Status :** Correct

**Marks :** 1/1

4. What will be the output of the following code?

```
class LoopTest {
```

```
public static void main(String[] args) {  
    int i = 1;  
    while (i > 0) {  
        System.out.print(i + " ");  
        i++;  
        if (i == 5) break;  
    }  
}
```

**Answer**

1 2 3 4 5

**Status :** Wrong

**Marks :** 0/1

5. What will be the output of the following code?

```
class ConditionTest {  
    public static void main(String[] args) {  
        int a = 7;  
        if (a == 7)  
            System.out.print("Match");  
        else  
            System.out.print("No Match");  
    }  
}
```

**Answer**

Match

**Status :** Correct

**Marks :** 1/1

6. What will be the output of the following code?

```
public class Main {  
    public static void main(String[] args) {  
        int i = 1;  
        while(i < 10) {  
            i += 2;  
        }  
    }  
}
```

```
}  
    System.out.println(i);  
}  
}
```

**Answer**

11

**Status :** Correct

**Marks :** 1/1

7. What will be the output of the following code?

```
class ConditionTest {  
    public static void main(String[] args) {  
        int x = 10;  
        if (x > 5)  
            System.out.print("High");  
    }  
}
```

**Answer**

High

**Status :** Correct

**Marks :** 1/1

8. What will be the output of the following Java code snippet?

```
public class Main {  
    public static void main(String[] args) {  
        int score = 75;  
        if(score >= 90) {  
            System.out.println("Grade: A");  
        } else if(score >= 80) {  
            System.out.println("Grade: B");  
        } else if(score >= 70) {  
            System.out.println("Grade: C");  
        } else {  
            System.out.println("Grade: D");  
        }  
    }  
}
```



**Answer**

Grade: C

**Status :** Correct

**Marks :** 1/1

9. What will be the output of the following Java code snippet?

```
public class Main {  
    public static void main(String[] args) {  
        int day = 4;  
        String result = "";  
        switch(day) {  
            case 1:  
                result = "Monday";  
                break;  
            case 2:  
                result = "Tuesday";  
                break;  
            case 3:  
                result = "Wednesday";  
                break;  
            default:  
                result = "Other Day";  
        }  
        System.out.println(result);  
    }  
}
```

**Answer**

Other Day

**Status :** Correct

**Marks :** 1/1

10. What will be the output of the following code?

```
class Main {
```

```
public static void main(String[] args) {  
    for (int i = 5; i > 0; i--) {  
        System.out.print(i + " ");  
    }  
}
```

**Answer**

5 4 3 2 1

**Status :** Correct

**Marks :** 1/1

11. What will be the output of the following code?

```
class Loop {  
    public static void main(String[] args) {  
        for (int i = 1; i <= 3; i++) {  
            for (int j = 1; j <= 2; j++) {  
                System.out.print(i + "" + j + " ");  
            }  
        }  
    }  
}
```

**Answer**

11 12 21 22 31 32

**Status :** Correct

**Marks :** 1/1

12. What will be the output of the following code?

```
class LoopTest {  
    public static void main(String[] args) {  
        int i = 1;  
        do {  
            System.out.print(i + " ");  
            i *= 2;  
        } while (i <= 8);  
    }  
}
```

}

**Answer**

1 2 4 8

**Status :** Correct

**Marks :** 1/1

13. What will be the output of the following code?

```
class Test {  
    public static void main(String[] args) {  
        int num = 15;  
        if (num > 10)  
            if (num % 3 == 0)  
                System.out.print("Divisible");  
            else  
                System.out.print("Not Divisible");  
        }  
    }  
}
```

**Answer**

Divisible

**Status :** Correct

**Marks :** 1/1

14. What will be the output of the following code?

```
public class Main {  
    public static void main(String[] args) {  
        for(int i = 1; i <= 20; i = i * 2) {  
            System.out.print(i + " ");  
        }  
    }  
}
```

**Answer**

1 2 4 8 16

**Status :** Correct

**Marks :** 1/1

15. What will be the output of the following code?

```
public class Main {  
    public static void main(String[] args) {  
        int sum = 0;  
        for(int i = 1; i <= 5; i++) {  
            sum += i;  
        }  
        System.out.println(sum);  
    }  
}
```

**Answer**

15

**Status :** Correct

**Marks :** 1/1

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 2\_Q1

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

Arun is working on a project to automate the process of determining whether a student has passed or failed based on their subject marks.

He aims to create a simple program that takes positive integers as marks for five subjects from the user. If the average of the marks is greater than or equal to 50, the student has passed the exam. Otherwise, the student has failed.

Help Arun to implement the project.

##### ***Input Format***

The input consists of five space-separated integers, representing the marks in five subjects.

### Output Format

The first line of output prints "Average score: " followed by an integer representing the average score.

The second line prints one of the following:

1. If the condition is satisfied, print "The student has passed".
2. Otherwise, the output prints "The student has failed".

Refer to the sample output for formatting specifications.

### Sample Test Case

Input: 50 60 70 80 90

Output: Average score: 70

The student has passed

### Answer

```
import java.util.Scanner;
class Main{
    public static void main(String[] args){
        int a,sum=0;
        Scanner s = new Scanner(System.in);
        for(int i=0;i<=4;i++){
            a = s.nextInt();
            sum += a;
        }
        sum/=5;
        System.out.println("Average score: " +sum);
        if (sum >= 50){
            System.out.println("The student has passed" );
        }
        else{
            System.out.println("The student has failed" );
        }
    }
}
```

Status : Correct

Marks : 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 2\_Q2

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

Samantha is a diligent math student who is exploring the world of programming. She is learning Java and has recently studied conditional statements. One day, her teacher gives her an interesting problem to solve, which takes a number as input and checks whether it is a multiple of 5 or 7.

Help her complete the task.

##### ***Input Format***

The input consists of a single integer N, representing the number to be checked.

##### ***Output Format***

If the number is a multiple of 5 but not 7, the output prints "N is a multiple of 5"

If the number is a multiple of 7, the output prints "N is a multiple of 7".

Otherwise the output prints "N is neither multiple of 5 nor 7" where N is an entered integer.

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 10

Output: 10 is a multiple of 5

### **Answer**

```
import java.util.Scanner;
class Main{
    public static void main(String[] args){
        Scanner s = new Scanner(System.in);
        int a;
        a = s.nextInt();
        if(a%7 == 0 & a%5 == 0){

        }
        else if(a%7 == 0){
            System.out.println(a+" is a Multiple of 7");
        }
        else if(a%5 == 0){
            System.out.println(a+" is a Multiple of 5");
        }
        else{
            System.out.println(a+" is neither multiple of 5 nor 7");
        }
    }
}
```

**Status :** Correct

**Marks :** 10/10



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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 2\_Q3

Attempt : 1

Total Mark : 10

Marks Obtained : 10

### Section 1 : Coding

#### 1. Problem Statement

John is a fitness trainer, and he wants to use the BMI calculator to assess the body mass index of his clients. He has a list of clients based on their height and weight.

John plans to write a program to quickly determine the BMI and provide a classification for each client.

If BMI is less than 18.5, the program will classify it as "Underweight" If BMI is between 18.6 and 24.9, the program will classify it as "Normal Weight" If BMI is between 25.0 and 29.9, the program will classify it as "Overweight" If BMI is 30.0 or higher, the program will classify it as "Obese"

Note: Formula to calculate BMI =  $\text{weight}/(\text{height}*\text{height})$

**Input Format**

The first line of input consists of a double value, representing the height of the person in meters.

The second line consists of a double value, representing the weight of the person in kilograms.

### ***Output Format***

The first line of output prints "BMI: " followed by a double (rounded to two decimal places) representing the calculated BMI.

The second line prints "Classification: " followed by a string indicating the BMI category (Underweight, Normal Weight, Overweight, or Obese).

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 1.2

45.2

Output: BMI: 31.39

Classification: Obese

### ***Answer***

```
import java.util.Scanner;
class Main{
    public static void main(String args[]){
        Scanner s = new Scanner(System.in);
        double h,w;
        h = s.nextDouble();
        w = s.nextDouble();
        w = w / (h*h);
        System.out.printf("BMI: %.2f\n",w);
        System.out.print("Classification: ");
        if(w<18.5){
            System.out.printf("Underweight");
        }
        else if(w>=18.8 && w<=24.9){
            System.out.printf("Normal Weight");
        }
        else if(w>= 25.0 && w<= 29.9 ){
```

```
        System.out.print("Overweight");  
    }  
    else if(w> 30.0 ){  
        System.out.print("Obese");  
    }  
    }  
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 2\_Q4

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

Amit wants to evaluate the depreciation of his car over time to understand its current value and categorize it based on that value.

Write a program that helps him determine the current value of his car after a certain number of years of depreciation and classify it into one of three categories:

High: If the current value is greater than 10,000. Medium: If the current value is between 5,000 and 10,000, both inclusive. Low: If the current value is less than 5,000.

The depreciation rate of the car is 15% per year. The program should calculate the current value of the car after applying this depreciation over the given number of years and print the current value along with the category.

### ***Input Format***

The first line of input consists of an integer, representing the initial cost of the car.

The second line consists of an integer, representing the number of years the car has been depreciating.

### ***Output Format***

The first line of output prints a double value, representing the current value of the car, rounded off to two decimal places "Current Value: <value>".

The second line prints its category "Category: <categories>".

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 20000  
5

Output: Current Value: 8874.11  
Category: Medium

### ***Answer***

```
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        double initialCost = scanner.nextDouble();
        int years = scanner.nextInt();

        double currentValue = initialCost;
        for (int i = 0; i < years; i++) {
            currentValue *= 0.85;
        }

        System.out.printf("Current Value: %.2f\n", currentValue);

        if (currentValue > 10000) {
```

```
        System.out.println("Category: High");
    } else if (currentValue >= 5000) {
        System.out.println("Category: Medium");
    } else {
        System.out.println("Category: Low");
    }
}
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 2\_Q5

Attempt : 1

Total Mark : 10

Marks Obtained : 10

### Section 1 : Coding

#### 1. Problem Statement

Ted, the computer science enthusiast, has accepted the challenge of writing a program that checks if the number of digits in an integer matches the sum of its digits.

Guide Ted in designing and writing the code to solve this problem using a 'do-while' loop.

#### ***Input Format***

The input consists of an integer N, representing the number to be checked.

#### ***Output Format***

If the sum is equal to the number of digits, print "The number of digits in N matches the sum of its digits."

Else, print "The number of digits in N does not match the sum of its digits."

Refer to the sample output for formatting specifications.

**Sample Test Case**

Input: 20

Output: The number of digits in 20 matches the sum of its digits.

**Answer**

```
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int N = sc.nextInt();

        int temp = N;
        int digitCount = 0;
        int digitSum = 0;

        do {
            int digit = temp % 10;
            digitSum += digit;
            digitCount++;
            temp /= 10;
        } while (temp > 0);

        if (digitCount == digitSum) {
            System.out.println("The number of digits in " + N + " matches the sum of
its digits.");
        } else {
            System.out.println("The number of digits in " + N + " does not match the
sum of its digits.");
        }
    }
}
```

**Status : Correct**

**Marks : 10/10**



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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 2\_Q6

Attempt : 1

Total Mark : 10

Marks Obtained : 10

### Section 1 : Coding

#### 1. Problem Statement

Maya, a student in an arts and crafts class, wants to create a pattern using stars (\*) in a specific format. She plans to use a program to help her construct the pattern.

Write a program that takes an integer as input and constructs the following pattern using nested for loops.

Input: 5

Output:

\*

\* \*

\* \* \*  
\* \* \* \*  
\* \* \* \* \*  
  
\* \* \* \*  
  
\* \* \*  
  
\* \*  
  
\*

### ***Input Format***

The input consists of a number (integer) representing the number of rows.

### ***Output Format***

The output displays the required pattern.

Refer to the sample output for the formatting specifications.

### ***Sample Test Case***

Input: 5

Output: \*

\* \*  
\* \* \*  
\* \* \* \*  
\* \* \* \* \*  
\* \* \* \*  
\* \* \*  
\* \*  
\*

### ***Answer***

```
import java.util.Scanner;
```

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

```
int rows = scanner.nextInt();
```

```
for (int i = 1; i <= rows; i++) {  
    for (int j = 1; j <= i; j++) {  
        System.out.print("* ");  
    }  
    System.out.println();  
}
```

```
for (int i = rows - 1; i >= 1; i--) {  
    for (int j = 1; j <= i; j++) {  
        System.out.print("* ");  
    }  
    System.out.println();  
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 2\_Q7

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

You are taking part in a coding challenge where your task is to design a program that conjures a mesmerizing numerical pyramid pattern. The enchanting pattern is fashioned using a for loop and is customized based on user input.

Participants are prompted to unveil the pyramid's magic by specifying its height - essentially dictating the number of rows in this spellbinding creation.

Write a program that employs to weave this captivating numerical pyramid as shown below.

Example

Input:

4

Output:

### ***Input Format***

The input consists of a positive integer n representing the number of rows in the pattern.

### ***Output Format***

The output prints the required pyramid pattern, as shown in the sample output.

Refer to the sample output for the formatting specifications.

### ***Sample Test Case***

Input: 4

Output: 1

123

12345

1234567

### ***Answer***

```
import java.util.Scanner;

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

        for (int i = 1; i <= n; i++) {
            for (int space = 1; space <= n - i; space++) {
                System.out.print(" ");
            }
            for (int num = 1; num <= 2 * i - 1; num++) {
                System.out.print(num);
            }
        }
    }
}
```

240701319

```
System.out.println();
```

```
}  
}  
}
```

240701319

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**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 2\_Q8

Attempt : 1

Total Mark : 10

Marks Obtained : 10

### Section 1 : Coding

#### 1. Problem Statement

A bank generates secure codes using 3-digit numbers where each digit is unique, and the code must be divisible by 3. You are tasked with generating the first N such codes based on user input, ensuring the digits are unique and the number is divisible by 3.

Note: Use nested for loops to solve.

#### ***Input Format***

The first line contains an integer N representing the number of valid codes to generate.

#### ***Output Format***

The output prints N lines, each line contains a valid 3-digit code.

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 5

Output: 102

105

108

120

123

### **Answer**

```
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        int N = scanner.nextInt();
        int count = 0;

        for (int i = 1; i <= 9 && count < N; i++) {
            for (int j = 0; j <= 9 && count < N; j++) {
                for (int k = 0; k <= 9 && count < N; k++) {
                    if (i != j && j != k && i != k) {
                        int num = i * 100 + j * 10 + k;
                        if (num % 3 == 0) {
                            System.out.println(num);
                            count++;
                        }
                    }
                }
            }
        }
    }
}
```

**Status :** Correct

**Marks :** 10/10



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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 2\_PAH

Attempt : 1  
Total Mark : 40  
Marks Obtained : 40

#### Section 1 : Coding

##### 1. Problem Statement

Rohit is tasked with designing a program to analyze the digits of a given integer.

Write a program to help Rohit that takes an integer as input and identifies the minimum odd digit and the maximum even digit present in the number. If no odd or even digits are present, display appropriate messages.

Implement the solution using a 'while' loop to iterate through the digits of the given number.

##### ***Input Format***

The input consists of an integer n.

##### ***Output Format***

The first line of output prints the message "Minimum odd digit: " followed by an integer representing the smallest odd digit found in the input number.

If no odd digit exists, it prints "There are no odd digits in the number."

The second line of output prints the message "Maximum even digit: " followed by an integer representing the largest even digit found in the input number.

If no even digit exists, it prints "There are no even digits in the number."

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 3465

Output: Minimum odd digit: 3

Maximum even digit: 6

### **Answer**

```
import java.util.Scanner;
```

```
public class Main {  
    public static void main(String[] args) {  
        Scanner sc = new Scanner(System.in);  
        int n = sc.nextInt();  
  
        int minOdd = 10;  
        int maxEven = -1;  
  
        int num = n;  
        while (num > 0) {  
            int digit = num % 10;  
            if (digit % 2 == 1) {  
                if (digit < minOdd) {  
                    minOdd = digit;  
                }  
            } else {  
                if (digit > maxEven) {  
                    maxEven = digit;  
                }  
            }  
            num = num / 10;  
        }  
    }  
}
```

```

    }
    num /= 10;
}

if (minOdd == 10) {
    System.out.println("There are no odd digits in the number.");
} else {
    System.out.println("Minimum odd digit: " + minOdd);
}

if (maxEven == -1) {
    System.out.println("There are no even digits in the number.");
} else {
    System.out.println("Maximum even digit: " + maxEven);
}
}
}

```

**Status :** Correct

**Marks :** 10/10

## 2. Problem Statement

Ravi wants to estimate the total utility bill for a household based on the consumption of electricity, water, and gas.

Write a program to calculate the total bill using the following criteria:

The cost per unit for electricity is 0.12, for water is 0.05, and for gas is 0.08. A discount is applied to the total cost based on the following conditions: If the total cost is 100 or more, a 10% discount is applied. If the total cost is between 50 and 99.99, a 5% discount is applied. No discount is applied if the total cost is less than 50.

The program should output the total bill after applying the discount with two decimal places.

### **Input Format**

The input consists of three double values, representing the number of units consumed for electricity, water, and gas respectively.

### **Output Format**

The output prints a double value, representing the total bill after applying the discount, formatted to two decimal places.

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 1000.0

200.0

100.0

Output: 124.20

### **Answer**

```
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        double electricityUnits = sc.nextDouble();
        double waterUnits = sc.nextDouble();
        double gasUnits = sc.nextDouble();

        double cost = (electricityUnits * 0.12) + (waterUnits * 0.05) + (gasUnits *
0.08);
        if (cost >= 100) {
            cost -= cost * 0.10;
        } else if (cost >= 50) {
            cost -= cost * 0.05;
        }

        System.out.printf("%.2f", cost);
    }
}
```

**Status :** Correct

**Marks :** 10/10

### **3. Problem Statement**

You are given a number of distribution centers (rows) and are tasked with generating a zigzag shipment route pattern. Each shipment route should alternate between left-to-right and right-to-left, as described below.

The program should print the zigzag pattern with a tab (\t) separating the columns. For each row, the shipment numbers should follow a diagonal pattern where numbers are placed in a zigzag, left to right on odd rows and right to left on even rows.

### ***Input Format***

The input consists of an integer N, which represents the number of distribution centers (rows) for the zigzag pattern.

### ***Output Format***

The output prints the zigzag pattern with N rows, formatted with a tab space (\t) separating the columns.

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 5

Output:       1  
          2  6  
          3  7  10  
          4  8  11  13  
          5  9  12  14  15

### ***Answer***

```
import java.io.BufferedReader;
import java.io.IOException;
import java.io.InputStreamReader;

public class Main {
    public static void main(String[] args) throws IOException {
        BufferedReader br = new BufferedReader(new
        InputStreamReader(System.in));
```

```

String line = br.readLine();
if (line == null || line.trim().isEmpty()) return;
int N = Integer.parseInt(line.trim());

int[] base = new int[N + 1];
base[1] = 1;
for (int c = 2; c <= N; c++) {
    base[c] = base[c - 1] + (N - (c - 2));
}

StringBuilder out = new StringBuilder();
for (int r = 1; r <= N; r++) {
    for (int t = 0; t < N - r; t++) out.append('\t');
    for (int c = 1; c <= r; c++) {
        int val = base[c] + (r - c);
        out.append(val).append('\t');
    }
    out.append('\n');
}

System.out.print(out.toString());
}
}

```

**Status :** Correct

**Marks :** 10/10

#### 4. Problem Statement

Sampad is a high school teacher who wants to convert numeric grades into letter grades.

Write a program that accepts a numeric grade as input. The program should then convert this numeric grade into a letter grade based on specific conditions. The letter grades are A, B, C, D and F.

The conversion is determined by the following conditions:

If the numeric grade is 90 or higher, it's an "A"  
 If the numeric grade is between 80 and 89 (inclusive), it's a "B"  
 If the numeric grade is between 70 and 79 (inclusive), it's a "C"  
 If the numeric grade is between 60 and 69

(inclusive), it's a "D" If the numeric grade is below 60, it's an "F"

### ***Input Format***

The input consists of an integer representing the numeric grade of the student.

### ***Output Format***

The output prints the letter grade corresponding to the input numeric grade as "Letter Grade: <grade>".

Refer to the sample output for the formatting specifications.

### ***Sample Test Case***

Input: 85

Output: Letter Grade: B

### ***Answer***

```
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        int numericGrade = scanner.nextInt();
        String letterGrade;

        if (numericGrade >= 90) {
            letterGrade = "A";
        } else if (numericGrade >= 80) {
            letterGrade = "B";
        } else if (numericGrade >= 70) {
            letterGrade = "C";
        } else if (numericGrade >= 60) {
            letterGrade = "D";
        } else {
            letterGrade = "F";
        }

        System.out.println("Letter Grade: " + letterGrade);
    }
}
```

**Status :** Correct

**Marks :** 10/10



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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 2\_CY

Attempt : 1

Total Mark : 40

Marks Obtained : 40

### Section 1 : Coding

#### 1. Problem Statement

Maya, a student in an arts and crafts class, wants to create a pattern using stars (\*) in a specific format. She plans to use a program to help her construct the pattern.

Write a program that takes an integer as input and constructs the following pattern using nested for loops.

Input: 5

Output:

\*

\* \*

\* \* \*  
\* \* \* \*  
\* \* \* \* \*  
  
\* \* \* \*  
  
\* \* \*  
  
\* \*  
  
\*

### ***Input Format***

The input consists of a number (integer) representing the number of rows.

### ***Output Format***

The output displays the required pattern.

Refer to the sample output for the formatting specifications.

### ***Sample Test Case***

Input: 5

Output: \*

\* \*  
\* \* \*  
\* \* \* \*  
\* \* \* \* \*  
\* \* \* \*  
\* \* \*  
\* \*  
\*

### ***Answer***

```
import java.util.Scanner;
```

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

```

int rows = scanner.nextInt();

for (int i = 1; i <= rows; i++) {
    for (int j = 1; j <= i; j++) {
        System.out.print("* ");
    }
    System.out.println();
}

for (int i = rows - 1; i >= 1; i--) {
    for (int j = 1; j <= i; j++) {
        System.out.print("* ");
    }
    System.out.println();
}
}
}

```

**Status :** Correct

**Marks :** 10/10

## 2. Problem Statement

Ted, the computer science enthusiast, has accepted the challenge of writing a program that checks if the number of digits in an integer matches the sum of its digits.

Guide Ted in designing and writing the code to solve this problem using a 'do-while' loop.

### **Input Format**

The input consists of an integer N, representing the number to be checked.

### **Output Format**

If the sum is equal to the number of digits, print "The number of digits in N matches the sum of its digits."

Else, print "The number of digits in N does not match the sum of its digits."

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 20

Output: The number of digits in 20 matches the sum of its digits.

### **Answer**

```
import java.util.Scanner;
```

```
public class Main {  
    public static void main(String[] args) {  
        Scanner scanner = new Scanner(System.in);  
        int N = scanner.nextInt();  
        int temp = N;  
        int sum = 0;  
        int count = 0;  
  
        do {  
            int digit = temp % 10;  
            sum += digit;  
            count++;  
            temp /= 10;  
        } while (temp > 0);  
  
        if (sum == count) {  
            System.out.println("The number of digits in " + N + " matches the sum of  
its digits.");  
        } else {  
            System.out.println("The number of digits in " + N + " does not match the  
sum of its digits.");  
        }  
    }  
}
```

**Status :** Correct

**Marks :** 10/10

### 3. Problem Statement

Samantha is a diligent math student who is exploring the world of

programming. She is learning Java and has recently studied conditional statements. One day, her teacher gives her an interesting problem to solve, which takes a number as input and checks whether it is a multiple of 5 or 7.

Help her complete the task.

### ***Input Format***

The input consists of a single integer N, representing the number to be checked.

### ***Output Format***

If the number is a multiple of 5 but not 7, the output prints "N is a multiple of 5".

If the number is a multiple of 7, the output prints "N is a multiple of 7".

Otherwise the output prints "N is neither multiple of 5 nor 7" where N is an entered integer.

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 10

Output: 10 is a multiple of 5

### ***Answer***

```
import java.util.Scanner;

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

        if (N % 7 == 0) {
            System.out.println(N + " is a multiple of 7");
        } else if (N % 5 == 0) {
            System.out.println(N + " is a multiple of 5");
        } else {
            System.out.println(N + " is neither multiple of 5 nor 7");
        }
    }
}
```

**Status :** Correct

**Marks :** 10/10

#### 4. Problem Statement

Noah is analyzing numbers within a given range  $[A, B]$  and wants to calculate a special sum. For each number in the range, he calculates the product of its odd digits (ignoring even digits). If the number contains no odd digits, it is skipped. The sum of these products for all numbers in the range is the result.

Write a program to compute this sum.

Example

Input:

10 12

Output:

3

Explanation:

For 10, odd digits = 1, product = 1.

For 11, odd digits = 1, 1, product =  $1 * 1 = 1$ .

For 12, odd digits = 1, product = 1.

Total sum =  $1 + 1 + 1 = 3$

#### **Input Format**

The input consists of two space-separated integers A and B, representing the inclusive range boundaries.

#### **Output Format**

The output prints a single integer representing the sum of the products of odd

digits for all numbers in the range.

Refer to the sample output for the formatting specifications.

### **Sample Test Case**

Input: 10 12

Output: 3

### **Answer**

```
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        int A = scanner.nextInt();
        int B = scanner.nextInt();
        int totalSum = 0;

        for (int num = A; num <= B; num++) {
            int temp = num;
            int product = 1;
            boolean hasOdd = false;

            while (temp > 0) {
                int digit = temp % 10;
                if (digit % 2 != 0) {
                    product *= digit;
                    hasOdd = true;
                }
                temp /= 10;
            }

            if (hasOdd) {
                totalSum += product;
            }
        }

        System.out.println(totalSum);
    }
}
```

}

**Status :** Correct

**Marks : 10/10**



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## 2024\_28\_III\_OOPS Using Java Lab

### REC\_2028\_OOPS using Java\_Week 3\_MCQ

Attempt : 1  
Total Mark : 15  
Marks Obtained : 14

#### Section 1 : MCQ

1. What will be the output of the following code?

```
class Q {  
    public static void main(String[] args) {  
        int[] a = {1, 2, 3, 4};  
        for (int i = 0; i < a.length / 2; i++) {  
            int temp = a[i];  
            a[i] = a[a.length - 1 - i];  
            a[a.length - 1 - i] = temp;  
        }  
        System.out.println(a[0]);  
    }  
}
```

Answer

4

Status : Correct

Marks : 1/1

2. What will be the output of the following code?

```
class Q {  
    public static void main(String[] args) {  
        int[] nums = {3, 6, 7, 2, 8};  
        int sum = 0;  
        for (int i = 0; i < nums.length; i++) {  
            if (nums[i] % 2 == 0)  
                sum += nums[i];  
        }  
        System.out.println(sum);  
    }  
}
```

Answer

16

Status : Correct

Marks : 1/1

3. What will be the output of the following code?

```
class Sample {  
    public static void main(String[] args) {  
        int[] a = {1, 2, 3};  
        int product = 1;  
        for (int i = 0; i < a.length; i++) {  
            product *= a[i];  
        }  
        System.out.println(product);  
    }  
}
```

Answer

10

Status : Wrong

Marks : 0/1

4. What will be the output of the following code?

```
class ReverseArray {  
    public static void main(String[] args) {  
        int[] a = {1, 2, 3, 4};  
        for (int i = 0; i < a.length / 2; i++) {  
            int temp = a[i];  
            a[i] = a[a.length - 1 - i];  
            a[a.length - 1 - i] = temp;  
        }  
        for (int i : a)  
            System.out.print(i + " ");  
    }  
}
```

**Answer**

4 3 2 1

**Status :** Correct

**Marks :** 1/1

5. What will be the output of the following code?

```
class Sample {  
    public static void main(String[] args) {  
        int[][] matrix = {  
            {1, 2, 3},  
            {4, 5, 6}  
        };  
        System.out.println(matrix[1][2]);  
    }  
}
```

**Answer**

6

**Status :** Correct

**Marks :** 1/1

6. What will be the output of the following code?

```
class Sample {  
    public static void main(String[] args) {  
        int[][] data = {  
            {1, 2},  
            {3, 4}  
        };  
        int sum = 0;  
  
        for (int[] row : data) {  
            for (int val : row) {  
                sum += val;  
            }  
        }  
  
        System.out.println("Sum = " + sum);  
    }  
}
```

**Answer**

Sum = 10

**Status : Correct**

**Marks : 1/1**

7. What will be the output of the following code?

```
class Q {  
    public static void main(String[] args) {  
        int[][] arr = {  
            {5, 6, 7},  
            {8, 9, 10}  
        };  
        System.out.println(arr[0][2]);  
    }  
}
```

**Answer**

7

**Status : Correct**

**Marks : 1/1**

8. What will be the output of the following code?

```
class Q {  
    public static void main(String[] args) {  
        int[] nums = {4, 2, 9, 5};  
        int max = nums[0];  
        for (int i = 1; i < nums.length; i++) {  
            if (nums[i] > max)  
                max = nums[i];  
        }  
        System.out.println(max);  
    }  
}
```

**Answer**

9

**Status :** Correct

**Marks :** 1/1

9. What will be the output of the following code?

```
public class Test {  
    public static void main(String[] args) {  
        int[] x = {4, 8, 12};  
        int result = x[0] * x[2];  
        System.out.println(result);  
    }  
}
```

**Answer**

48

**Status :** Correct

**Marks :** 1/1

10. What will be the output of the following code?

```
class Q {  
    public static void main(String[] args) {  
        int[][] a = {
```

```

        {1, 2},
        {3, 4}
    };
    int sum = 0;
    for (int i = 0; i < a.length; i++)
        for (int j = 0; j < a[0].length; j++)
            sum += a[i][j];
    System.out.println(sum);
}
}

```

**Answer**

10

**Status :** Correct

**Marks :** 1/1

11. What will be the output of the given code?

```

public class Main {
    public static void main(String[] args) {
        int[] arr = {1, 2, 3, 4, 5};
        int n = arr.length;
        int temp = arr[0];

        for (int i = 0; i < n - 1; i++) {
            arr[i] = arr[i + 1];
        }
        arr[n - 1] = temp;

        for (int num : arr) {
            System.out.print(num + " ");
        }
    }
}

```

**Answer**

2 3 4 5 1

**Status :** Correct

**Marks :** 1/1

12. What will be the output of the following code?

```
class Q {  
    public static void main(String[] args) {  
        int[] a = {1, 2, 3, 4};  
        for (int i = 0; i < a.length; i++) {  
            if (a[i] % 2 == 0)  
                a[i] = 0;  
        }  
        System.out.println(a[1] + " " + a[3]);  
    }  
}
```

**Answer**

0 0

**Status :** Correct

**Marks :** 1/1

13. What will be the output of the following code?

```
class Q {  
    public static void main(String[] args) {  
        int[] a = {1, 2, 1, 3, 1, 4};  
        int count = 0;  
        for (int i = 0; i < a.length; i++) {  
            if (a[i] == 1) count++;  
        }  
        System.out.println(count);  
    }  
}
```

**Answer**

3

**Status :** Correct

**Marks :** 1/1

14. What will be the output of the following code?

```
class Q {
```

```

public static void main(String[] args) {
    int[][] a = {
        {1, 2},
        {3, 4}
    };
    for (int i = 0; i < a.length; i++) {
        for (int j = 0; j < a[0].length; j++) {
            System.out.print(a[i][j] + " ");
        }
    }
}

```

**Answer**

1 2 3 4

**Status :** Correct

**Marks :** 1/1

15. What will be the output of the following code?

```

class M {
    public static void main(String[] args) {
        int[][] arr = {
            {1, 2},
            {3, 4},
            {5, 6}
        };

        for (int i = 0; i < arr.length; i++) {
            System.out.print(arr[i][0] + " ");
        }
    }
}

```

**Answer**

1 3 5

**Status :** Correct

**Marks :** 1/1



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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 3\_Q1

Attempt : 1

Total Mark : 10

Marks Obtained : 10

### Section 1 : Coding

#### 1. Problem Statement

Rosh is intrigued by numerical patterns. Today, she stumbled upon a puzzle while working with arrays. She wants to compute the sum of the third-largest and second-smallest elements from a list of integers. She seeks your help to implement a program that solves this for her efficiently.

#### ***Input Format***

The first line of input is an integer N, representing the size of the array.

The second line of input consists of N space-separated integers, representing the elements of the array.

#### ***Output Format***

The output displays a single integer representing the sum of the third-largest and second-smallest elements in the array.

Refer to the sample output for the formatting specifications.

**Sample Test Case**

Input: 10

10 20 30 40 50 60 70 80 90 100

Output: 100

**Answer**

```
import java.util.*;

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int N = sc.nextInt();
        int[] arr = new int[N];
        for (int i = 0; i < N; i++) {
            arr[i] = sc.nextInt();
        }
        Arrays.sort(arr);
        int secondSmallest = arr[1];
        int thirdLargest = arr[N - 3];
        System.out.println(secondSmallest + thirdLargest);
    }
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 3\_Q2

Attempt : 1

Total Mark : 10

Marks Obtained : 10

### Section 1 : Coding

#### 1. Problem Statement

Monica is interested in finding a treasure but the key to opening is to get the sum of the main diagonal elements and secondary diagonal elements.

Write a program to help Monica find the diagonal sum of a square 2D array.

Note: The main diagonal of the array consists of the elements traversing from the top-left corner to the bottom-right corner. The secondary diagonal includes elements from the top-right corner to the bottom-left corner.

#### ***Input Format***

The first line of input consists of an integer N, representing the number of rows and columns.

The following N lines consist of N space-separated integers, representing the 2D array elements.

### **Output Format**

The first line of output prints "Sum of the main diagonal: " followed by an integer, representing the sum of the main diagonal.

The second line prints "Sum of the secondary diagonal: " followed by an integer, representing the sum of the secondary diagonal.

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 3

1 2 3

4 5 6

7 8 9

Output: Sum of the main diagonal: 15

Sum of the secondary diagonal: 15

### **Answer**

```
import java.util.*;
```

```
public class Main {  
    public static void main(String[] args) {  
        Scanner sc = new Scanner(System.in);  
        int N = sc.nextInt();  
        int[][] matrix = new int[N][N];  
        int mainDiagonalSum = 0;  
        int secondaryDiagonalSum = 0;  
  
        for (int i = 0; i < N; i++) {  
            for (int j = 0; j < N; j++) {  
                matrix[i][j] = sc.nextInt();  
                if (i == j) {  
                    mainDiagonalSum += matrix[i][j];  
                }  
                if (i + j == N - 1) {  
                    secondaryDiagonalSum += matrix[i][j];  
                }  
            }  
        }  
    }  
}
```

```
    }  
    }  
}  
  
    System.out.println("Sum of the main diagonal: " + mainDiagonalSum);  
    System.out.println("Sum of the secondary diagonal: " +  
secondaryDiagonalSum);  
}  
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 3\_Q3

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

You are developing a warehouse management system for a shipping company. The system uses an integer array to represent the weights of packages in a specific order. To verify that the weight capacity is not exceeded, the program needs to calculate the sum of the weights of the first and last packages in the list.

Task:

Write a code to calculate the sum of the weights of the first and last packages in the list. The program should take an integer array as input and return the total weight of the first and last packages.

##### ***Input Format***

The first line of the input is an integer N representing the size of the array.

The second line of the input is N space-separated integer values.

### **Output Format**

The output is displayed in the following format:

"Sum of the first and last elements: <<Sum>>"

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 5

10 20 30 40 50

Output: Sum of the first and last elements: 60

### **Answer**

```
import java.util.Scanner;
class Main{
    public static void main(String[] args){
        Scanner s = new Scanner(System.in);
        int n,sum=0;
        n = s.nextInt();
        int a[] = new int[n];
        for(int i=0;i<n;i++){
            a[i] = s.nextInt();
        }
        sum+= a[0] + a[n-1];
        System.out.println("Sum of the first and last elements: " +sum);
    }
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 3\_Q4

Attempt : 1

Total Mark : 10

Marks Obtained : 10

### Section 1 : Coding

#### 1. Problem Statement

Sesha is developing a weather monitoring system for a region with multiple weather stations. Each weather station collects temperature data hourly and stores it in a 2D array.

Write a program that can add the temperature data from two different weather stations to create a combined temperature record for the region.

#### ***Input Format***

The first line of input consists of two space-separated integers N and M, representing the number of rows and columns of the matrices, respectively.

The next N lines consist of M space-separated integers, representing the values of the first matrix.



The following N lines consist of M space-separated integers, representing the values of the second matrix.

### **Output Format**

The output prints the addition of the two matrices in N rows and M columns, representing the combined temperature record.

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 3 3

1 2 3

4 5 6

7 8 9

1 1 1

2 2 2

3 3 3

Output: 2 3 4

6 7 8

10 11 12

### **Answer**

```
import java.util.*;

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int N = sc.nextInt();
        int M = sc.nextInt();
        int[][] station1 = new int[N][M];
        int[][] station2 = new int[N][M];
        int[][] combined = new int[N][M];

        for (int i = 0; i < N; i++)
            for (int j = 0; j < M; j++)
                station1[i][j] = sc.nextInt();

        for (int i = 0; i < N; i++)
            for (int j = 0; j < M; j++)
```

```
        station2[i][j] = sc.nextInt();  
    for (int i = 0; i < N; i++) {  
        for (int j = 0; j < M; j++) {  
            combined[i][j] = station1[i][j] + station2[i][j];  
            System.out.print(combined[i][j] + " ");  
        }  
        System.out.println();  
    }  
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 3\_Q5

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

Sharon is creating a program that finds the first repeated element in an integer array. The program should efficiently identify the first element that appears more than once in the given array. If no such element is found, it should appropriately display a message.

Help Sharon to complete the program.

##### ***Input Format***

The first line of input consists of an integer  $n$ , representing the number of elements in the array.

The second line consists of  $n$  space-separated integers, representing the array elements.

### **Output Format**

If a repeated element is found, print the first element that appears more than once.

If no repeated element is found, print "No repeated element found in the array".

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 8

12 21 13 14 21 36 47 21

Output: 21

### **Answer**

```
import java.util.*;
```

```
public class Main {  
    public static void main(String[] args) {  
        Scanner sc = new Scanner(System.in);  
        int n = sc.nextInt();  
        int[] arr = new int[n];  
        Set<Integer> seen = new HashSet<>();  
        int repeated = -1;  
  
        for (int i = 0; i < n; i++) {  
            arr[i] = sc.nextInt();  
            if (seen.contains(arr[i]) && repeated == -1) {  
                repeated = arr[i];  
            }  
            seen.add(arr[i]);  
        }  
  
        if (repeated != -1) {  
            System.out.println(repeated);  
        } else {  
            System.out.println("No repeated element found in the array");  
        }  
    }  
}
```

}

**Status :** Correct

**Marks : 10/10**

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## 2024\_28\_III\_OOPS Using Java Lab

### REC\_2028\_OOPS using Java\_Week 3\_PAH

Attempt : 1  
Total Mark : 40  
Marks Obtained : 40

#### Section 1 : Coding

##### 1. Problem Statement

Egath is participating in a coding hackathon, and one of the challenges requires him to work with an array of integers. The task is to remove exactly one element from the array such that the sum of the remaining elements is a prime number.

Help Egath find the first possible prime sum by removing one element or determining if no such prime sum can be achieved.

##### ***Input Format***

The first line of input consists of an integer N, representing the number of elements in the array.

The second line consists of N space-separated integers, representing the array elements.

### **Output Format**

If removing one element results in a prime sum, print the sum.

If no such prime sum can be achieved by removing exactly one element, print "No valid prime sum found".

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 3

1 2 3

Output: 5

### **Answer**

```
import java.util.*;
```

```
public class Main {  
    public static boolean isPrime(int num) {  
        if (num <= 1) return false;  
        for (int i = 2; i <= Math.sqrt(num); i++)  
            if (num % i == 0) return false;  
        return true;  
    }  
}
```

```
public static void main(String[] args) {  
    Scanner sc = new Scanner(System.in);  
    int N = sc.nextInt();  
    int[] arr = new int[N];  
    int totalSum = 0;
```

```
    for (int i = 0; i < N; i++) {  
        arr[i] = sc.nextInt();  
        totalSum += arr[i];  
    }
```

```
    boolean found = false;  
    for (int i = 0; i < N; i++) {  
        int newSum = totalSum - arr[i];
```

```
        if (isPrime(newSum)) {  
            System.out.println(newSum);  
            found = true;  
            break;  
        }  
    }  
  
    if (!found)  
        System.out.println("No valid prime sum found");  
}
```

**Status :** Correct

**Marks :** 10/10

## 2. Problem Statement

Priya is building a system to automate image transformations using matrix operations. To do this, she needs to multiply two matrices representing pixel data and transformation rules.

Help Priya perform matrix multiplication and print the resulting matrix if the operation is valid.

### **Input Format**

The first line of input consists of two int values, representing the number of rows R1 and columns C1 of the first matrix.

The next  $R1 \times C1$  integers represent the elements of the first matrix.

The next line consists of two int values, representing the number of rows R2 and columns C2 of the second matrix.

The next  $R2 \times C2$  integers represent the elements of the second matrix.

### **Output Format**

If matrix multiplication is possible, print R1 lines, each containing C2 space-separated int values representing the resulting matrix.

Otherwise, print "Matrix multiplication not possible".



Refer to the sample output for formatting specifications.

**Sample Test Case**

Input: 2 3

1 2 3

4 5 6

3 2

7 8

9 10

11 12

Output: 58 64

139 154

**Answer**

```
import java.util.*;
```

```
public class Main {  
    public static void main(String[] args) {  
        Scanner sc = new Scanner(System.in);  
        int R1 = sc.nextInt();  
        int C1 = sc.nextInt();  
        int[][] mat1 = new int[R1][C1];  
        for (int i = 0; i < R1; i++)  
            for (int j = 0; j < C1; j++)  
                mat1[i][j] = sc.nextInt();  
  
        int R2 = sc.nextInt();  
        int C2 = sc.nextInt();  
        int[][] mat2 = new int[R2][C2];  
        for (int i = 0; i < R2; i++)  
            for (int j = 0; j < C2; j++)  
                mat2[i][j] = sc.nextInt();  
  
        if (C1 != R2) {  
            System.out.println("Matrix multiplication not possible");  
            return;  
        }  
  
        int[][] result = new int[R1][C2];
```

```

        for (int i = 0; i < R1; i++)
            for (int j = 0; j < C2; j++)
                for (int k = 0; k < C1; k++)
                    result[i][j] += mat1[i][k] * mat2[k][j];

        for (int i = 0; i < R1; i++) {
            for (int j = 0; j < C2; j++)
                System.out.print(result[i][j] + " ");
            System.out.println();
        }
    }
}

```

**Status :** Correct

**Marks : 10/10**

### 3. Problem Statement

Eminem is a billiard player who enjoys playing billiards and also likes solving mathematical puzzles. He notices that the billiard balls on the table are arranged in a grid, and he is curious to find the sum of the numbers written on each ball.

Write a program to find the sum of all the numbers written on each ball in the grid.

#### **Input Format**

The first line of input consists of an integer N, representing the number of rows.

The second line consists of an integer M, representing the number of columns.

The following lines N lines consist of M space-separated integers, representing the numbers written on each ball.

#### **Output Format**

The output prints an integer representing the sum of all the numbers written on each ball.

Refer to the sample output for the formatting specifications.

### **Sample Test Case**

Input: 3

3

1 2 3

4 5 6

7 8 9

Output: 45

### **Answer**

```
import java.util.*;

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int N = sc.nextInt();
        int M = sc.nextInt();
        int sum = 0;

        for (int i = 0; i < N; i++)
            for (int j = 0; j < M; j++)
                sum += sc.nextInt();

        System.out.println(sum);
    }
}
```

**Status : Correct**

**Marks : 10/10**

## **4. Problem Statement**

In a customer loyalty program, reward points are logged in a sorted array as customers make transactions. Occasionally, due to system errors, duplicate entries for the same transaction may appear. To ensure accurate reward calculations, it's crucial to remove these duplicates from the list.

Write a program to process the array of reward points, removing any duplicates while preserving the order of unique entries. The program

should then display the cleaned list of unique reward points and the total count of these unique points.

### ***Input Format***

The first line of input consists of an integer N, representing the number of reward points.

The second line consists of N space-separated integers, representing the reward points in sorted order.

### ***Output Format***

The first line of output prints the cleaned list of unique reward points separated by a space.

The second line of output prints an integer representing the total count of unique reward points.

Refer to the sample output for the formatting specifications.

### ***Sample Test Case***

Input: 3  
100 100 200  
Output: 100 200  
2

### ***Answer***

```
import java.util.*;

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int N = sc.nextInt();
        int[] points = new int[N];
        for (int i = 0; i < N; i++)
            points[i] = sc.nextInt();

        List<Integer> unique = new ArrayList<>();
        for (int i = 0; i < N; i++) {
```

```
        if (i == 0 || points[i] != points[i - 1])  
            unique.add(points[i]);  
    }  
  
    for (int val : unique)  
        System.out.print(val + " ");  
    System.out.println();  
    System.out.println(unique.size());  
}  
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### REC\_2028\_OOPS using Java\_Week 3\_CY

Attempt : 1  
Total Mark : 40  
Marks Obtained : 40

#### Section 1 : Coding

##### 1. Problem Statement

Nikila is working as an intern in a software firm and is practicing with a matrix where each row represents a set of numerical values. Her task is to identify the row with the highest sum of its elements and remove that row from the matrix. After removing the row with the highest sum, Nikila needs to print the updated matrix.

Your task is to help Nikila in implementing the same. If there are two or more rows that have same the highest sum, the firstly encountered row is deleted.

##### ***Input Format***

The first line of the input consists of two space-separated integers, R and C, representing the number of rows and columns in the matrix, respectively.

The following R lines each contain, C space-separated integers representing the matrix elements.

### **Output Format**

The output prints the matrix after removing the row with the highest sum. Each row should be printed on a new line, with elements separated by a space.

Refer to the sample output for the formatting specifications.

### **Sample Test Case**

Input: 2 2

1 2

3 4

Output: 1 2

### **Answer**

```
import java.util.*;
```

```
public class Main {  
    public static void main(String[] args) {  
        Scanner sc = new Scanner(System.in);  
        int R = sc.nextInt();  
        int C = sc.nextInt();  
        int[][] matrix = new int[R][C];  
        int maxSum = -1;  
        int maxRowIndex = -1;
```

```
        for (int i = 0; i < R; i++) {  
            int rowSum = 0;  
            for (int j = 0; j < C; j++) {  
                matrix[i][j] = sc.nextInt();  
                rowSum += matrix[i][j];  
            }  
            if (rowSum > maxSum) {  
                maxSum = rowSum;  
                maxRowIndex = i;  
            }  
        }  
    }  
}
```

```

    for (int i = 0; i < R; i++) {
        if (i == maxRowIndex) continue;
        for (int j = 0; j < C; j++) {
            System.out.print(matrix[i][j] + " ");
        }
        System.out.println();
    }
}
}
}

```

**Status :** Correct

**Marks :** 10/10

## 2. Problem Statement

Alex is a treasure hunter who collects valuable items during their quests. Each item has a specific point value, and Alex wants to maximize their score by strategically removing items one at a time.

The rule is simple: Alex removes the item with the highest point value in each step until no items are left, summing the values of the removed items to calculate the maximum score.

Help Alex to complete his task.

### **Input Format**

The first line of input consists of an integer N, representing the size of the array.

The second line of input consists of N space-separated integers, representing the point values of the items.

### **Output Format**

The output prints "Maximum Sum: " followed by the calculated maximum score after removing all items.

Refer to the sample output for formatting specifications.



### Sample Test Case

Input: 14

7 14 21 28 35 42 49 56 63 70 77 84 91 98

Output: Maximum Sum: 735

### Answer

```
import java.util.*;

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int N = sc.nextInt();
        int[] items = new int[N];
        for (int i = 0; i < N; i++)
            items[i] = sc.nextInt();

        Arrays.sort(items);
        int sum = 0;
        for (int i = N - 1; i >= 0; i--)
            sum += items[i];

        System.out.println("Maximum Sum: " + sum);
    }
}
```

Status : Correct

Marks : 10/10

### 3. Problem Statement:

Emma, a budding computer vision enthusiast, is working on a challenging image processing project. She has a square image represented as a 2D matrix of integers. As part of a special filter operation, she needs to rotate the image by 90 degrees clockwise, but there's a twist — she must perform the rotation in-place, using no extra space.

This means Emma has to rotate the matrix without creating a new one. Your task is to help her implement a Java program that takes this square matrix as input and rotates it within the same structure.

Can you help Emma efficiently rotate the image so that her project can move to the next stage?

### ***Input Format***

The first line of input contains a single integer  $n$ , representing the number of rows and columns of the square matrix (i.e., the matrix is of size  $n \times n$ ).

The next  $n$  lines each contain  $n$  space-separated integers, representing the elements of each row of the 2D array.

### ***Output Format***

The first line of output prints "Rotated 2D Array:"

The next  $n$  lines of output print the rotated matrix.

Each line contains  $n$  space-separated integers representing a row of the rotated matrix.

Refer to the sample output for format specification.

### ***Sample Test Case***

Input: 3

1 2 3

4 5 6

7 8 9

Output: Rotated 2D Array:

7 4 1

8 5 2

9 6 3

### ***Answer***

```
import java.util.*;
```

```
public class Main {  
    public static void main(String[] args) {  
        Scanner sc = new Scanner(System.in);  
        int n = sc.nextInt();
```

```

int[][] matrix = new int[n][n];

for (int i = 0; i < n; i++)
    for (int j = 0; j < n; j++)
        matrix[i][j] = sc.nextInt();

for (int i = 0; i < n; i++)
    for (int j = i + 1; j < n; j++) {
        int temp = matrix[i][j];
        matrix[i][j] = matrix[j][i];
        matrix[j][i] = temp;
    }

for (int i = 0; i < n; i++)
    for (int j = 0; j < n / 2; j++) {
        int temp = matrix[i][j];
        matrix[i][j] = matrix[i][n - 1 - j];
        matrix[i][n - 1 - j] = temp;
    }

System.out.println("Rotated 2D Array:");
for (int i = 0; i < n; i++) {
    for (int j = 0; j < n; j++)
        System.out.print(matrix[i][j] + " ");
    System.out.println();
}
}
}

```

**Status :** Correct

**Marks :** 10/10

#### 4. Problem Statement:

Imagine you have an array of integer values, and you're tasked with identifying a pair of elements within the array. This pair of elements should have a sum that is the closest to zero when compared to any other pair in the array.

Your goal is to create a program that solves this problem efficiently. The program should accept an array of integers and return the pair of elements

whose sum is closest to zero.

### ***Input Format***

The first line of the input is an integer N representing the size of the array.

The second line of the input contains N space-separated integer values.

### ***Output Format***

The output is displayed in the following format:

"Pair with the sum closest to zero: {value} and {value}"

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 5

9 10 -3 -5 -2

Output: Pair with the sum closest to zero: 9 and -5

### ***Answer***

```
import java.util.*;
```

```
public class Main {  
    public static void main(String[] args) {  
        Scanner sc = new Scanner(System.in);  
        int n = sc.nextInt();  
        int[] arr = new int[n];
```

```
        for (int i = 0; i < n; i++)  
            arr[i] = sc.nextInt();
```

```
        int minSum = Integer.MAX_VALUE;  
        int first = 0, second = 0;
```

```
        for (int i = 0; i < n - 1; i++) {  
            for (int j = i + 1; j < n; j++) {  
                int sum = arr[i] + arr[j];  
                if (Math.abs(sum) < Math.abs(minSum)) {
```

```
        minSum = sum;  
        first = arr[i];  
        second = arr[j];  
    }  
}
```

```
    System.out.println("Pair with the sum closest to zero: " + first + " and " +  
second);  
}  
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### REC\_2028\_OOPS using Java\_Week 4\_MCQ

Attempt : 1  
Total Mark : 15  
Marks Obtained : 12

#### Section 1 : MCQ

1. Predict the output for the following code.

```
public class Main {  
    public static void main(String[] args) {  
        String a = "java";  
        char temp = a.charAt(1);  
        System.out.println(temp);  
    }  
}
```

**Answer**

a

**Status : Correct**

**Marks : 1/1**

2. What will be the output of the following program?

```
public class Main {  
    public static void main(String[] args) {  
        String str = "1234.34";  
        int a = Integer.parseInt(str);  
        System.out.println(a);  
    }  
}
```

**Answer**

NumberFormatException

**Status :** Correct

**Marks :** 1/1

3. What will be the output of the following code?

```
class Main {  
    public static void main(String args[]) {  
        String s1 = "Hello i love java";  
        String s2 = new String(s1);  
        System.out.println((s1 == s2) + " " + s1.equals(s2));  
    }  
}
```

**Answer**

false true

**Status :** Correct

**Marks :** 1/1

4. What will be the output of the following program?

```
class Main {  
    public static void main(String args[]) {  
        StringBuffer sb = new StringBuffer("Hello");  
        System.out.println("buffer = " + sb);  
        System.out.println("length = " + sb.length());  
        System.out.println("capacity = " + sb.capacity());  
    }  
}
```

}

**Answer**

buffer = Hello length = 5 capacity = 21

**Status :** Correct

**Marks :** 1/1

5. What will be the output of the following program?

```
class Main {  
    public static void main(String[] args) {  
        String greet = "Welcome\n";  
        System.out.print("String: " + greet);  
        int length = greet.length();  
        System.out.print("Length: " + length);  
    }  
}
```

**Answer**

String: welcomeLength: 8

**Status :** Wrong

**Marks :** 0/1

6. What will be the output of the following program?

```
class Main {  
    public static void main(String[] args) {  
        String s = new String("5");  
        System.out.println(1 + 1111 + s + 1 + 1010);  
    }  
}
```

**Answer**

1112511010

**Status :** Correct

**Marks :** 1/1

7. What will be the output of the following program?



```
class Main {  
    public static void main(String args[]) {  
        String name="Work Hard";  
        name.concat("Success");  
        System.out.println(name);  
    }  
}
```

**Answer**

Work HardSuccess

**Status : Wrong**

**Marks : 0/1**

8. Predict the output for the following code:

```
public class Main {  
    public static void main(String[] args) {  
        float a = 10.0f;  
        String temp = Float.toString(a);  
        System.out.println(temp);  
    }  
}
```

**Answer**

10.0

**Status : Correct**

**Marks : 1/1**

9. What will be the output of the following code?

```
class Main {  
    public static void main(String args[])  
    {  
        StringBuffer sb = new StringBuffer("Hello");  
        System.out.println("buffer before = " + sb);  
        System.out.println("charAt(1) before = " + sb.charAt(1));  
        sb.setCharAt(1, 'i');  
        sb.setLength(2);  
    }  
}
```

```
        System.out.println("buffer after = " + sb);  
        System.out.println("charAt(1) after = " + sb.charAt(1));  
    }  
}
```

**Answer**

buffer before = Hello charAt(1) before = e buffer after = Hi charAt(1) after = i

**Status :** Correct

**Marks :** 1/1

10. What is the output of the following code?

```
class Main  
{  
    public static void main(String args[])  
    {  
        StringBuffer c = new StringBuffer("Hello");  
        c.delete(0,2);  
        System.out.println(c);  
    }  
}
```

**Answer**

llo

**Status :** Correct

**Marks :** 1/1

11. Predict the output for the following code:

```
class Main {  
    public static void main(String args[]) {  
        StringBuffer sb = new StringBuffer("I Java!");  
        sb.insert(5, "like ");  
        System.out.println(sb);  
    }  
}
```

**Answer**

I Java like!

**Status : Wrong**

**Marks : 0/1**

12. What will be the output for the following code?

```
class Main {  
    public static void main(String[] args) {  
        String languages[] = { "C", "C++", "Java", "Python", "Ruby"};  
        for (String sample: languages) {  
            System.out.println(sample);  
        }  
    }  
}
```

**Answer**

CC++JavaPythonRuby

**Status : Correct**

**Marks : 1/1**

13. Predict the output for the following code.

```
class Main {  
    public static void main(String[] fruits) {  
        String fruit1 = new String("apple");  
        String fruit2 = new String("orange");  
        String fruit3 = new String("pear");  
        fruit3 = fruit1;  
        fruit2 = fruit3;  
        fruit1 = fruit2;  
        System.out.println(fruit1);  
        System.out.println(fruit2);  
        System.out.println(fruit3);  
    }  
}
```

**Answer**

appleappleapple

**Status : Correct**

**Marks : 1/1**

14. What will be the output of the following code?

```
class Main {  
    public static void main(String args[]) {  
        char c[] = {'j', 'a', 'v', 'a'};  
        String s1 = new String(c);  
        String s2 = new String(s1);  
        System.out.println(s1);  
        System.out.println(s2);  
    }  
}
```

**Answer**

javajava

**Status :** Correct

**Marks :** 1/1

15. What will be the output of the following program?

```
class Main {  
    public static void main(String[] args) {  
        String s1 = "EDUCATION";  
        String s2 = new String("EDUCATION");  
        String s3 = "EDUCATION";  
        if (s1 == s2) {  
            System.out.println("s1 and s2 equal");  
        }  
        else {  
            System.out.println("s1 and s2 not equal");  
        }  
        if (s1 == s3) {  
            System.out.println("s1 and s3 equal");  
        }  
        else {  
            System.out.println("s1 and s3 not equal");  
        }  
    }  
}
```

**Answer**

s1 and s2 not equals1 and s3 equal

**Status :** Correct

**Marks :** 1/1

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 4\_Q1

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

In a publishing company, editors often need to quickly analyze passages of text to check for punctuation usage. To assist them, you are asked to write a program that counts the number of specific punctuation marks in each passage.

The punctuation marks of interest are:

Commas (,) Periods (.) Question marks (?)

##### ***Input Format***

The first line of input contains an integer T, representing the number of test cases (passages).

Each of the next T lines contains a single passage of text.

### **Output Format**

For each test case, print three integers separated by spaces, representing the number of commas, periods, and question marks in the passage.

The first line of output corresponds to the first passage, the second line to the second passage, and so on.

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 1

Hello, world. How are you?

Output: 1 1 1

### **Answer**

```
import java.util.Scanner;
```

```
public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int T = Integer.parseInt(sc.nextLine()); // Number of test cases

        for (int i = 0; i < T; i++) {
            String passage = sc.nextLine();

            int commas = 0;
            int periods = 0;
            int questions = 0;

            for (char ch : passage.toCharArray()) {
                if (ch == ',') commas++;
                else if (ch == '.') periods++;
                else if (ch == '?') questions++;
            }

            System.out.println(commas + " " + periods + " " + questions);
        }
    }
}
```

}

**Status :** Correct

**Marks : 10/10**



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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 4\_Q2

Attempt : 1

Total Mark : 10

Marks Obtained : 10

### Section 1 : Coding

#### 1. Problem Statement

Anu is developing a tool for a conference registration system. Participants submit keywords related to their fields of interest. The organizer wants to sort these keywords alphabetically to generate tags for session grouping.

Write a program that accepts at least five keywords as input arguments and outputs them in sorted alphabetical order.

#### ***Input Format***

The first line of input contains an integer n, representing the number of keywords.

The second line of input contains n space-separated keywords (string).

#### ***Output Format***

The output prints n space separated strings representing the sorted keyword in alphabetical order.

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 5

Blockchain Cloud AI Data Cybersecurity

Output: AI Blockchain Cloud Cybersecurity Data

### **Answer**

```
import java.util.*;

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

        int n = sc.nextInt();
        String[] keywords = new String[n];

        for (int i = 0; i < n; i++) {
            keywords[i] = sc.next();
        }

        Arrays.sort(keywords);

        for (int i = 0; i < n; i++) {
            System.out.print(keywords[i]);
            if (i != n - 1) {
                System.out.print(" ");
            }
        }

        sc.close();
    }
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 4\_Q3

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

Bechan Chacha is seeking help to filter out valid mobile numbers from a list provided by his crush. He can only pick his crush's number if the list contains valid mobile numbers.

A mobile number is considered valid if:

It has exactly 10 digits. It consists only of numeric values (0–9). It does not begin with zero.

Your task is to determine whether each mobile number in the list is valid or not.

##### ***Input Format***

The first line contains an integer T, representing the number of mobile numbers

to check.

The next T lines each contain a string S, representing a mobile number.

### **Output Format**

For each mobile number S, the output print "YES" if it is valid.

Otherwise, print "NO".

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 1  
9876543210

Output: YES

### **Answer**

```
import java.util.Scanner;
```

```
public class Main {  
    public static void main(String[] args) {  
        Scanner sc = new Scanner(System.in);  
        int T = Integer.parseInt(sc.nextLine());  
  
        for (int i = 0; i < T; i++) {  
            String mobile = sc.nextLine();  
  
            // Check length, first digit not zero, and all digits numeric  
            if (mobile.length() == 10 && mobile.charAt(0) != '0' &&  
mobile.matches("[0-9]{10}")) {  
                System.out.println("YES");  
            } else {  
                System.out.println("NO");  
            }  
        }  
  
        sc.close();  
    }  
}
```

**Status : Correct**

**Marks : 10/10**

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 4\_Q4

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

Arjun is learning how to filter words from a sentence based on grammar rules. He wants to identify the valid words in a sentence.

A word is considered valid if it satisfies all these conditions:

The word contains only alphabets (a–z, A–Z). The word length is at least 2 characters. The word should not contain digits or special characters.

Your task is to read a sentence and print all the valid words in it.

##### ***Input Format***

The input contains a single line containing a sentence S.

##### ***Output Format***

The output prints all the valid words separated by spaces.

If no valid word exists, print "No valid words."

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: Hello world1 123 ab" @\$ Hi

Output: Hello Hi

### **Answer**

```
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        String sentence = sc.nextLine();
        sc.close();

        String[] words = sentence.split(" ");
        StringBuilder validWords = new StringBuilder();

        for (String word : words) {
            // Check if word length >= 2 and contains only alphabets
            if (word.length() >= 2 && word.matches("[a-zA-Z]+")) {
                if (validWords.length() > 0) {
                    validWords.append(" ");
                }
                validWords.append(word);
            }
        }

        if (validWords.length() == 0) {
            System.out.print("No valid words.");
        } else {
            System.out.print(validWords.toString());
        }
    }
}
```

**Status :** Correct

**Marks :** 10/10



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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 4\_Q5

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

In a secure banking system, customers are required to create PIN codes for accessing their accounts. The bank wants to validate these PIN codes before accepting them.

A PIN code is considered valid if:

It consists of exactly 4 digits. All characters must be numeric (0–9). It cannot contain all identical digits (e.g., 1111 is invalid).

Your task is to determine whether each PIN code in the list is valid or not.

##### ***Input Format***

The first line of input contains an integer T, representing the number of PIN codes to check.

The next T lines each contain a string S, representing a PIN code.

### **Output Format**

For each PIN code S, the output print "YES" if it is valid.

Otherwise, the output print "NO".

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 1

1234

Output: YES

### **Answer**

```
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int T = Integer.parseInt(sc.nextLine());

        for (int i = 0; i < T; i++) {
            String pin = sc.nextLine();

            if (isValidPin(pin)) {
                System.out.println("YES");
            } else {
                System.out.println("NO");
            }
        }

        sc.close();
    }

    private static boolean isValidPin(String pin) {
        // Check if length is exactly 4
        if (pin.length() != 4) return false;
    }
}
```

```
// Check if all characters are digits
if (!pin.matches("[0-9]{4}")) return false;

// Check if all digits are not identical
char firstChar = pin.charAt(0);
for (int i = 1; i < 4; i++) {
    if (pin.charAt(i) != firstChar) {
        return true; // Not all identical
    }
}
return false; // All digits identical
}
```

**Status :** Correct

**Marks :** 10/10

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Scan to verify results



## 2024\_28\_III\_OOPS Using Java Lab

### REC\_2028\_OOPS using Java\_Week 4\_PAH

Attempt : 1  
Total Mark : 40  
Marks Obtained : 40

#### Section 1 : Coding

##### 1. Problem Statement

Sana is analyzing text for a secret code. She wants to find all words in a sentence that start and end with the same letter. These words are considered "special words" for her analysis.

Your task is to write a program that extracts and prints all words that start and end with the same letter (case-insensitive).

If no such word exists, print "No special words found".

##### ***Input Format***

The input contains a single line containing a sentence with multiple words.

##### ***Output Format***

The output prints all words that start and end with the same letter separated by a space.

If no word satisfies the condition, print "No special words found".

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: Anna went to the civic center

Output: Anna civic

### **Answer**

```
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        String sentence = sc.nextLine();
        sc.close();

        String[] words = sentence.split(" ");
        StringBuilder specialWords = new StringBuilder();

        for (String word : words) {
            if (word.length() > 0) {
                char first = Character.toLowerCase(word.charAt(0));
                char last = Character.toLowerCase(word.charAt(word.length() - 1));
                if (first == last) {
                    if (specialWords.length() > 0) {
                        specialWords.append(" ");
                    }
                    specialWords.append(word);
                }
            }
        }

        if (specialWords.length() == 0) {
            System.out.print("No special words found");
        } else {
```

```
        System.out.print(specialWords.toString());  
    }  
}  
}
```

**Status :** Correct

**Marks :** 10/10

## 2. Problem Statement

At a digital library, the system needs to analyze passages to identify the frequency of vowels, since they are key for linguistic research. You are asked to write a program that counts the number of vowels in each passage of text.

The vowels of interest are:

a, e, i, o, u (both uppercase and lowercase).

### ***Input Format***

The first line of input contains an integer T, representing the number of test cases (passages).

Each of the next T lines contains a single passage of text.

### ***Output Format***

For each test case, print a single integer representing the total number of vowels in the passage.

The first line of output corresponds to the first passage, the second line to the second passage, and so on.

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 1  
Hello World  
Output: 3

**Answer**

```
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int T = Integer.parseInt(sc.nextLine());

        for (int i = 0; i < T; i++) {
            String passage = sc.nextLine();
            int count = 0;

            for (char ch : passage.toLowerCase().toCharArray()) {
                if (ch == 'a' || ch == 'e' || ch == 'i' || ch == 'o' || ch == 'u') {
                    count++;
                }
            }

            System.out.println(count);
        }
        sc.close();
    }
}
```

**Status : Correct****Marks : 10/10****3. Problem Statement**

Ravi is analyzing text messages for his research on typing patterns. He wants to count the number of uppercase letters, lowercase letters, and digits in a sentence to understand typing trends.

Your task is to help Ravi by writing a program that takes a sentence and prints the count of uppercase letters, lowercase letters, and digits.

**Input Format**

The input contains a single line containing a sentence (string).

**Output Format**

The output prints three integers separated by spaces:

- Number of uppercase letters
- Number of lowercase letters
- Number of digits

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: Hello World 123

Output: 2 8 3

### **Answer**

```
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        String sentence = sc.nextLine();
        sc.close();

        int uppercase = 0;
        int lowercase = 0;
        int digits = 0;

        for (char ch : sentence.toCharArray()) {
            if (Character.isUpperCase(ch)) {
                uppercase++;
            } else if (Character.isLowerCase(ch)) {
                lowercase++;
            } else if (Character.isDigit(ch)) {
                digits++;
            }
        }

        System.out.println(uppercase + " " + lowercase + " " + digits);
    }
}
```



**Status :** Correct

**Marks :** 10/10

#### 4. Problem Statement

Riya is preparing a puzzle game for her friends. She wants to include a feature that highlights special words in a sentence — specifically, palindromic words (words that read the same forward and backward).

Your task is to help Riya by writing a program that extracts all palindrome words from the given sentence. If there are no palindromes, print "No palindromes found".

##### **Input Format**

The input contains a single string S representing a sentence.

##### **Output Format**

The output prints all palindromic words separated by a space.

If no palindrome exists, print "No palindromes found".

Refer to the sample output for formatting specifications.

##### **Sample Test Case**

Input: madam went to school

Output: madam

##### **Answer**

```
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        String sentence = sc.nextLine();
        sc.close();

        String[] words = sentence.split(" ");
```

```

StringBuilder palindromes = new StringBuilder();

for (String word : words) {
    if (isPalindrome(word)) {
        if (palindromes.length() > 0) {
            palindromes.append(" ");
        }
        palindromes.append(word);
    }
}

if (palindromes.length() == 0) {
    System.out.print("No palindromes found");
} else {
    System.out.print(palindromes.toString());
}
}

private static boolean isPalindrome(String word) {
    int left = 0, right = word.length() - 1;
    while (left < right) {
        if (word.charAt(left) != word.charAt(right)) {
            return false;
        }
        left++;
        right--;
    }
    return true;
}
}

```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### REC\_2028\_OOPS using Java\_Week 4\_CY

Attempt : 1  
Total Mark : 40  
Marks Obtained : 40

#### Section 1 : Coding

##### 1. Problem Statement

Meera is practicing her English vocabulary. She wants to focus on words that have more vowels in them, as they help improve her pronunciation. She decides to extract only those words from a sentence that contain at least two vowels.

Your task is to help Meera by writing a program that finds such words from the given sentence.

##### ***Input Format***

The input contains a string representing the sentence.

##### ***Output Format***

The output prints all the words that contain at least two vowels, separated by a space.

If no such word exists, print "No words with two vowels".

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: This is an example sentence

Output: example sentence

### **Answer**

```
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        String sentence = sc.nextLine();
        sc.close();

        String[] words = sentence.split(" ");
        StringBuilder result = new StringBuilder();

        for (String word : words) {
            if (countVowels(word) >= 2) {
                if (result.length() > 0) {
                    result.append(" ");
                }
                result.append(word);
            }
        }

        if (result.length() == 0) {
            System.out.print("No words with two vowels");
        } else {
            System.out.print(result.toString());
        }
    }

    private static int countVowels(String word) {
        int count = 0;
```

```
String vowels = "aeiouAEIOU";
for (char ch : word.toCharArray()) {
    if (vowels.indexOf(ch) != -1) {
        count++;
    }
}
return count;
}
```

**Status :** Correct

**Marks :** 10/10

## 2. Problem Statement

Neha is analyzing text messages to identify words that have repeated characters. A word is considered “repetitive” if any character appears more than once in that word.

Your task is to write a program that extracts all words that contain repeated characters from a given sentence.

If no such word exists, print "No repetitive words found".

### **Input Format**

The input contains a single line containing a sentence with multiple words.

### **Output Format**

The output prints all words that contain repeated characters separated by a space.

If no word contains repeated characters, print "No repetitive words found".

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: letter balloon apple tree

Output: letter balloon apple tree

**Answer**

```
import java.util.Scanner;
import java.util.HashSet;

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        String sentence = sc.nextLine();
        sc.close();

        String[] words = sentence.split(" ");
        StringBuilder result = new StringBuilder();

        for (String word : words) {
            if (hasRepeatedChars(word)) {
                if (result.length() > 0) {
                    result.append(" ");
                }
                result.append(word);
            }
        }

        if (result.length() == 0) {
            System.out.print("No repetitive words found");
        } else {
            System.out.print(result.toString());
        }
    }

    private static boolean hasRepeatedChars(String word) {
        HashSet<Character> seen = new HashSet<>();
        for (char ch : word.toCharArray()) {
            if (seen.contains(ch)) {
                return true;
            }
            seen.add(ch);
        }
        return false;
    }
}
```

**Status :** Correct

**Marks :** 10/10

### 3. Problem Statement

Riya is preparing for a vocabulary test. Her teacher told her to focus on long words in her practice sentences, specifically words that have at least 5 letters.

Riya wants to write a program that will help her identify such words quickly.

Your task is to help Riya by printing all the words in a given sentence that have a length greater than or equal to 5.

If no such word exists, display "No long words found".

#### **Input Format**

The input contains a single line containing a sentence with multiple words.

#### **Output Format**

The output prints all words having length  $\geq 5$ , separated by a space.

If no such word is found, print "No long words found".

Refer to the sample output for formatting specifications.

#### **Sample Test Case**

Input: The quick brown fox jumps over the lazy dog

Output: quick brown jumps

#### **Answer**

```
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        String sentence = sc.nextLine();
        sc.close();
```

```

String[] words = sentence.split(" ");
StringBuilder result = new StringBuilder();

for (String word : words) {
    if (word.length() >= 5) {
        if (result.length() > 0) {
            result.append(" ");
        }
        result.append(word);
    }
}

if (result.length() == 0) {
    System.out.print("No long words found");
} else {
    System.out.print(result.toString());
}
}

```

**Status :** Correct

**Marks :** 10/10

#### 4. Problem Statement

Anjali is preparing a report on text complexity. She wants to identify all words in a sentence that contain at least one digit so she can analyze numeric mentions.

Your task is to write a program that extracts and prints all words containing at least one digit from a given sentence.

If no such word exists, print "No words with digits found".

##### **Input Format**

The input contains a single line containing a sentence with multiple words.

##### **Output Format**

The output prints all words containing at least one digit separated by a space.



If no word contains a digit, print "No words with digits found".

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: The model X100 and Y200 are available

Output: X100 Y200

### **Answer**

```
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        String sentence = sc.nextLine();
        sc.close();

        String[] words = sentence.split(" ");
        StringBuilder result = new StringBuilder();

        for (String word : words) {
            if (containsDigit(word)) {
                if (result.length() > 0) {
                    result.append(" ");
                }
                result.append(word);
            }
        }

        if (result.length() == 0) {
            System.out.print("No words with digits found");
        } else {
            System.out.print(result.toString());
        }
    }

    private static boolean containsDigit(String word) {
        for (char ch : word.toCharArray()) {
            if (Character.isDigit(ch)) {
```

```
    return true;
  }
  return false;
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 5\_MCQ

Attempt : 1

Total Mark : 15

Marks Obtained : 15

#### Section 1 : MCQ

1. What will be the output of the following code?

```
class Sample {  
    int x = 10;  
  
    void display() {  
        System.out.println("x = " + x);  
    }  
  
    public static void main(String[] args) {  
        Sample s = new Sample();  
        s.display();  
    }  
}
```

**Answer**

x = 10

**Status :** Correct

**Marks :** 1/1

2. What will be the output of the following code?

```
class Box {  
    int length = 5;  
    int width = 4;  
  
    int area() {  
        return length * width;  
    }  
  
    public static void main(String[] args) {  
        Box b = new Box();  
        System.out.println("Area = " + b.area());  
    }  
}
```

**Answer**

Area = 20

**Status :** Correct

**Marks :** 1/1

3. What will be the output of the following code?

```
class MathUtils {  
    int add(int x) {  
        return x + x;  
    }  
}  
  
public class Main {  
    public static void main(String[] args) {  
        MathUtils m = new MathUtils();  
        System.out.println(m.add(5));  
    }  
}
```

**Answer**

10

**Status :** Correct

**Marks :** 1/1

4. What will be the output of the following code?

```
class A {  
    int p = 5;  
    int q = 2;  
}  
  
class Main {  
    public static void main(String[] args) {  
        A obj = new A();  
        System.out.println(obj.p + obj.q);  
    }  
}
```

**Answer**

7

**Status :** Correct

**Marks :** 1/1

5. What will be the output of the following code?

```
class Box {  
    int volume(int l, int b, int h) {  
        return l * b * h;  
    }  
}  
  
public class Main {  
    public static void main(String[] args) {  
        Box b = new Box();  
        System.out.println(b.volume(2, 3, 4));  
    }  
}
```

**Answer**

24

**Status :** Correct

**Marks :** 1/1

6. What will be the output of the following code?

```
class A {  
    int x = 50;  
}  
  
public class Main {  
    public static void main(String[] args) {  
        A obj1 = new A();  
        A obj2 = obj1;  
        obj2.x = 100;  
        System.out.println(obj1.x);  
    }  
}
```

**Answer**

100

**Status :** Correct

**Marks :** 1/1

7. What will be the output of the following code?

```
class Test {  
    private int value;  
    Test(int value) {  
        this.value = value;  
    }  
    public int getValue() {  
        return value;  
    }  
}  
  
public class Main {  
    public static void main(String[] args) {
```

```
Test obj = new Test(10);  
System.out.println(obj.value);  
}  
}
```

**Answer**

Compile-time error

**Status :** Correct

**Marks :** 1/1

8. What will be the output of the following code?

```
class A {  
    int y = 30;  
}  
  
public class Main {  
    public static void main(String[] args) {  
        A a1 = new A();  
        A a2 = new A();  
        a1.y = 50;  
        System.out.println(a2.y);  
    }  
}
```

**Answer**

30

**Status :** Correct

**Marks :** 1/1

9. What will be the output of the following code?

```
class A {  
    int val = 20;  
}  
  
public class Main {  
    public static void main(String[] args) {  
        A obj1 = new A();
```

```
        A obj2 = obj1;  
        obj2.val += 5;  
        System.out.println(obj1.val);  
    }  
}
```

**Answer**

25

**Status :** Correct

**Marks :** 1/1

10. What will be the output of the following code?

```
class Ball {  
    int size = 11;  
}  
  
class Game {  
    public static void main(String[] args) {  
        Ball b1 = new Ball();  
        Ball b2 = new Ball();  
        b2.size = 10;  
        System.out.println(b1.size);  
    }  
}
```

**Answer**

11

**Status :** Correct

**Marks :** 1/1

11. What will be the output of the following code?

```
class Person {  
    String name;  
    void setName(String n) {  
        name = n;  
    }  
    void printName() {
```



```
        System.out.println(name);
    }
}

class Test {
    public static void main(String[] args) {
        Person p = new Person();
        p.printName();
    }
}
```

**Answer**

null

**Status :** Correct

**Marks :** 1/1

12. What will be the output of the following code?

```
class Person {
    int age = 18;
}

public class Main {
    public static void main(String[] args) {
        Person p = new Person();
        p.age += 2;
        System.out.println("Age: " + p.age);
    }
}
```

**Answer**

Age: 20

**Status :** Correct

**Marks :** 1/1

13. What is the output of the following code?

```
class Box {
    int height;
```

```
Box(int height) {
    this.height = height;
}
void modifyHeight(Box b) {
    b.height += 10;
}
}
public class Main {
    public static void main(String[] args) {
        Box b1 = new Box(20);
        b1.modifyHeight(b1);
        System.out.println(b1.height);
    }
}
```

**Answer**

30

**Status :** Correct

**Marks :** 1/1

14. What will be the output of the following code?

```
class Alpha {
    void greet(String name) {
        System.out.println("Hello" + name);
    }
}

public class Main {
    public static void main(String[] args) {
        Alpha obj = new Alpha();
        obj.greet("Anu");
    }
}
```

**Answer**

Hello Anu

**Status :** Correct

**Marks :** 1/1

15. What will be the output of the following code?

```
class Demo {  
    void printMessage() {  
        System.out.println("Hello from Demo");  
    }  
}
```

```
public class Main {  
    public static void main(String[] args) {  
        Demo d = new Demo();  
        d.printMessage();  
    }  
}
```

**Answer**

Hello from Demo

**Status :** Correct

**Marks :** 1/1

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 5\_Q2

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

You are working as a developer for CityBank, which wants to build a basic account management system.

Each customer at the bank has:

An Account Number (integer) A Customer Name (string) An Initial Balance (double)

The bank allows two types of transactions:

Deposit – increases the balance. Withdrawal – decreases the balance only if enough funds are available.

If the withdrawal amount is greater than the balance, the withdrawal should not happen, and the balance should remain the same.

You are required to implement this system using:

A class with attributes for account details. A constructor to initialize account details. Setter methods to update details if needed. Getter methods to retrieve details. Objects of the class to represent customers.

Finally, display each customer's account details after all transactions.

### ***Input Format***

The first line of input contains an integer N, representing the number of customers.

For each customer:

- The next line contains the account number (integer).
- The following line contains the customer name (string).
- The next line contains the initial balance (double).
- The next line contains the deposit amount (double).
- The next line contains the withdrawal amount (double).

### ***Output Format***

For each customer, print the details in the following format:

1. Account Number: <account\_number>
2. Customer Name: <customer\_name>
3. Final Balance: <final\_balance> (rounded to one decimal place)

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 1

1234

Rahul Sharma

5000

2000

3000

Output: Account Number: 1234

Customer Name: Rahul Sharma

Final Balance: 4000.0

**Answer**

```
import java.util.Scanner;
```

```
class Account {  
    private int accountNumber;  
    private String customerName;  
    private double balance;  
  
    public Account(int accountNumber, String customerName, double  
initialBalance) {  
        this.accountNumber = accountNumber;  
        this.customerName = customerName;  
        this.balance = initialBalance;  
    }  
  
    public int getAccountNumber() {  
        return accountNumber;  
    }  
  
    public String getCustomerName() {  
        return customerName;  
    }  
  
    public double getBalance() {  
        return balance;  
    }  
  
    public void deposit(double amount) {  
        if (amount >= 0) {  
            this.balance += amount;  
        }  
    }  
  
    public void withdraw(double amount) {  
        if (amount <= balance) {  
            balance -= amount;  
        }  
    }  
}
```

```

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int N = Integer.parseInt(sc.nextLine().trim());

        for (int i = 0; i < N; i++) {
            int accNumber = Integer.parseInt(sc.nextLine().trim());
            String custName = sc.nextLine().trim();
            double initBalance = Double.parseDouble(sc.nextLine().trim());
            double depositAmt = Double.parseDouble(sc.nextLine().trim());
            double withdrawalAmt = Double.parseDouble(sc.nextLine().trim());

            Account customer = new Account(accNumber, custName, initBalance);
            customer.deposit(depositAmt);
            customer.withdraw(withdrawalAmt);

            System.out.println("Account Number: " + customer.getAccountNumber());
            System.out.println("Customer Name: " + customer.getCustomerName());
            System.out.printf("Final Balance: %.1f\n", customer.getBalance());
        }
        sc.close();
    }
}

```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 5\_Q3

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

Neha is working as a developer for CityElectricity Board, which wants to build a household electricity billing system.

Each customer's electricity account has:

A Customer ID (integer) A Customer Name (string) Units Consumed (double)

The electricity bill is calculated based on these rules:

For the first 100 units 5 units charge per unit For the next 100 units (101–200) 7 units charge per unit For units above 200 10 units charge per unit If the total bill exceeds 2000 units, a 5% discount is applied on the final bill.

Neha has been asked to implement this system using:



A class with attributes for customer details. A constructor to initialize customer details. Setter methods to update details if needed. Getter methods to retrieve details. Objects of the class to represent customers.

Finally, display each customer's details and final bill amount.

### ***Input Format***

The first line of input contains an integer N, representing the number of customers.

For each customer:

- The next line contains the Customer ID (integer).
- The following line contains the Customer Name (string).
- The next line contains the Units Consumed (double).

### ***Output Format***

For each customer, print the details in the following format:

Customer ID: <customer\_id>

Customer Name: <customer\_name>

Final Bill: <final\_bill> (rounded to one decimal place)

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 1

1001

Ravi Kumar

80

Output: Customer ID: 1001

Customer Name: Ravi Kumar

Final Bill: 400.0

### ***Answer***

```
import java.util.Scanner;
```

```
class Customer {
    private int customerId;
    private String customerName;
    private double unitsConsumed;

    public Customer(int customerId, String customerName, double
unitsConsumed) {
        this.customerId = customerId;
        this.customerName = customerName;
        this.unitsConsumed = unitsConsumed;
    }

    public int getCustomerId() {
        return customerId;
    }

    public String getCustomerName() {
        return customerName;
    }

    public double getUnitsConsumed() {
        return unitsConsumed;
    }

    public double calculateBill() {
        double bill = 0;
        double units = unitsConsumed;

        if (units <= 100) {
            bill = units * 5;
        } else if (units <= 200) {
            bill = 100 * 5 + (units - 100) * 7;
        } else {
            bill = 100 * 5 + 100 * 7 + (units - 200) * 10;
        }

        if (bill > 2000) {
            bill = bill - (bill * 0.05);
        }

        return bill;
    }
}
```

```

    }
}

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int N = Integer.parseInt(sc.nextLine().trim());

        for (int i = 0; i < N; i++) {
            int id = Integer.parseInt(sc.nextLine().trim());
            String name = sc.nextLine().trim();
            double units = Double.parseDouble(sc.nextLine().trim());

            Customer customer = new Customer(id, name, units);
            double bill = customer.calculateBill();

            System.out.println("Customer ID: " + customer.getId());
            System.out.println("Customer Name: " + customer.getName());
            System.out.printf("Final Bill: %.1f\n", bill);
        }

        sc.close();
    }
}

```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 5\_Q4

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

You are working as a developer for CityCab, a taxi service company that wants to build a ride fare management system.

Each customer booking has:

A Booking ID (integer) A Customer Name (string) A Distance Travelled in km (double)

The fare calculation rules are:

Base Fare = 50 units (flat charge for every ride). Per km charge = 10 units/km. If the distance is greater than 20 km, a 10% discount is applied on the total fare.

You are required to implement this system using:

A class with attributes for booking details. A constructor to initialize booking details. Setter methods to update details if needed. Getter methods to retrieve details. Objects of the class to represent customer rides.

Finally, display each booking's details and final fare.

### ***Input Format***

The first line of input contains an integer N, representing the number of bookings.

For each booking:

- The next line contains the booking ID (integer).
- The following line contains the customer's name (string).
- The next line contains the distance travelled (double).

### ***Output Format***

For each booking, print the details in the following format:

1. Booking ID: <booking\_id>
2. Customer Name: <customer\_name>
3. Final Fare: <final\_fare> (rounded to one decimal place)

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 1

1234

Rahul Sharma

15

Output: Booking ID: 1234

Customer Name: Rahul Sharma

Final Fare: 200.0

### ***Answer***

```
import java.util.*;
```

```
class Booking {
```

```
private int bookingId;  
private String customerName;  
private double distance;  
  
public Booking(int bookingId, String customerName, double distance) {  
    this.bookingId = bookingId;  
    this.customerName = customerName;  
    this.distance = distance;  
}
```

```
public int getBookingId() {  
    return bookingId;  
}
```

```
public String getCustomerName() {  
    return customerName;  
}
```

```
public double getDistance() {  
    return distance;  
}
```

```
public double calculateFare() {  
    double baseFare = 50;  
    double fare = baseFare + (distance * 10);  
    if (distance > 20) {  
        fare = fare - (fare * 0.10);  
    }  
    return fare;  
}
```

```
public class Main {  
    public static void main(String[] args) {  
        Scanner sc = new Scanner(System.in);  
        int n = sc.nextInt();  
        sc.nextLine();  
        for (int i = 0; i < n; i++) {  
            int id = sc.nextInt();  
            sc.nextLine();  
            String name = sc.nextLine();  
            double distance = sc.nextDouble();
```

```
        if (i < n - 1) sc.nextLine();  
        Booking b = new Booking(id, name, distance);  
        System.out.printf("Booking ID: %d Customer Name: %s Final Fare: %.1f",  
            b.getBookingId(), b.getCustomerName(), b.calculateFare());  
    }  
    sc.close();  
}  
}
```

**Status :** Correct

**Marks : 10/10**

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Degree: B.E - CSE

Scan to verify results



## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 5\_Q5

Attempt : 1

Total Mark : 10

Marks Obtained : 10

### Section 1 : Coding

#### 1. Problem Statement

Ram is working as a developer for BrightEdu Coaching Center, which wants to build a student fee management system.

Each student's enrollment has:

An Enrollment ID (integer) A Student Name (string) The Number of Subjects (integer)

The fee calculation rules are:

Registration Fee = 1000 units (flat for every student). Per Subject Fee = 800 units. If the student enrolls in more than 5 subjects, a 20% scholarship (discount) is applied on the total fee.

Ram has been asked to implement this system using:



A class with attributes for student details. A constructor to initialize student details. Setter methods to update details if needed. Getter methods to retrieve details. Objects of the class to represent student enrollments.

Finally, display each student's details and final fee.

### ***Input Format***

The first line of input contains an integer N, representing the number of students.

For each student:

- The next line contains the Enrollment ID (integer).
- The following line contains the student's name (string).
- The next line contains the Number of subjects (integer).

### ***Output Format***

For each student, print the details in the following format:

- Enrollment ID: <enrollment\_id>
- Student Name: <student\_name>
- Final Fee: <final\_fee> (rounded to one decimal place)

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 1

1234

Ravi Kumar

3

Output: Enrollment ID: 1234

Student Name: Ravi Kumar

Final Fee: 3400.0

### ***Answer***

```
import java.util.*;
```

```
class Student {  
    private int enrollmentId;
```

```
private String studentName;  
private int numberOfSubjects;
```

```
public Student(int enrollmentId, String studentName, int numberOfSubjects) {  
    this.enrollmentId = enrollmentId;  
    this.studentName = studentName;  
    this.numberOfSubjects = numberOfSubjects;  
}
```

```
public int getEnrollmentId() {  
    return enrollmentId;  
}
```

```
public String getStudentName() {  
    return studentName;  
}
```

```
public int getNumberOfSubjects() {  
    return numberOfSubjects;  
}
```

```
public double calculateFee() {  
    double registrationFee = 1000;  
    double totalFee = registrationFee + (numberOfSubjects * 800);  
    if (numberOfSubjects > 5) {  
        totalFee = totalFee - (totalFee * 0.20);  
    }  
    return totalFee;  
}
```

```
public class Main {  
    public static void main(String[] args) {  
        Scanner sc = new Scanner(System.in);  
        int n = sc.nextInt();  
        sc.nextLine();  
        for (int i = 0; i < n; i++) {  
            int id = sc.nextInt();  
            sc.nextLine();  
            String name = sc.nextLine();  
            int subjects = sc.nextInt();  
            if (i < n - 1) sc.nextLine();  
        }  
    }  
}
```

```
Student s = new Student(id, name, subjects);  
System.out.printf("Enrollment ID: %d Student Name: %s Final Fee: %.1f",  
s.getEnrollmentId(), s.getStudentName(), s.calculateFee());  
}  
sc.close();  
}  
}
```

**Status :** Correct

**Marks :** 10/10

# Rajalakshmi Engineering College

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Batch: 2028

Degree: B.E - CSE

Scan to verify results



## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 5\_PAH

Attempt : 1

Total Mark : 50

Marks Obtained : 50

### Section 1 : Coding

#### 1. Problem Statement

Anjali is working as a developer for CityFitness Gym, which wants to build a system to calculate monthly membership fees for gym members based on the type of membership and the number of personal training sessions booked.

Each member's record has:

Member ID (integer) Member Name (string) Membership Type (string: "Basic", "Premium", "Elite") Number of Personal Training Sessions (integer)

The monthly fees are:

Basic – 1000 units Premium – 1500 units Elite – 2000 units

The cost of personal training sessions is 500 units per session.

The calculation rules:

Total Amount = Membership Fee + (Number of Personal Training Sessions × 500) If the number of sessions is more than 5, a 10% discount is applied on the total amount. If the member has Elite membership and the total amount exceeds 4000, an additional 5% service tax is added after discount.

Anjali has been asked to implement this system using:

A class with attributes for member details. A constructor to initialize member details. Getter and Setter methods to retrieve and update member details if required. A method to calculate the final monthly fee. Objects of the class to represent members.

Finally, display each member's details and the final monthly fee.

### ***Input Format***

The first line contains an integer N, representing the number of members.

For each member:

- Next line contains Member ID (integer)
- Next line contains Member Name (string)
- Next line contains Membership Type ("Basic", "Premium", "Elite")
- Next line contains Number of Personal Training Sessions (integer)

### ***Output Format***

For each member, print:

- Member ID: <member\_id>
- Member Name: <member\_name>
- Final Monthly Fee: <final\_fee> (The final fee must be rounded to one decimal place)

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 1

1001  
Ravi Kumar  
Basic  
3

Output: Member ID: 1001  
Member Name: Ravi Kumar  
Final Monthly Fee: 2500.0

**Answer**

```
import java.util.*;

class Member {
    private int memberId;
    private String memberName;
    private String membershipType;
    private int personalSessions;

    public Member(int memberId, String memberName, String membershipType,
int personalSessions) {
        this.memberId = memberId;
        this.memberName = memberName;
        this.membershipType = membershipType;
        this.personalSessions = personalSessions;
    }

    public int getMemberId() {
        return memberId;
    }

    public String getMemberName() {
        return memberName;
    }

    public String getMembershipType() {
        return membershipType;
    }

    public int getPersonalSessions() {
        return personalSessions;
    }

    public double calculateMonthlyFee() {
```

```

double membershipFee = 0;
if (membershipType.equalsIgnoreCase("Basic")) membershipFee = 1000;
else if (membershipType.equalsIgnoreCase("Premium")) membershipFee =
1500;
else if (membershipType.equalsIgnoreCase("Elite")) membershipFee = 2000;

double total = membershipFee + (personalSessions * 500);

if (personalSessions > 5) {
    total = total - (total * 0.10);
}

if (membershipType.equalsIgnoreCase("Elite") && total > 4000) {
    total = total + (total * 0.05);
}

return total;
}
}

```

```

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        sc.nextLine();
        for (int i = 0; i < n; i++) {
            int id = sc.nextInt();
            sc.nextLine();
            String name = sc.nextLine();
            String type = sc.nextLine();
            int sessions = sc.nextInt();
            if (i < n - 1) sc.nextLine();
            Member m = new Member(id, name, type, sessions);
            System.out.printf("Member ID: %d Member Name: %s Final Monthly Fee:
%.1f", m.getMemberId(), m.getMemberName(), m.calculateMonthlyFee());
        }
        sc.close();
    }
}

```

**Status :** Correct

**Marks :** 10/10

## 2. Problem Statement

Each customer at the bank has an Account Number, Customer Name, and an Initial Balance. The bank allows two types of transactions:

Deposit – Increases the balance. Withdrawal – Decreases the balance, but only if enough funds are available. If the withdrawal amount exceeds the available balance, the transaction should be skipped, and the balance should remain unchanged.

You are required to implement this banking system by:

Creating a class with the necessary attributes to store account details.

Using a constructor to initialize the account details when a new account is created. Providing setter methods to update the details if required. Providing getter methods to retrieve account details. Creating objects of this class to represent different customers, where each customer can perform deposits and withdrawals.

Instructions:

Implement the class to store account details. Implement the logic for performing deposit and withdrawal transactions. Ensure that withdrawals don't exceed the available balance. After performing the transactions, print the account number, customer name, and final balance.

### ***Input Format***

The first line of input contains an integer N, representing the number of customers.

For each customer:

- The next line contains the account number (integer).
- The following line contains the customer name (string).
- The next line contains the initial balance (double).
- The next line contains the deposit amount (double).
- The next line contains the withdrawal amount (double).

### ***Output Format***

For each customer, print the details in the following format:



1. Account Number: <account\_number>
2. Customer Name: <customer\_name>
3. Final Balance: <final\_balance> (rounded to one decimal place)

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 1

1234

Rahul Sharma

5000

2000

3000

Output: Account Number: 1234

Customer Name: Rahul Sharma

Final Balance: 4000.0

### **Answer**

```
import java.util.*;
class Account {
    int accNo; String name; double bal;
    Account(int a,String n,double b){accNo=a;name=n;bal=b;}
    void deposit(double d){bal+=d;}
    void withdraw(double w){if(w<=bal)bal-=w;}
}
public class Main{
    public static void main(String[] args){
        Scanner s=new Scanner(System.in);
        int n=s.nextInt();s.nextLine();
        for(int i=0;i<n;i++){
            int a=s.nextInt();s.nextLine();
            String nme=s.nextLine();
            double b=s.nextDouble(),d=s.nextDouble(),w=s.nextDouble();
            if(i<n-1)s.nextLine();
            Account ac=new Account(a,nme,b);
            ac.deposit(d);
            ac.withdraw(w);
            System.out.printf("Account Number: %d Customer Name: %s Final
Balance: %.1f",a,nme,ac.bal);
```

**Status : Correct**

**Marks : 10/10**

### 3. Problem Statement

Ravi is working as a developer for SecureLogin Systems, which wants to build a system to evaluate the strength of user passwords.

Each user record has:

User ID (integer) User Name (string) Password (string)

The system must calculate whether a password is strong or weak.

A password is considered strong if it meets all of the following conditions:

At least 8 characters long. Contains at least one uppercase letter. Contains at least one lowercase letter. Contains at least one digit. Contains at least one special character (from !@#\$%^&\*).

Ravi has been asked to implement this system using:

A class with attributes for user details. A constructor to initialize user details. Getter and setter methods to retrieve or update user details. A method to check whether the password is strong. Objects of the class to represent users.

Finally, display each user's details and indicate whether their password is Strong or Weak.

#### ***Input Format***

The first line contains an integer N, representing the number of users.

For each user:

The next line contains the User ID (integer).

The next line contains the User Name (string).

The next line contains the Password (string).

### ***Output Format***

For each user, print the details in the following format:

User ID: <user\_id>

User Name: <user\_name>

Password: <password>

Password Strength: <Strong/Weak>

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 1

1001

Ravi Kumar

Abc@1234

Output: User ID: 1001

User Name: Ravi Kumar

Password: Abc@1234

Password Strength: Strong

### ***Answer***

```
import java.util.*;
class User{
    int id; String name, pass;
    User(int i,String n,String p){id=i;name=n;pass=p;}
    String check(){
        boolean up=false,low=false,dig=false,spl=false;
        if(pass.length()>=8){
            for(char c:pass.toCharArray()){
                if(Character.isUpperCase(c)) up=true;
                else if(Character.isLowerCase(c)) low=true;
                else if(Character.isDigit(c)) dig=true;
```

```

        else if("!@#$%^&*".indexOf(c)!=-1) spl=true;
    }
}
return (up&&low&&dig&&spl)?"Strong":"Weak";
}
}
public class Main{
    public static void main(String[] args){
        Scanner s=new Scanner(System.in);
        int n=s.nextInt();s.nextLine();
        for(int i=0;i<n;i++){
            int id=s.nextInt();s.nextLine();
            String name=s.nextLine();
            String pass=s.nextLine();
            User u=new User(id,name,pass);
            System.out.printf("User ID: %d User Name: %s Password: %s Password
Strength: %s",id,name,pass,u.check());
        }
    }
}

```

**Status :** Correct

**Marks :** 10/10

#### 4. Problem Statement

Neha is working as a developer for CityQuiz Platform, which wants to build a system to calculate quiz scores and identify top scorers among participants.

Each participant's record has:

Participant ID (integer) Participant Name (string) An array of scores in 5 quiz rounds (integers, each between 0 and 100)

The system must calculate:

Total Score = sum of scores in all 5 rounds. Average Score = Total Score ÷ 5. If a participant scores above 80 in all rounds, a bonus of 10 points is added to the total score. Identify the Top Scorer among all participants. If two participants have the same total score, the one with the lower

Participant ID is considered the top scorer.

Neha has been asked to implement this system using:

A class with attributes for participant details. A constructor to initialize participant details. Getter and setter methods to retrieve or update participant details. A method to calculate total score and average score (including bonus if applicable). Objects of the class to represent participants.

Finally, display each participant's details and announce the Top Scorer.

### ***Input Format***

The first line of input contains an integer N, representing the number of participants.

For each participant:

- Next line: Participant ID (integer)
- Next line: Participant Name (string)
- Next line: 5 integers separated by spaces (scores for 5 quiz rounds)

### ***Output Format***

For each participant:

- Participant ID: <participant\_id>
- Participant Name: <participant\_name>
- Total Score: <total\_score>
- Average Score: <average\_score>

Finally, print "Top Scorer: <participant\_name> with <total\_score> points"

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 1

1001

Ravi Kumar

85 90 88 92 87

Output: Participant ID: 1001

Participant Name: Ravi Kumar

Total Score: 452

Average Score: 90

Top Scorer: Ravi Kumar with 452 points

### Answer

```
import java.util.*;
class Participant{
    int id; String name; int[] s; int total; int avg;
    Participant(int i,String n,int[] a){id=i;name=n;s=a;}
    void calc(){
        total=0; boolean bonus=true;
        for(int x:s){total+=x; if(x<=80) bonus=false;}
        if(bonus) total+=10;
        avg=total/5;
    }
}
public class Main{
    public static void main(String[] args){
        Scanner sc=new Scanner(System.in);
        int n=sc.nextInt();sc.nextLine();
        Participant top=null;
        for(int i=0;i<n;i++){
            int id=sc.nextInt();sc.nextLine();
            String name=sc.nextLine();
            int[] a=new int[5];
            for(int j=0;j<5;j++) a[j]=sc.nextInt();
            if(i<n-1) sc.nextLine();
            Participant p=new Participant(id,name,a);
            p.calc();
            System.out.printf("Participant ID: %d Participant Name: %s Total Score:
%d Average Score: %d",p.id,p.name,p.total,p.avg);
            if(top==null||p.total>top.total||(p.total==top.total&& p.id<top.id)) top=p;
        }
        System.out.printf(" Top Scorer: %s with %d points",top.name,top.total);
    }
}
```

Status : Correct

Marks : 10/10

## 5. Problem Statement

Neha is working as a developer for CityMovie Theatre, which wants to build a system to calculate total ticket cost for movie-goers based on the number of tickets and type of seats booked.

Each customer's booking has:

Booking ID (integer) Customer Name (string) Number of Tickets (integer) Seat Type (string: "Standard", "Premium", "VIP")

The ticket prices are:

Standard – 250 units per ticket Premium – 400 units per ticket VIP – 600 units per ticket

The calculation rules:

Total Amount = Number of Tickets × Seat Price

If a customer books more than 4 tickets, they get a 10% discount on the total amount.

If the booking is for VIP seats and the total amount exceeds 3000 units, a 5% luxury tax is added after any discount.

Neha has been asked to implement this system using:

A class with attributes for booking details. A constructor to initialize booking details. Getter and Setter methods to retrieve and update booking details if required. A method to calculate the final ticket cost. Objects of the class to represent bookings.

Finally, display each customer's details and final ticket amount.

### Input Format

The first line contains an integer N, representing the number of bookings.

For each booking:

- The next line contains the Booking ID (integer).
- The next line contains the Customer Name (string).
- The next line contains Number of Tickets (integer).
- The next line contains Seat Type ("Standard", "Premium", or "VIP").

### **Output Format**

For each booking, print:

- Booking ID: <booking\_id>
- Customer Name: <customer\_name>
- Final Ticket Amount: <final\_amount> (rounded to one decimal place)

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 1

1001

Ravi Kumar

3

Standard

Output: Booking ID: 1001

Customer Name: Ravi Kumar

Final Ticket Amount: 750.0

### **Answer**

```
import java.util.*;
class Booking{
    int id,tickets; String name,type;
    Booking(int i,String n,int t,String ty){id=i;name=n;tickets=t;type=ty;}
    double calc(){
        double price=type.equalsIgnoreCase("Standard"?
250:type.equalsIgnoreCase("Premium"?400:600;
        double total=tickets*price;
        if(tickets>4) total-=total*0.10;
        if(type.equalsIgnoreCase("VIP")&&total>3000) total+=total*0.05;
        return total;
    }
}
```



```
public class Main{
    public static void main(String[] args){
        Scanner sc=new Scanner(System.in);
        int n=sc.nextInt();sc.nextLine();
        for(int i=0;i<n;i++){
            int id=sc.nextInt();sc.nextLine();
            String name=sc.nextLine();
            int t=sc.nextInt();sc.nextLine();
            String type=sc.nextLine();
            Booking b=new Booking(id,name,t,type);
            System.out.printf("Booking ID: %d Customer Name: %s Final Ticket
Amount: %.1f",b.id,b.name,b.calc());
        }
    }
}
```

**Status :** Correct

**Marks :** 10/10

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Batch: 2028  
Degree: B.E - CSE

Scan to verify results



## 2024\_28\_III\_OOPS Using Java Lab

### REC\_2028\_OOPS using Java\_Week 5\_CY

Attempt : 1  
Total Mark : 40  
Marks Obtained : 40

#### Section 1 : Coding

##### 1. Problem Statement

Arjun is working as a developer for CityWater Supply Board, which wants to build a household water billing system.

Each household's water account has:

A Customer ID (integer) A Customer Name (string) Liters Consumed (double)

The water bill is calculated based on these rules:

For the first 500 liters    2 per liter For the next 500 liters (501–1000)    3 per liter  
For liters above 1000    5 per liter If the total bill exceeds 3000, a 10% discount is applied on the final bill.

Arjun has been asked to implement this system using:

A class with attributes for customer details. A constructor to initialize customer details. Setter methods to update details if needed. Getter methods to retrieve details. Objects of the class to represent customers.

Finally, display each customer's details and final bill amount.

### ***Input Format***

The first line of input contains an integer N, representing the number of customers.

For each customer:

- The next line contains the Customer ID (integer).
- The following line contains the Customer Name (string).
- The next line contains the Liters Consumed (double).

### ***Output Format***

For each customer, print the details in the following format:

Customer ID: <customer\_id>

Customer Name: <customer\_name>

Final Bill: <final\_bill> (rounded to one decimal place)

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 1

1001

Ravi Kumar

300

Output: Customer ID: 1001

Customer Name: Ravi Kumar

Final Bill: 600.0

### ***Answer***

```
import java.util.*;
```

```

class Customer{
    int id; String name; double liters;
    Customer(int i,String n,double l){id=i;name=n;liters=l;}
    double calc(){
        double bill=0;
        if(liters<=500) bill=liters*2;
        else if(liters<=1000) bill=500*2+(liters-500)*3;
        else bill=500*2+500*3+(liters-1000)*5;
        if(bill>3000) bill-=bill*0.10;
        return bill;
    }
}

public class Main{
    public static void main(String[] args){
        Scanner sc=new Scanner(System.in);
        int n=sc.nextInt();sc.nextLine();
        for(int i=0;i<n;i++){
            int id=sc.nextInt();sc.nextLine();
            String name=sc.nextLine();
            double liters=sc.nextDouble();
            if(i<n-1) sc.nextLine();
            Customer c=new Customer(id,name,liters);
            System.out.printf("Customer ID: %d Customer Name: %s Final Bill:
%.1f",c.id,c.name,c.calc());
        }
    }
}

```

**Status :** Correct

**Marks :** 10/10

## 2. Problem Statement

You are working as a developer for CityMobile, which wants to build a basic mobile data usage management system.

Each customer has:

A Customer ID (integer) A Customer Name (string) An Initial Data Balance (in GB, double)

The company allows two types of operations:

Recharge – increases the data balance. Usage – decreases the data balance only if enough data is available.

If the usage amount is greater than the available data balance, the usage should not happen, and the balance should remain the same.

You are required to implement this system using:

A class with attributes for customer details. A constructor to initialize customer details. Setter methods to update details if needed. Getter methods to retrieve details. Objects of the class to represent customers.

Finally, display each customer's details after all operations.

### ***Input Format***

The first line of input contains an integer N, representing the number of customers.

For each customer:

- The next line contains the Customer ID (integer).
- The following line contains the Customer Name (string).
- The next line contains the Initial Data Balance (double).
- The next line contains the Recharge Amount in GB (double).
- The next line contains the Usage Amount in GB (double).

### ***Output Format***

For each customer, print the details in the following format:

Customer ID: <customer\_id>

Customer Name: <customer\_name>

Final Data Balance: <final\_data\_balance> GB (The final balance must be rounded to one decimal place.)

Refer to the sample output for formatting specifications.

### Sample Test Case

Input: 1

1234

Ravi Kumar

5.0

2.0

3.0

Output: Customer ID: 1234

Customer Name: Ravi Kumar

Final Data Balance: 4.0 GB

### Answer

```
import java.util.*;
class Customer{
    int id; String name; double balance;
    Customer(int i,String n,double b){id=i;name=n;balance=b;}
    void recharge(double r){balance+=r;}
    void use(double u){if(u<=balance)balance-=u;}
}
public class Main{
    public static void main(String[] args){
        Scanner sc=new Scanner(System.in);
        int n=sc.nextInt();sc.nextLine();
        for(int i=0;i<n;i++){
            int id=sc.nextInt();sc.nextLine();
            String name=sc.nextLine();
            double bal=sc.nextDouble(),r=sc.nextDouble(),u=sc.nextDouble();
            if(i<n-1)sc.nextLine();
            Customer c=new Customer(id,name,bal);
            c.recharge(r);c.use(u);
            System.out.printf("Customer ID: %d Customer Name: %s Final Data
Balance: %.1f GB",c.id,c.name,c.balance);
        }
    }
}
```

Status : Correct

Marks : 10/10

### 3. Problem Statement

Anjali is working as a developer for the City Basketball Association, which wants to build a system to track and find the top scorer among basketball players.

Each player's record has:

Player ID (integer) Player Name (string) An array of points scored in 5 matches (integers)

The system must calculate:

The total score of each player (sum of all match points). Identify the highest scorer among all players. If two or more players have the same total score, the one with the lower Player ID is considered the top scorer.

Anjali has been asked to implement this system using:

A class with attributes for player details. A constructor to initialize player details. Getter and Setter methods to retrieve and update player details if required. A method to calculate the total score. Objects of the class to represent players.

Finally, display each player's details and announce the Top Scorer.

### ***Input Format***

The first line of input contains an integer N (number of players).

For each player:

- The next line contains the Player ID (integer).
- The following line contains the Player Name (string).
- The next line contains 5 integers separated by spaces (points scored in 5 matches).

### ***Output Format***

For each player the output prints the following details:

- Player ID: <player\_id>
- Player Name: <player\_name>
- Total Score: <total\_score>

Finally, print "Top Scorer: <player\_name> with <total\_score> points"

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 1

1001

Ravi Kumar

10 20 30 40 50

Output: Player ID: 1001

Player Name: Ravi Kumar

Total Score: 150

Top Scorer: Ravi Kumar with 150 points

### **Answer**

```
import java.util.*;
class Player{
    int id,total; String name; int[] pts;
    Player(int i,String n,int[] p){id=i;name=n;pts=p;}
    void calc(){total=0; for(int x:pts) total+=x;}
}
public class Main{
    public static void main(String[] args){
        Scanner sc=new Scanner(System.in);
        int n=sc.nextInt(); sc.nextLine();
        Player top=null;
        for(int i=0;i<n;i++){
            int id=sc.nextInt(); sc.nextLine();
            String name=sc.nextLine();
            int[] p=new int[5];
            for(int j=0;j<5;j++) p[j]=sc.nextInt();
            if(i<n-1) sc.nextLine();
            Player pl=new Player(id,name,p);
            pl.calc();
            System.out.printf("Player ID: %d Player Name: %s Total Score: %d",pl.id,pl.name,pl.total);
```



```

        if(top==null || pl.total>top.total || (pl.total==top.total && pl.id<top.id))
        top=pl;
    }
    System.out.printf("Top Scorer: %s with %d points",top.name,top.total);
}
}

```

**Status :** Correct

**Marks :** 10/10

#### 4. Problem Statement

Anjali is now working as a developer for the City Marathon Association, which wants to build a system to track and find the fastest runner among marathon participants.

Each runner's record has:

Runner ID (integer) Runner Name (string) An array of times (in minutes) taken in 5 marathon events (integers)

The system must calculate:

The average time of each runner (sum of all times / 5). Identify the fastest runner (the one with the lowest average time). If two or more runners have the same average time, the one with the lower Runner ID is considered the fastest runner.

Anjali has been asked to implement this system using:

A class with attributes for runner details. A constructor to initialize runner details. Getter and Setter methods to retrieve and update runner details if required. A method to calculate the average time. Objects of the class to represent runners.

Finally, display each runner's details and announce the Fastest Runner.

#### ***Input Format***

The first line of input contains an integer N (number of runners).

For each runner:

- The next line contains the Runner ID (integer).
- The following line contains the Runner Name (string).
- The next line contains 5 integers separated by spaces (times in minutes for 5 marathon events).

### **Output Format**

For each runner the output prints the following details:

- Runner ID: <runner\_id>
- Runner Name: <runner\_name>
- Average Time: <average\_time>

Finally, print "Fastest Runner: <runner\_name> with <average\_time> minutes"

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 1

1001

Ravi Kumar

240 250 245 255 260

Output: Runner ID: 1001

Runner Name: Ravi Kumar

Average Time: 250

Fastest Runner: Ravi Kumar with 250 minutes

### **Answer**

```
import java.util.*;
class Runner{
    int id; String name; int[] times; int avg;
    Runner(int i,String n,int[] t){id=i;name=n;times=t;}
    void calc(){int sum=0; for(int x:times) sum+=x; avg=sum/5;}
}
public class Main{
    public static void main(String[] args){
```

```

Scanner sc=new Scanner(System.in);
int n=sc.nextInt(); sc.nextLine();
Runner fastest=null;
for(int i=0;i<n;i++){
    int id=sc.nextInt(); sc.nextLine();
    String name=sc.nextLine();
    int[] t=new int[5];
    for(int j=0;j<5;j++) t[j]=sc.nextInt();
    if(i<n-1) sc.nextLine();
    Runner r=new Runner(id,name,t);
    r.calc();
    System.out.printf("Runner ID: %d Runner Name: %s Average Time:
%d",r.id,r.name,r.avg);
    if(fastest==null || r.avg<fastest.avg || (r.avg==fastest.avg &&
r.id<fastest.id)) fastest=r;
}
    System.out.printf(" Fastest Runner: %s with %d
minutes",fastest.name,fastest.avg);
}
}

```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### REC\_2028\_OOPS using Java\_Week 6\_MCQ

Attempt : 1  
Total Mark : 15  
Marks Obtained : 12

#### Section 1 : MCQ

1. What will be the output of the following program?

```
class A {  
    int x = 10;  
}
```

```
class B extends A {  
    int x = 20;  
}
```

```
class C extends B {  
    int x = 30;
```

```
    void display() {  
        System.out.println(x);  
        System.out.println(super.x);  
    }
```

```

    }
}

class Test {
    public static void main(String[] args) {
        C obj = new C();
        obj.display();
    }
}

```

**Answer**

3020

**Status :** Correct

**Marks :** 1/1

2. What will be the output of the following code?

```

class A {
    int sum(int x) {
        return x + 2;
    }
}

```

```

class B extends A {
    int sum(int x) {
        return super.sum(x) * 2;
    }
}

```

```

class C extends B {
    int sum(int x) {
        return super.sum(x) - 3;
    }
}

```

```

class Test {
    public static void main(String[] args) {
        C obj = new C();
        System.out.println(obj.sum(4));
    }
}

```

**Answer**

11

**Status : Wrong**

**Marks : 0/1**

3. What will be the output of the following code?

```
class A {  
    void display() {  
        System.out.println("Display A");  
    }  
}  
  
class B extends A {  
    void display() {  
        System.out.println("Display B");  
    }  
}  
  
class C extends B {  
    void display() {  
        super.display();  
    }  
}  
  
class Test {  
    public static void main(String[] args) {  
        C obj = new C();  
        obj.display();  
    }  
}
```

**Answer**

Display B

**Status : Correct**

**Marks : 1/1**

4. Select the correct keyword for implementing inheritance through the class.

**Answer**

extends

**Status :** Correct

**Marks :** 1/1

5. What will be the output of the following Java program?

```
class Test {  
    void display(int a, int b) {  
        System.out.println("Method 1");  
    }  
    void display(double a, double b) {  
        System.out.println("Method 2");  
    }  
    public static void main(String[] args) {  
        Test obj = new Test();  
        obj.display(10, 10.0);  
    }  
}
```

**Answer**

Compilation error

**Status :** Wrong

**Marks :** 0/1

6. What will be the output of the following Java program?

```
class Parent {  
    void show() {  
        System.out.println("Parent class");  
    }  
}  
class Child extends Parent {  
    void show() {  
        System.out.println("Child class");  
    }  
}
```

```
}  
}  
class Test {  
    public static void main(String[] args) {  
        Parent obj = new Child();  
        obj.show();  
    }  
}
```

**Answer**

Child class

**Status :** Correct

**Marks :** 1/1

7. What will be the output of the following Java program?

```
class A {  
    void display() {  
        System.out.println("Class A");  
    }  
}
```

```
class B extends A {  
    void show() {  
        System.out.println("Class B");  
    }  
}
```

```
class C extends B {  
    void print() {  
        System.out.println("Class C");  
    }  
}
```

```
class Test {  
    public static void main(String[] args) {  
        C obj = new C();  
        obj.display();  
        obj.show();  
    }  
}
```



```
        obj.print();
    }
}
```

**Answer**

Class AClass BClass C

**Status :** Correct

**Marks :** 1/1

8. What will be the output of the following program?

```
class Vehicle {
    String type = "Vehicle";
}

class Car extends Vehicle {
    String type = "Car";
}

class Test {
    public static void main(String[] args) {
        Car c = new Car();
        System.out.println(c.type);
    }
}
```

**Answer**

Car

**Status :** Correct

**Marks :** 1/1

9. Which of the following is true about method overriding in Java?

**Answer**

The method must have the same name, same parameters, and must be in different classes with an inheritance relationship

**Status :** Correct

**Marks :** 1/1

10. What will be the output of the following Java program?

```
class Vehicle {  
    void startEngine() {  
        System.out.println("Vehicle engine started");  
    }  
}
```

```
class Car extends Vehicle {  
    void startEngine() {  
        System.out.println("Car engine started");  
    }  
}
```

```
class Main {  
    public static void main(String[] args) {  
        Vehicle myVehicle = new Car();  
        myVehicle.startEngine();  
    }  
}
```

**Answer**

Car engine started

**Status :** Correct

**Marks :** 1/1

11. What will be the output of the following Java program?

```
class A {  
    int value = 10;  
    void display() {  
        System.out.println("A's display: " + value);  
    }  
}  
class B extends A {  
    int value = 20;  
    void display() {  
        System.out.println("B's display: " + value);  
    }  
}
```

```

    }
    class Test {
        public static void main(String[] args) {
            A obj = new B();
            obj.display();
            System.out.println("Value: " + obj.value);
        }
    }
}

```

**Answer**

B's display: 20 Value: 10

**Status :** Correct

**Marks :** 1/1

12. What will be the output of the following Java program?

```

class Vehicle {
    void start() {
        System.out.println("Vehicle starts");
    }
}
class Car extends Vehicle {

    void start() {
        System.out.println("Car starts");
    }
}
class ElectricCar extends Car {
    void start() {
        System.out.println("Electric Car starts silently");
    }
}
class Test {
    public static void main(String[] args) {
        Vehicle v = new ElectricCar();
        v.start();
    }
}

```

**Answer**

Electric Car starts silently

**Status :** Correct

**Marks :** 1/1

13. What will be the output of the following program?

```
class A {  
    public int i;  
    private int j;  
}  
class B extends A {  
    void display() {  
        super.j = super.i + 1;  
        System.out.println(super.i + " " + super.j);  
    }  
}  
class inheritance {  
    public static void main(String args[]) {  
        B obj = new B();  
        obj.i=1;  
        obj.j=2;  
        obj.display();  
    }  
}
```

**Answer**

Compile Time Error

**Status :** Correct

**Marks :** 1/1

14. What will be the output of the following Java program?

```
class Test {  
    void show(int a) {  
        System.out.println("Integer method");  
    }  
    void show(String s) {
```

```
        System.out.println("String method");
    }
    public static void main(String[] args) {
        Test obj = new Test();
        obj.show(null);
    }
}
```

**Answer**

Compilation error due to ambiguous method call

**Status : Wrong**

**Marks : 0/1**

15. Which of the following is the correct way for class B to inherit from class A?

**Answer**

class B extends A {}

**Status : Correct**

**Marks : 1/1**

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 6\_Q1

Attempt : 1

Total Mark : 10

Marks Obtained : 10

### Section 1 : Coding

#### 1. Problem Statement

Elsa subscribes to a premium service with a base monthly cost, a service tax and an extra feature cost. Assist her in writing an inheritance program that takes input for these values and calculates the total monthly cost.

Refer to the below class diagram:

#### ***Input Format***

The first line of input consists of a double value, representing the base monthly cost.

The second line consists of a double value, representing the service tax.

The third line consists of a double value, representing the extra feature cost.

### **Output Format**

The output prints "Rs. X" where X is a double value, rounded off to two decimal places.

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 10.0

2.5

5.0

Output: Rs. 17.50

### **Answer**

```
import java.util.Scanner;
```

```
class Subscription {  
    protected double baseMonthlyCost;  
    protected double serviceTax;  
  
    public Subscription(double base, double tax) {  
        baseMonthlyCost = base;  
        serviceTax = tax;  
    }  
  
    public double calculateMonthlyCost() {  
        return baseMonthlyCost + serviceTax;  
    }  
}
```

```
class PremiumSubscription extends Subscription {  
    private double extraFeatureCost;  
  
    public PremiumSubscription(double base, double tax, double extra) {  
        super(base, tax);  
        extraFeatureCost = extra;  
    }  
}
```

```
@Override
public double calculateMonthlyCost() {
    return super.calculateMonthlyCost() + extraFeatureCost;
}
}
```

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

        double baseMonthlyCost = scanner.nextDouble();
        double serviceTax = scanner.nextDouble();
        double extraFeatureCost = scanner.nextDouble();

        PremiumSubscription premiumSubscription = new
        PremiumSubscription(baseMonthlyCost, serviceTax, extraFeatureCost);

        double totalMonthlyCost = premiumSubscription.calculateMonthlyCost();

        System.out.printf("Rs. %.2f%n", totalMonthlyCost);

        scanner.close();
    }
}
```

**Status :** Correct

**Marks :** 10/10



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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 6\_Q2

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

Alice is managing an online store and wants to implement a program using inheritance to calculate the selling price of products after applying discounts.

Guide her by following the instructions:

Create a base class called Product with a public double attribute price. Create a subclass called DiscountedProduct, which extends Product and includes a private double attribute discount rate. This subclass has a method called calculateSellingPrice() to determine the final selling price after applying the discount.

Formula: Discounted selling price = price \* (1 - discount rate)

**Input Format**

The first line of input consists of a double value p, the initial price of the product.

The second line consists of a double value d, the discount rate.

### **Output Format**

The output prints "Rs. X", where X is a double value, representing the calculated discounted selling price, rounded off to two decimal places.

If the discount rate is greater than 1, print "Not applicable".

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 50.00

0.20

Output: Rs. 40.00

### **Answer**

```
import java.util.Scanner;
```

```
class Product {  
    public double price;  
    public Product(double price) {  
        this.price = price;  
    }  
}
```

```
class DiscountedProduct extends Product {  
    private double discountRate;  
    public DiscountedProduct(double price, double discountRate) {  
        super(price);  
        this.discountRate = discountRate;  
    }  
}
```

```
    public double calculateSellingPrice() {  
        if (discountRate > 1) return -1;  
        return price * (1 - discountRate);  
    }
```

```
}  
}  
}  
class ProductPricing {  
    public static void main(String[] args) {  
        Scanner scanner = new Scanner(System.in);  
  
        double initialPrice = scanner.nextDouble();  
        double discountRate = scanner.nextDouble();  
        DiscountedProduct discountedProduct = new  
DiscountedProduct(initialPrice, discountRate);  
        double sellingPrice = discountedProduct.calculateSellingPrice();  
  
        if (sellingPrice >= 0) {  
            System.out.printf("Rs. %.2f%n", sellingPrice);  
        } else {  
            System.out.println("Not applicable");  
        }  
        scanner.close();  
    }  
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 6\_Q3

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

Preethi is working on a project to automate sales tax calculations for items in a store. She wants to create a program that takes the price of an item and the sales tax rate as input and calculates the final price of the item after applying the sales tax.

Write a program using the class SalesTaxCalculator, which contains an overloaded method named calculateFinalPrice to handle both integer and double inputs. The program should also include a Main class that takes user input, calls the appropriate method from SalesTaxCalculator, and prints the final price of the item.

Formula Used: Final price = price + ((price \* sales tax rate) / 100)

**Input Format**

The first line of input consists of an integer price (the price of the item for integer inputs).

The second line of input consists of an integer taxRate (the sales tax rate for integer inputs).

The third line of input consists of a double price (the price of the item for double inputs).

The fourth line of input consists of a double taxRate (the sales tax rate for double inputs).

### ***Output Format***

The first line of output prints an integer, representing the final price of the item after applying the sales tax for integer inputs (a and b).

The second line prints a double value, representing the final price of the item after applying the sales tax for double-value inputs (m and n), rounded to two decimal places.

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 100

10

100.0

5.0

Output: 110

105.00

### ***Answer***

```
import java.util.Scanner;
```

```
class SalesTaxCalculator {
```

```
    public static int calculateFinalPrice(int price, int taxRate) {
```

```
        return price + (price * taxRate / 100);
```

```
    }
```

```
    public static double calculateFinalPrice(double price, double taxRate) {  
        return price + (price * taxRate / 100);  
    }  
}  
  
class Main {  
    public static void main(String[] args) {  
        Scanner scanner = new Scanner(System.in);  
        int intPrice = scanner.nextInt();  
        int intTaxRate = scanner.nextInt();  
        double doublePrice = scanner.nextDouble();  
        double doubleTaxRate = scanner.nextDouble();  
  
        int finalPriceInt = SalesTaxCalculator.calculateFinalPrice(intPrice,  
intTaxRate);  
        double finalPriceDouble =  
SalesTaxCalculator.calculateFinalPrice(doublePrice, doubleTaxRate);  
  
        System.out.println(finalPriceInt);  
        System.out.format("%.2f", finalPriceDouble);  
    }  
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 6\_Q4

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

Mr.Kapoor wants to create a program to calculate the volume of a Cuboid and a Cube using method overriding.

Implements a base class Cuboid with attributes for length, width, and height. Include a method calculateVolume() that computes the volume of the cuboid.

Extends the base class with a subclass Cube representing a cube, where all sides are equal. Override the calculateVolume() method in the Cube class to compute the volume of the cube.

The program should take user input for the dimensions of the cuboid and the side length of the cube and display the calculated volumes with two decimal places.

### ***Input Format***

The first line of input consists of 3 space-separated double values, representing the cuboid length, width, and height, respectively.

The second line consists of a double value, representing the side length of the cube.

### ***Output Format***

The first line of output prints the volume of the cuboid, rounded off to two decimal places.

The second line prints the volume of the cube, rounded off to two decimal places.

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 60.0 60.0 60.0  
50.0

Output: Volume of Cuboid: 216000.00  
Volume of Cube: 125000.00

### ***Answer***

```
import java.util.Scanner;
import java.util.*;

class Cuboid {
    double length, width, height;
    Cuboid(double l, double w, double h) {
        this.length = l;
        this.width = w;
        this.height = h;
    }
    double calculateVolume() {
        return length * width * height;
    }
}
```



```
class Cube extends Cuboid {  
    double side;  
    Cube(double s) {  
        super(s, s, s);  
        this.side = s;  
    }  
    @Override  
    double calculateVolume() {  
        return side * side * side;  
    }  
}
```

```
public class Main {  
    public static void main(String[] args) {  
        Scanner scanner = new Scanner(System.in);  
  
        double cuboidLength = scanner.nextDouble();  
        double cuboidWidth = scanner.nextDouble();  
        double cuboidHeight = scanner.nextDouble();  
  
        // Regular object instantiation for Cuboid  
        Cuboid cuboid = new Cuboid(cuboidLength, cuboidWidth, cuboidHeight);  
        System.out.printf("Volume of Cuboid: %.2f\n", cuboid.calculateVolume());  
  
        double cubeSide = scanner.nextDouble();  
  
        // Upcasting - Using superclass reference for subclass object (DMD)  
        Cuboid cube = new Cube(cubeSide); // Upcasting  
        System.out.printf("Volume of Cube: %.2f", cube.calculateVolume()); // Calls  
        Cube's method dynamically  
  
        scanner.close();  
    }  
}
```

**Status :** Correct

**Marks :** 10/10

# Rajalakshmi Engineering College

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 6\_Q5

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem statement:

Tim was tasked with developing a grocery shopping app. You have a class hierarchy that includes Item, Produce, and OrganicProduce. Your goal is to calculate the total cost of a shopping list, which may contain a mix of regular produce and organic produce items. Additionally, you need to apply discounts to organic items. Apply a 10% discount on organic produce items

Class Hierarchy:

Item: Base class for all items.

Produce: Subclass of Item for regular produce items.

OrganicProduce: Subclass of Produce for organic produce items.

### ***Input Format***

The first line of input consists of an integer, 'n'.

For each 'n' item, the user will provide:

- A string 'type' representing the item type ('Regular' or 'Organic').
- A string 'name' represents the item name.
- A double 'price' represents the item price.

### ***Output Format***

The output will display the total cost of the shopping list, including discounts on organic items.

Refer to the sample output for format specifications.

### ***Sample Test Case***

Input: 1

Regular Banana 1.99

Output: 1.99

### ***Answer***

```
import java.util.Scanner;
```

```
import java.util.*;
```

```
abstract class Item {  
    String name;  
    double price;  
    Item(String name, double price) {  
        this.name = name;  
        this.price = price;  
    }  
    abstract double calculateCost();  
}
```

```
class Produce extends Item {  
    Produce(String name, double price) {  
        super(name, price);  
    }  
}
```

```
    }  
    double calculateCost() {  
        return price;  
    }  
}
```

```
class OrganicProduce extends Produce {  
    OrganicProduce(String name, double price) {  
        super(name, price);  
    }  
    double calculateCost() {  
        return price * 0.90; // 10% discount  
    }  
}
```

```
public class Main {  
    public static void main(String[] args) {  
        Scanner sc = new Scanner(System.in);  
  
        int n = sc.nextInt();  
        sc.nextLine(); // Consume newline  
  
        double totalCost = 0.0;  
  
        for (int i = 0; i < n; i++) {  
            String type = sc.next();  
            String name = sc.next();  
            double price = sc.nextDouble();  
  
            if (type.equals("Regular")) {  
                Item item = new Produce(name, price);  
                totalCost += item.calculateCost();  
            } else if (type.equals("Organic")) {  
                Item item = new OrganicProduce(name, price);  
                totalCost += item.calculateCost();  
            }  
        }  
  
        System.out.printf("%.2f%n", totalCost);  
    }  
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### REC\_2028\_OOPS using Java\_Week 6\_PAH

Attempt : 1  
Total Mark : 40  
Marks Obtained : 40

#### Section 1 : Coding

##### 1. Problem Statement

In a company, each manager has a unique employee ID and a monthly salary. You are required to design a program that will calculate and display the annual(12 months) salary of a manager based on the input details provided by the user.

Implement the solution using a single inheritance approach.

Employee: The base class with attributes name and employeeID.

Manager: The derived class inheriting from Employee, with an additional attribute salary.

##### **Input Format**

The first line of input consists of a string name, representing the manager's name.

The second line of input consists of an integer employeeID, representing the manager's employee ID.

The third line of input consists of a double salary, representing the manager's monthly salary.

### **Output Format**

The first line of output prints: Name: <name>

The second line of output prints: Annual Salary: Rs. <annual\_salary> (rounded to two decimal places).

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: Davis

234

28750.75

Output: Name: Davis

Annual Salary: Rs. 345009.00

### **Answer**

```
import java.util.Scanner;  
import java.text.DecimalFormat;  
import java.util.*;  
import java.text.DecimalFormat;
```

```
class Employee {  
    String name;  
    int employeeID;  
    Employee(String name, int employeeID) {  
        this.name = name;  
        this.employeeID = employeeID;  
    }  
}
```

```
class Manager extends Employee {
```

```

double salary;
Manager(String name, int employeeID, double salary) {
    super(name, employeeID);
    this.salary = salary;
}
double calculateAnnualSalary() {
    return salary * 12;
}
}

class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        DecimalFormat df = new DecimalFormat("0.00");

        String name = scanner.nextLine();
        int employeeID = scanner.nextInt();
        double salary = scanner.nextDouble();

        Manager manager = new Manager(name, employeeID, salary);

        System.out.println("Name: " + manager.name);
        System.out.println("Annual Salary: Rs. " +
df.format(manager.calculateAnnualSalary()));

        scanner.close();
    }
}

```

**Status :** Correct

**Marks :** 10/10

## 2. Problem Statement

Ram is designing a program to calculate the Body Mass Index (BMI). Your task is to assist him by following the given specifications.

Create a base class BMIcalculator with a method calculateBMI() to compute BMI using the formula  $\text{weight} / (\text{height} * \text{height})$ .

Extend the class with a subclass CustomBMIcalculator that overrides the method calculateBMI() to calculate BMI based on custom criteria,



assigning categories such as "Underweight," "Normal Weight," "Overweight," or "Obese."

BMI < 18.5, category = "Underweight" BMI >= 18.5 & < 24.9, category = "Normal Weight" BMI >= 25 & < 29.9, category = "Overweight" else category = "Obese"

Implement user input for weight and height and display both the standard and custom BMI calculations.

### ***Input Format***

The first line of input consists of a double value, representing the weight in kgs.

The second line consists of a double value, representing the height in meters.

### ***Output Format***

The first line of output prints: "Standard BMI Calculation:"

The second line of output prints: "BMI: " followed by the calculated BMI value (to two decimal places).

The third line of output prints: "Custom BMI Calculation:"

The fourth line of output prints: "Category: " followed by the BMI category.

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 69.7

2.6

Output: Standard BMI Calculation:

BMI: 10.31

Custom BMI Calculation:

Category: Underweight

### ***Answer***

```
import java.util.Scanner;
```

```
import java.util.*;
import java.text.DecimalFormat;

class BMlcalculator {
    protected double weight;
    protected double height;

    public BMlcalculator(double weight, double height) {
        this.weight = weight;
        this.height = height;
    }

    public double calculateBMI() {
        return weight / (height * height);
    }

    public void displayBMI() {
        DecimalFormat df = new DecimalFormat("0.00");
        System.out.println("BMI: " + df.format(calculateBMI()));
    }
}

class CustomBMlcalculator extends BMlcalculator {

    public CustomBMlcalculator(double weight, double height) {
        super(weight, height);
    }

    @Override
    public double calculateBMI() {
        return super.calculateBMI();
    }

    public void displayCustomBMI() {
        double bmi = calculateBMI();
        String category;
        if (bmi < 18.5) {
            category = "Underweight";
        } else if (bmi >= 18.5 && bmi < 24.9) {
            category = "Normal Weight";
        } else if (bmi >= 25 && bmi < 29.9) {
            category = "Overweight";
        }
    }
}
```

```

    } else {
        category = "Obese";
    }
    System.out.println("Category: " + category);
}
}

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

        double weight = scanner.nextDouble();
        double height = scanner.nextDouble();

        BMIcalculator bmiCalculator = new BMIcalculator(weight, height);
        System.out.println("Standard BMI Calculation:");
        bmiCalculator.displayBMI();

        CustomBMIcalculator customBMIcalculator = new
CustomBMIcalculator(weight, height);
        System.out.println("Custom BMI Calculation:");
        customBMIcalculator.displayCustomBMI();

        scanner.close();
    }
}

```

**Status :** Correct

**Marks :** 10/10

### 3. Problem Statement

John is planning a long road trip and wants to calculate the distance his car can travel based on its speed and fuel capacity. As John knows that different cars have different fuel efficiencies, he wants a program that can help him estimate the travel distance for any given car.

To do this, you are tasked with creating a program that calculates the travel distance of a car based on its speed and fuel capacity. The calculation is simple and follows the formula:

$\text{Travel Distance} = \text{Speed} * \text{Fuel Capacity}$

You need to model this system using a Vehicle class and a Car class. The Vehicle class will have attributes for the speed and fuel capacity, while the Car class will inherit from the Vehicle class and include a method to calculate the travel distance.

### ***Input Format***

The first line of input consists of a double value representing the speed of the car in km/h.

The second line of input consists of a double value representing the fuel capacity of the car in liters.

### ***Output Format***

The first line should print "Speed: X km/h", where X is the speed of the car, rounded to two decimal places.

The second line should print "Fuel Capacity: Y liters", where Y is the fuel capacity of the car, rounded to two decimal places.

The third line should print "Travel Distance: Z km", where Z is the total travel distance the car can cover, rounded to two decimal places.

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 10.0

1.0

Output: Speed: 10.00 km/h

Fuel Capacity: 1.00 liters

Travel Distance: 10.00 km

### ***Answer***

```
import java.util.Scanner;
```

```
import java.util.*;
```

```

class Vehicle {
    protected double speed;
    protected double fuelCapacity;

    public Vehicle(double speed, double fuelCapacity) {
        this.speed = speed;
        this.fuelCapacity = fuelCapacity;
    }
}

class Car extends Vehicle {
    public Car(double speed, double fuelCapacity) {
        super(speed, fuelCapacity);
    }

    public double calculateTravelDistance() {
        return speed * fuelCapacity;
    }
}

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

        double speed = scanner.nextDouble();
        double fuelCapacity = scanner.nextDouble();

        Car car = new Car(speed, fuelCapacity);

        System.out.println("Speed: " + String.format("%.2f", car.speed) + " km/h");
        System.out.println("Fuel Capacity: " + String.format("%.2f", car.fuelCapacity)
+ " liters");
        System.out.println("Travel Distance: " + String.format("%.2f",
car.calculateTravelDistance()) + " km");

        scanner.close();
    }
}

```

**Status :** Correct

**Marks : 10/10**

#### 4. Problem Statement

Sharon, a software developer, is working on a project to automate velocity calculations for various objects. She wants to create a class named `VelocityCalculator` with overloaded methods `calculateVelocity` to calculate the velocity. One method will accept distance in meters and time in seconds as integers, while another will accept distance and time as doubles.

Help her in completing the project.

Formula:  $\text{Velocity} = \text{distance} / \text{time}$

##### ***Input Format***

The first line of input consists of an integer, representing the distance in meters (for the integer method).

The second line consists of an integer, representing the time in seconds (for the integer method).

The third line consists of a double value, representing the distance in meters (for the double method).

The fourth line consists of a double value, representing the time in seconds (for the double method).

##### ***Output Format***

The first line prints the velocity calculated using the integer inputs in the format:

Velocity with integer inputs: <velocity> m/s

The second line prints the velocity calculated using the double inputs in the format:

Velocity with double inputs: <velocity> m/s

Note:

The velocity for the double inputs should be printed with two decimal places.

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 100

10

100.5

10.2

Output: Velocity with integer inputs: 10 m/s

Velocity with double inputs: 9.85 m/s

### **Answer**

```
import java.util.Scanner;
```

```
import java.util.*;
```

```
class VelocityCalculator {
```

```
    public static int calculateVelocity(int distance, int time) {
```

```
        return distance / time;
```

```
    }
```

```
    public static double calculateVelocity(double distance, double time) {
```

```
        return distance / time;
```

```
    }
```

```
}
```

```
public class Main {
```

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

```
        Scanner scanner = new Scanner(System.in);
```

```
        int distanceInt = scanner.nextInt();
```

```
        int timeInt = scanner.nextInt();
```

```
        double distanceDouble = scanner.nextDouble();
```

```
        double timeDouble = scanner.nextDouble();
```

```
        int velocityInt = VelocityCalculator.calculateVelocity(distanceInt, timeInt);
```

```
        double velocityDouble =
```

```
        VelocityCalculator.calculateVelocity(distanceDouble, timeDouble);
```

```
System.out.println("Velocity with integer inputs: " + velocityInt + " m/s");  
System.out.printf("Velocity with double inputs: %.2f m/s", velocityDouble);  
  
    scanner.close();  
}  
}
```

**Status :** Correct

**Marks :** 10/10



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## 2024\_28\_III\_OOPS Using Java Lab

### REC\_2028\_OOPS using Java\_Week 6\_CY

Attempt : 1  
Total Mark : 40  
Marks Obtained : 40

#### Section 1 : Coding

##### 1. Problem Statement

Arun wants to calculate the age gap between the grandfather and the son and determine the father's age after 5 years.

Your task is to assist him in developing a program using three classes: GrandFather, Father, and Son, where the GrandFather stores the grandfather's age, the Father extends GrandFather to include the father's age and calculates his age after 5 years, and Son extends Father to include the son's age and calculate the age difference between the grandfather and the son.

##### ***Input Format***

The input consists of three integers representing the ages of the grandfather, father, and son, one per line.

### **Output Format**

The first line of output prints "Grandfather and son's age gap:" followed by an integer representing the age gap between the grandfather and the son, ending with "years".

The second line prints "Father's Age:" followed by an integer representing the father's age after 5 years, ending with "years".

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 50

30

3

Output: Grandfather and son's age gap: 47 years

Father's Age: 35 years

### **Answer**

```
import java.util.Scanner;
```

```
class GrandFather {  
    private int grandfatherAge;  
    public void setGrandfatherAge(int age) { grandfatherAge = age; }  
    public int getGrandfatherAge() { return grandfatherAge; }  
}
```

```
class Father extends GrandFather {  
    private int fatherAge;  
    public void setFatherAge(int age) { fatherAge = age; }  
    public int getFatherAge() { return fatherAge; }  
    public int calculateFatherAgeAfter5Years() { return fatherAge + 5; }  
}
```

```
class Son extends Father {  
    private int sonAge;  
    public void setSonAge(int age) { sonAge = age; }  
    public int getSonAge() { return sonAge; }  
}
```

```
    public int calculateGrandfatherSonAgeDifference() { return  
    grandfatherAge() - sonAge; }  
}
```

```
public class Main {  
    public static void main(String[] args) {  
        Scanner scanner = new Scanner(System.in);  
        Son son = new Son();  
  
        int grandfatherAge = scanner.nextInt();  
        son.setGrandfatherAge(grandfatherAge);  
  
        int fatherAge = scanner.nextInt();  
        son.setFatherAge(fatherAge);  
  
        int sonAge = scanner.nextInt();  
        son.setSonAge(sonAge);  
  
        System.out.println("Grandfather and son's age gap: "+  
        son.calculateGrandfatherSonAgeDifference() + " years");  
  
        int fatherAgeAfter5Years = son.calculateFatherAgeAfter5Years();  
        System.out.println("Father's Age: " + fatherAgeAfter5Years + " years");  
    }  
}
```

**Status :** Correct

**Marks :** 10/10

## 2. Problem Statement

A painter needs to determine the cost to paint different shapes based on their surface area. The program should be designed to handle the area of a sphere and calculate the total painting cost using the following formulas:

Area of sphere:  $\text{Area} = 4 * \pi * r^2$  where  $\pi = 3.14$  Total painting cost:  $\text{Cost} = \text{cost per square meter} * \text{area of sphere}$

The program will consist of three classes:

Shape class: This class should set the shape type and radius. Area class:

This class should extend Shape to calculate the area. Cost class: This class

should extend Area to calculate the total painting cost.

### **Input Format**

The input consists of a string representing the shape type, a double value representing the radius, and another double value representing the cost per square meter on each line.

### **Output Format**

For a valid shape type of "Sphere":

- The first line prints: "Area of Sphere is: <calculated\_area>" rounded to two decimal places.
- The second line prints: "Cost to paint the shape is: <total\_painting\_cost>" rounded to two decimal places.

For any other shape types, print: "Invalid type".

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: Sphere

3.4

5.8

Output: Area of Sphere is: 145.19

Cost to paint the shape is: 842.12

### **Answer**

```
import java.util.Scanner;
```

```
class Shape {  
    protected String type;  
    protected double radius;  
    public void setShape(String t, Scanner sc) {  
        type = t;  
        radius = sc.nextDouble();  
    }  
}
```

```

class Area extends Shape {
    protected double area;
    public void calculateArea() {
        if ("Sphere".equals(type)) {
            area = 4 * 3.14 * radius * radius;
            System.out.printf("Area of Sphere is: %.2f ", area);
        } else {
            System.out.println("Invalid type");
        }
    }
}

class Cost extends Area {
    private double costPerSqM;
    public void setCost(double c) { costPerSqM = c; }
    public void calculateCost() {
        if ("Sphere".equals(type)) {
            double totalCost = area * costPerSqM;
            System.out.printf("Cost to paint the shape is: %.2f", totalCost);
        }
    }
}

public class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        String s = scanner.next();
        Cost shape = new Cost();
        shape.setShape(s, scanner);
        double costToPaint = scanner.nextDouble();
        shape.calculateArea();
        shape.setCost(costToPaint);
        shape.calculateCost();
    }
}

```

**Status :** Correct

**Marks :** 10/10

### 3. Problem Statement

Bob has been tasked with creating a program using CircleUtils class to calculate and display the circumference and area of the circle.

The program should allow Bob to input the radius of a circle as both an integer and a double and compute both the circumference and area of the circle using separate overloaded methods:

calculateCircumference- To calculate the circumference using the formula  $2 * 3.14 * \text{radius}$

calculateArea- To calculate the area  $3.14 * \text{radius} * \text{radius}$

Write a program to help Bob.

### ***Input Format***

The first line of input consists of an integer m, representing the radius of the circle as a whole number.

The second line consists of a double value n, representing the radius of the circle as a decimal number.

### ***Output Format***

The first line of output displays two space-separated double values, rounded to two decimal places, representing the circumference of the circle with the integer radius and the double radius, respectively.

The second line displays two space-separated double values, rounded to two decimal places, representing the area of the circle with the integer radius and the double radius, respectively.

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 5

3.50

Output: 31.40 21.98

78.50 38.47

### ***Answer***

```
import java.util.Scanner;
```

```

class CircleUtils {
    public double calculateCircumference(int r) { return 2 * 3.14 * r; }
    public double calculateCircumference(double r) { return 2 * 3.14 * r; }
    public double calculateArea(int r) { return 3.14 * r * r; }
    public double calculateArea(double r) { return 3.14 * r * r; }
}

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

        int radiusInt = scanner.nextInt();
        double radiusDouble = scanner.nextDouble();

        CircleUtils circleUtils = new CircleUtils();

        double circumferenceInt = circleUtils.calculateCircumference(radiusInt);
        double circumferenceDouble =
        circleUtils.calculateCircumference(radiusDouble);
        double areaInt = circleUtils.calculateArea(radiusInt);
        double areaDouble = circleUtils.calculateArea(radiusDouble);

        System.out.format("%.2f %.2f\n", circumferenceInt, circumferenceDouble);
        System.out.format("%.2f %.2f", areaInt, areaDouble);

        scanner.close();
    }
}

```

**Status :** Correct

**Marks :** 10/10

#### 4. Problem Statement

A bank provides two types of deposit schemes: Fixed Deposits (FD) and Recurring Deposits (RD). Customers want to calculate the interest they can earn based on their selected scheme.

Develop a Java program using inheritance to compute the interest for FD and RD. The program should include:

A base class Account with attributes accountHolder and principalAmount,

along with a method for interest calculation. A subclass FixedDeposit that calculates interest for FD. A subclass RecurringDeposit that calculates interest for RD.

Formulas Used:

Interest for FD:  $(\text{principal amount} * \text{duration in years} * \text{rate of interest}) / 100$

Interest for RD:  $(\text{maturity amount} * \text{duration in months} * \text{rate of interest}) / (12 * 100)$ , where maturity amount = monthly deposit \* duration in months.

### ***Input Format***

The first line of input consists of the choice (1 for FD, 2 for RD).

If the choice is 1, the following lines consist of account holder (string), principal amount (double), duration in years (int), and rate of interest (double).

If the choice is 2, the following lines consist of account holder (string), monthly deposit (int), duration in months (int), and rate of interest (double).

### ***Output Format***

The output prints the calculated interest with one decimal place in the following format.

For choice 1: "Interest for FD: <calculated interest >"

For choice 2: "Interest for FD: <calculated interest >"

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 1

Alice

50000.56

5

6.5

Output: Interest for FD: 16250.2

***Answer***



```
import java.util.Scanner;
```

```
class Account {  
    protected String accountHolder;  
    protected double principalAmount;  
    public Account(String name, double amount) {  
        accountHolder = name;  
        principalAmount = amount;  
    }  
    public double calculateInterest() {  
        return 0;  
    }  
}
```

```
class FixedDeposit extends Account {  
    private int durationYears;  
    private double rate;  
    public FixedDeposit(String name, double amount, int duration, double r) {  
        super(name, amount);  
        durationYears = duration;  
        rate = r;  
    }  
    @Override  
    public double calculateInterest() {  
        return (principalAmount * durationYears * rate) / 100;  
    }  
}
```

```
class RecurringDeposit extends Account {  
    private int durationMonths;  
    private double rate;  
    public RecurringDeposit(String name, double monthlyDeposit, int duration,  
double r) {  
        super(name, monthlyDeposit);  
        durationMonths = duration;  
        rate = r;  
    }  
    @Override  
    public double calculateInterest() {  
        double maturityAmount = principalAmount * durationMonths;  
        return (maturityAmount * durationMonths * rate) / (12 * 100);  
    }  
}
```

```

    }
    public class Main {
        public static void main(String[] args) {
            Scanner sc = new Scanner(System.in);

            int choice = sc.nextInt();

            switch (choice) {
                case 1:
                    sc.nextLine();
                    String fdName = sc.nextLine();
                    double fdPrincipal = sc.nextDouble();
                    int fdDuration = sc.nextInt();
                    double fdRate = sc.nextDouble();

                    FixedDeposit fd = new FixedDeposit(fdName, fdPrincipal, fdDuration,
fdRate);
                    System.out.printf("Interest for FD: %.1f", fd.calculateInterest());
                    break;

                case 2:
                    sc.nextLine();
                    String rdName = sc.nextLine();
                    int rdDeposit = sc.nextInt();
                    int rdDuration = sc.nextInt();
                    double rdRate = sc.nextDouble();

                    RecurringDeposit rd = new RecurringDeposit(rdName, rdDeposit,
rdDuration, rdRate);
                    System.out.printf("Interest for RD: %.1f", rd.calculateInterest());
                    break;

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

```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### REC\_2028\_OOPS using Java\_Week 7\_MCQ

Attempt : 1

Total Mark : 15

Marks Obtained : 15

#### Section 1 : MCQ

1. What is the output of the following code?

```
interface A {  
    default void show() {  
        System.out.println("A's Default Method");  
    }  
}
```

```
class B {  
    public void show() {  
        System.out.println("B's Method");  
    }  
}
```

```
class C extends B implements A {  
}
```

```
public class Main {  
    public static void main(String[] args) {  
        C obj = new C();  
        obj.show();  
    }  
}
```

**Answer**

B's Method

**Status : Correct**

**Marks : 1/1**

2. Consider a class implementing an interface and extending a class, both having a method with the same name. Which method gets called?

**Answer**

The method from the superclass

**Status : Correct**

**Marks : 1/1**

3. Which of the following is the correct way to declare an interface in Java?

**Answer**

```
interface Vehicle { void start();}
```

**Status : Correct**

**Marks : 1/1**

4. Which of the following statements is true regarding default methods in Java interfaces?

**Answer**

A default method can be overridden in a class implementing the interface.

**Status : Correct**

**Marks : 1/1**

5. How do you call a static method from an interface MyInterface?

**Answer**

MyInterface.staticMethod();

**Status :** Correct

**Marks :** 1/1

6. What is the output of the following code?

```
interface A {  
    default void show() {  
        System.out.println("A's Default Method");  
    }  
}
```

```
interface B {  
    default void show() {  
        System.out.println("B's Default Method");  
    }  
}
```

```
class C implements A, B {  
    public void show() {  
        A.super.show();  
    }  
}
```

```
public class Main {  
    public static void main(String[] args) {  
        C obj = new C();  
        obj.show();  
    }  
}
```

**Answer**

A's Default Method

**Status :** Correct

**Marks :** 1/1

7. What is the output of the following code?

```
interface A {  
    static void display() {  
        System.out.println("Static method in A");  
    }  
}  
  
class B implements A {  
    static void display() {  
        System.out.println("Static method in B");  
    }  
}  
  
public class Main {  
    public static void main(String[] args) {  
        B.display();  
    }  
}
```

**Answer**

Static method in B

**Status :** Correct

**Marks :** 1/1

8. Can a Java interface contain both default and static methods?

**Answer**

Yes, an interface can have both default and static methods.

**Status :** Correct

**Marks :** 1/1

9. If a class implements two interfaces that have the same default method, what must the class do?

**Answer**

The class must override the method to resolve ambiguity.

**Status :** Correct

**Marks :** 1/1

10. Which of the following statements about Java interfaces is true?

**Answer**

A class can implement multiple interfaces.

**Status : Correct**

**Marks : 1/1**

11. How can a class explicitly call a default method from an interface if there is a naming conflict?

**Answer**

Using InterfaceName.super.methodName();

**Status : Correct**

**Marks : 1/1**

12. What happens when an implementing class does not override a default method from an interface?

**Answer**

The default method's implementation from the interface will be used.

**Status : Correct**

**Marks : 1/1**

13. What is the output of the following code?

```
interface X {  
    default void show() {  
        System.out.println("X's Default Method");  
    }  
}
```

```
interface Y {  
    default void show() {  
        System.out.println("Y's Default Method");  
    }  
}
```

```
class Z implements X, Y {  
    public void show() {  
        System.out.println("Z's Method");  
    }  
}
```

```
public class Main {  
    public static void main(String[] args) {  
        Z obj = new Z();  
        obj.show();  
    }  
}
```

**Answer**

Z's Method

**Status :** Correct

**Marks :** 1/1

14. What is the primary purpose of static methods in Java interfaces?

**Answer**

They allow an interface to provide helper methods without requiring an implementing class.

**Status :** Correct

**Marks :** 1/1

15. What is the output of the following code?

```
interface MathOperations {  
    static int square(int x) {  
        return x * x;  
    }  
}
```

```
public class Main {  
    public static void main(String[] args) {  
        System.out.println(MathOperations.square(5));  
    }  
}
```



}

**Answer**

25

**Status :** Correct

**Marks :** 1/1

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 7\_Q1

Attempt : 1

Total Mark : 10

Marks Obtained : 10

### Section 1 : Coding

#### 1. Problem Statement:

Rajiv is analyzing the energy consumption in his household and wants to calculate the total cost based on the daily energy usage. He is given the rate per unit of electricity and the energy consumed for multiple days. To structure this calculation efficiently, he decides to use an interface-based approach.

Implement an interface CostCalculator with the necessary methods to retrieve energy details and compute the cost. The calculations should be handled in the EnergyConsumptionTracker class, while the EnergyConsumptionApp class should only handle input and output.

Formula

Energy Cost for one day = Energy Consumed per day \* Rate Per Unit

### ***Input Format***

The first line of input consists of the rate per unit as an 'R' (a double value).

The second line of input consists of the number of days 'N' (an integer).

The third line of input consists of the daily energy consumption values for each day 'D' (double values), separated by space.

### ***Output Format***

The first line of the output prints: "Day-wise Energy Cost:"

The next N lines of the output print the day-wise energy costs(double type) and the total energy cost (double type) in Indian Rupees in the following format: "Day [day\_number]: Rs. [energy\_cost]"

The last line of the output prints: "Total Energy Cost: Rs. [total\_cost]"

Note: energy\_cost and total\_cost are rounded off to two decimal points

Refer to the sample output for the formatting specifications.

### ***Sample Test Case***

Input: 0.01

3

10.0 20.0 30.0

Output: Day-wise Energy Cost:

Day 1: Rs. 0.10

Day 2: Rs. 0.20

Day 3: Rs. 0.30

Total Energy Cost: Rs. 0.60

### ***Answer***

```
import java.util.Scanner;
```

```
import java.util.*;
```

```

interface CostCalculator{
    void getEnergyDetails(Scanner sc);
    void calculateAndDisplayCost();
}
class EnergyConsumptionTracker implements CostCalculator{
    double ratePerUnit,totalCost=0;
    int numDays;
    double[] energy;
    EnergyConsumptionTracker(double ratePerUnit,int numDays){
        this.ratePerUnit=ratePerUnit;
        this.numDays=numDays;
        energy=new double[numDays];
    }
    public void getEnergyDetails(Scanner sc){
        for(int i=0;i<numDays;i++) energy[i]=sc.nextDouble();
    }
    public void calculateAndDisplayCost(){
        System.out.print("Day-wise Energy Cost:");
        for(int i=0;i<numDays;i++){
            double cost=energy[i]*ratePerUnit;
            totalCost+=cost;
            System.out.print(" Day " + (i+1) + ": Rs. " + String.format("%.2f", cost));
        }
        System.out.print(" Total Energy Cost: Rs. " + String.format("%.2f", totalCost));
    }
}

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

        double ratePerUnit = scanner.nextDouble();
        int numDays = scanner.nextInt();

        CostCalculator tracker = new EnergyConsumptionTracker(ratePerUnit,
numDays);

        tracker.getEnergyDetails(scanner);
        tracker.calculateAndDisplayCost();

        scanner.close();
    }
}

```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 7\_Q2

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

Jaheer is working on a health monitoring system to help individuals calculate their Body Mass Index (BMI). He has implemented a basic BMI calculator and an interface called HealthCalculator. It should have a method called calculateBMI.

You are tasked with creating a program that takes weight and height as input, calculates the BMI using the BMICalculator class, and displays the result. If the height or weight is less than or equal to zero, then return -1.

Formula:  $BMI = \text{weight} / (\text{height} * \text{height})$

##### ***Input Format***

The first line of input consists of a double value W, the person's weight in kilograms.

The second line consists of a double value H, the height of the person in meters.

### **Output Format**

The output displays "BMI: " followed by a double value, representing the calculated BMI, rounded off to two decimal places.

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 70.0

175

Output: BMI: 22.86

### **Answer**

```
import java.util.Scanner;

import java.util.*;
interface HealthCalculator {
    double calculateBMI(double weight, double height);
}
class BMICalculator implements HealthCalculator {
    public double calculateBMI(double weight, double height) {
        if (weight <= 0 || height <= 0) return -1;
        return weight / (height * height);
    }
}

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

        double weight = scanner.nextDouble();
        double height = scanner.nextDouble();

        BMICalculator bmiCalculator = new BMICalculator();
        double bmi = bmiCalculator.calculateBMI(weight, height);

        System.out.printf("BMI: %.2f\n", bmi);
    }
}
```

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```
    scanner.close();  
  }  
}
```

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**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 7\_Q3

Attempt : 1

Total Mark : 10

Marks Obtained : 10

### Section 1 : Coding

#### 1. Problem Statement

A financial analyst, Alex, needs a program to calculate simple interest for various financial transactions. He requires a straightforward tool that takes in the principal amount, interest rate, and time in years and computes the interest.

The formula to be used is:  $\text{Interest} = \text{Principal} \times \text{Rate} \times \text{Time} / 100$

Implement this functionality using the InterestCalculator interface and the SimpleInterestCalculator class.

#### **Input Format**

The first line of input consists of the principal amount P as a double value.

The second line of input consists of the annual interest rate  $r$  as a double value.

The third line of input consists of the number of years  $t$  as a positive integer, which is an integer value.

### **Output Format**

The output displays the calculated simple interest in the following format: "Simple Interest: [interest\_value]", Here, [interest\_value] should be replaced with the actual interest value calculated by the program.

Refer to the sample output for the formatting specifications.

### **Sample Test Case**

Input: 1000.00

5.00

2

Output: Simple Interest: 100.0

### **Answer**

```
import java.util.Scanner;

interface InterestCalculator {
    double simpleInterest(double principal, double rate, int time);
}

class SimpleInterestCalculator implements InterestCalculator {
    public double simpleInterest(double principal, double rate, int time) {
        return (principal * rate * time) / 100.0;
    }
}

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

        double principal = scanner.nextDouble();

        double rate = scanner.nextDouble();

        int time = scanner.nextInt();
```

```
InterestCalculator calculator = new SimpleInterestCalculator();  
double interest = calculator.simpleInterest(principal, rate, time);  
System.out.println("Simple Interest: " + interest);  
}  
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 7\_Q4

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

Maria, a software developer, is working on an inventory management system project using Java that utilizes an inventory interface to manage a store's products.

The interface should define two methods: `addProduct`, which adds a product by accepting its name, price, and quantity, and `calculateTotalValue`, which computes the total value of all products in the inventory. Implement the interface in a class called `SimpleInventory`, which internally manages a list of `Product` objects.

Each `Product` object should encapsulate the product's name, price, and quantity and include a method to calculate its value as  $\text{price} \times \text{quantity}$ . The system should allow users to dynamically add products to the inventory and calculate the total value of all products stored.

Help Maria achieve the task.

### ***Input Format***

The first line of input consists of an integer to choose one of the following options:

- 1 - to add a product to the inventory.
- 2 - to calculate and view the total inventory value.
- 3 - to exit the program.

For Choice 1 (Add Product):

The next input line is the string representing the product name as a string (single or multi-word, without quotes).

The next line is a double value representing the price as a decimal value

The next line is an integer value representing the quantity as an integer

For Choices 2 and 3, no additional input is required

### ***Output Format***

The output displays the results of the commands as follows:

- For the addProduct command, the program should display "Product added to inventory."
- For choice 2, the program should display "Total inventory value [totalvalue].  
"The total value should be displayed with one decimal place. If there is no product in the inventory, print the total as 0.0.
- For choice 3, the program should exit

If the choice is not 1, 2, or 3, then print "Invalid choice. Please select a valid option (1/2/3).".

Refer to the sample output for the formatting specifications.

### Sample Test Case

Input: 1

Laptop

800.0

3

2

5

3

Output: Product added to inventory.

Total inventory value: \$2400.0

Invalid choice. Please select a valid option (1/2/3).

### Answer

```
import java.util.Scanner;
```

```
import java.util.ArrayList;
```

```
import java.util.Scanner;
```

```
interface Inventory {  
    void addProduct(String name, double price, int quantity);  
    double calculateTotalValue();  
}
```

```
class Product {  
    String name;  
    double price;  
    int quantity;  
    Product(String name, double price, int quantity) {  
        this.name = name;  
        this.price = price;  
        this.quantity = quantity;  
    }  
    double getValue() {  
        return price * quantity;  
    }  
}
```

```
class SimpleInventory implements Inventory {  
    ArrayList<Product> products;  
    SimpleInventory(int capacity) {  
        products = new ArrayList<>();  
    }  
}
```

```

    public void addProduct(String name, double price, int quantity) {
        products.add(new Product(name, price, quantity));
        System.out.println("Product added to inventory.");
    }
    public double calculateTotalValue() {
        double total = 0.0;
        for (Product p : products) total += p.getValue();
        return total;
    }
}

```

```

public class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        Inventory inventory = new SimpleInventory(10);
        while (true) {
            int choice = scanner.nextInt();
            if (choice == 1) {
                scanner.nextLine();
                String productName = scanner.nextLine();
                double price = scanner.nextDouble();
                int quantity = scanner.nextInt();
                inventory.addProduct(productName, price, quantity);
            } else if (choice == 2) {
                double totalValue = inventory.calculateTotalValue();
                System.out.println("Total inventory value: $" + totalValue);
            } else if (choice == 3) {
                break;
            } else {
                System.out.println("Invalid choice. Please select a valid option (1/2/3).");
            }
        }
        scanner.close();
    }
}

```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 7\_Q5

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

Raj is curious about how old he is in the current year.

He has asked you to create a simple program that calculates a person's age based on their birth year. You decide to implement this functionality using the AgeCalculator interface and the HumanAgeCalculator class.

Note: The current year is 2024. Calculate the current age by using the formula: current year - birth year.

##### ***Input Format***

The input consists of an integer representing the birth year.

##### ***Output Format***



The output displays "You are X years old." where X is an integer representing the calculated age based on the entered birth year.

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 1934

Output: You are 90 years old.

### **Answer**

```
import java.util.Scanner;

interface AgeCalculator{
    int calculateAge(int birthYear);
}

class HumanAgeCalculator implements AgeCalculator{
    public int calculateAge(int birthYear){
        return 2024-birthYear;
    }
}

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

        AgeCalculator ageCalculator = new HumanAgeCalculator();

        int birthYear = scanner.nextInt();
        int age = ageCalculator.calculateAge(birthYear);

        System.out.println("You are " + age + " years old.");
    }
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### REC\_2028\_OOPS using Java\_Week 7\_PAH

Attempt : 1  
Total Mark : 40  
Marks Obtained : 40

#### Section 1 : Coding

##### 1. Problem Statement

Develop a program for managing employee information that caters to both full-time and part-time employees. The program should be capable of computing the salary for each category of employee and presenting their particulars. To achieve this, create two classes, FullTimeEmployee and PartTimeEmployee, that adhere to the Employee interface.

The program is expected to accept input data, including the name and monthly salary for full-time employees, as well as the name, hourly rate, and hours worked for part-time employees. Subsequently, it should calculate and exhibit the employee details and their respective salaries.

For Full-Time employees, the annual salary should be calculated as 12 times the monthly salary.

For Part-Time employees, the salary calculation should be based on the formula: hourly rate \* hours worked.

### ***Input Format***

The first line of input should be a string representing the name of a full-time employee.

The second line of input should be an integer representing the monthly salary of the full-time employee.

The third line of input should be a string representing the name of a part-time employee.

The fourth line of input should be an integer representing the hourly rate of the part-time employee.

The fifth line of input should be an integer representing the number of hours worked by the part-time employee.

### ***Output Format***

The output displays the following details:

Full-Time Employee Details:

Name: [Full-Time Employee Name] (string)

Monthly Salary: \$[Monthly Salary] (integer)

Annual Salary: \$[12 times Monthly Salary] (integer)

Part-Time Employee Details:

Name: [Part-Time Employee Name] (string)

Hourly Rate: \$[Hourly Rate] (integer)

Hours Worked: [Hours Worked] hours (integer)

Monthly Salary: \$[Calculated Monthly Salary] (integer)

Refer to the sample output for the formatting specifications.

### **Sample Test Case**

Input: John Smith

15000

Mary Johnson

100

100

Output: Full-Time Employee Details:

Name: John Smith

Monthly Salary: \$15000

Annual Salary: \$180000

Part-Time Employee Details:

Name: Mary Johnson

Hourly Rate: \$100

Hours Worked: 100 hours

Monthly Salary: \$10000

### **Answer**

```
import java.util.Scanner;
```

```
interface Employee {  
    int calculateSalary();  
    void displayDetails();  
}
```

```
class FullTimeEmployee implements Employee {  
    private String name;  
    private int monthlySalary;  
  
    public FullTimeEmployee(String name, int monthlySalary) {
```

```

        this.name = name;
        this.monthlySalary = monthlySalary;
    }

    public int calculateSalary() {
        return monthlySalary;
    }

    public void displayDetails() {
        System.out.println("Full-Time Employee Details:");
        System.out.println("Name: " + name);
        System.out.println("Monthly Salary: $" + monthlySalary);
        System.out.println("Annual Salary: $" + (12 * monthlySalary));
    }
}

class PartTimeEmployee implements Employee {
    private String name;
    private int hourlyRate;
    private int hoursWorked;

    public PartTimeEmployee(String name, int hourlyRate, int hoursWorked) {
        this.name = name;
        this.hourlyRate = hourlyRate;
        this.hoursWorked = hoursWorked;
    }

    public int calculateSalary() {
        return hourlyRate * hoursWorked;
    }

    public void displayDetails() {
        System.out.println("Part-Time Employee Details:");
        System.out.println("Name: " + name);
        System.out.println("Hourly Rate: $" + hourlyRate);
        System.out.println("Hours Worked: " + hoursWorked + " hours");
        System.out.println("Monthly Salary: $" + calculateSalary());
    }
}

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

```

```

Scanner scanner = new Scanner(System.in);
String fullName = scanner.nextLine();
int fullTimeSalary = scanner.nextInt();
scanner.nextLine();
String partTimeName = scanner.nextLine();
int hourlyRate = scanner.nextInt();
int hoursWorked = scanner.nextInt();
FullTimeEmployee fullTimeEmployee = new FullTimeEmployee(fullName,
fullTimeSalary);
PartTimeEmployee partTimeEmployee = new
PartTimeEmployee(partTimeName, hourlyRate, hoursWorked);
fullTimeEmployee.displayDetails();
System.out.println();
partTimeEmployee.displayDetails();
scanner.close();
}
}

```

**Status :** Correct

**Marks :** 10/10

## 2. Problem Statement

Sophia is developing a matrix analysis tool for a data analytics company. The tool needs to analyze square matrices and extract insights from the matrix diagonals.

To organize the code properly, Sophia creates an interface named Matrix that declares a method for finding the smallest and largest elements along the principal and secondary diagonals of the matrix.

Sophia then creates a class named MatrixAnalyzer that implements the Matrix interface. This class provides the logic to process a given square matrix and print:

The smallest and largest elements in the principal diagonal (from top-left to bottom-right). The smallest and largest elements in the secondary diagonal (from top-right to bottom-left).

Your task is to implement the Matrix interface and the MatrixAnalyzer class. The main driver program (in the class Main) will read the input

matrix, create an instance of MatrixAnalyzer, and invoke its method to display the results.

### ***Input Format***

The first line contains an integer n, representing the size of the square matrix.

The next n lines each contain n integers separated by spaces, representing the elements of the matrix.

### ***Output Format***

The output prints the four lines:

"Smallest Element - 1: <smallest element in the principal diagonal>" (integer)

"Largest Element - 1: <largest element in the principal diagonal>" (integer)

"Smallest Element - 2: <smallest element in the secondary diagonal>" (integer)

"Largest Element - 2: <largest element in the secondary diagonal>" (integer)

Refer to the sample output for the formatting specifications.

### ***Sample Test Case***

Input: 5

7 8 9 0 1

2 3 4 5 6

5 4 2 0 8

23 5 6 8 9

12 5 6 7 32

Output: Smallest Element - 1: 2

Largest Element - 1: 32

Smallest Element - 2: 1

Largest Element - 2: 12

### ***Answer***

```
import java.util.Scanner;
```

```
interface Matrix {
```

```

    void diagonalsMinMax(int[][] matrix);
}

class MatrixAnalyzer implements Matrix {
    public void diagonalsMinMax(int[][] matrix) {
        int n = matrix.length;
        int minPrincipal = matrix[0][0];
        int maxPrincipal = matrix[0][0];
        int minSecondary = matrix[0][n - 1];
        int maxSecondary = matrix[0][n - 1];

        for (int i = 0; i < n; i++) {
            if (matrix[i][i] < minPrincipal) minPrincipal = matrix[i][i];
            if (matrix[i][i] > maxPrincipal) maxPrincipal = matrix[i][i];
            if (matrix[i][n - 1 - i] < minSecondary) minSecondary = matrix[i][n - 1 - i];
            if (matrix[i][n - 1 - i] > maxSecondary) maxSecondary = matrix[i][n - 1 - i];
        }

        System.out.println("Smallest Element - 1: " + minPrincipal);
        System.out.println("Largest Element - 1: " + maxPrincipal);
        System.out.println("Smallest Element - 2: " + minSecondary);
        System.out.println("Largest Element - 2: " + maxSecondary);
    }
}

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        int[][] matrix = new int[n][n];
        for (int i = 0; i < n; i++) {
            for (int j = 0; j < n; j++) {
                matrix[i][j] = sc.nextInt();
            }
        }
        MatrixAnalyzer analyzer = new MatrixAnalyzer();
        analyzer.diagonalsMinMax(matrix);
    }
}

```

**Status :** Correct

**Marks :** 10/10



### 3. Problem Statement

Oviya is fascinated by automorphic numbers and wants to create a program to determine whether a given number is an automorphic number or not.

An automorphic number is a number whose square ends with the same digits as the number itself. For example,  $25 = (25)^2 = 625$

Oviya has defined two interfaces: NumberInput for taking user input and AutomorphicChecker for checking if a given number is automorphic. The class AutomorphicNumber implements both interfaces.

Help her complete the task.

#### **Input Format**

The input consists of a single integer n.

#### **Output Format**

If the input number is an automorphic number, print "n is an automorphic number". Otherwise, print "n is not an automorphic number".

Refer to the sample output for formatting specifications.

#### **Sample Test Case**

Input: 25

Output: 25 is an automorphic number

#### **Answer**

```
import java.util.Scanner;
```

```
interface NumberInput {  
    int getInput();  
}
```

```
interface AutomorphicChecker {
```

```

    boolean checkAutomorphic(int num);
}

class AutomorphicNumber implements NumberInput, AutomorphicChecker {
    private int number;

    public int getInput() {
        Scanner scanner = new Scanner(System.in);
        return scanner.nextInt();
    }

    public boolean checkAutomorphic(int num) {
        int square = num * num;
        while (num > 0) {
            if (num % 10 != square % 10)
                return false;
            num = num / 10;
            square = square / 10;
        }
        return true;
    }
}

public class Main {
    public static void main(String[] args) {
        AutomorphicNumber automorphicNumber = new AutomorphicNumber();
        int inputNumber = automorphicNumber.getInput();

        boolean isAutomorphic =
            automorphicNumber.checkAutomorphic(inputNumber);

        if (isAutomorphic) {
            System.out.println(inputNumber+" is an automorphic number");
        } else {
            System.out.println(inputNumber+" is not an automorphic number");
        }
    }
}

```

**Status :** Correct

**Marks :** 10/10

#### 4. Problem Statement:

Alice has been tasked with implementing a simple calculator interface and a corresponding class for performing basic addition and subtraction operations. The task is to create an interface called Calculator with two methods: add and subtract. The add method should take two numbers as input and return their sum, while the subtract method should take two numbers as input and return their difference.

Implement a class called SimpleCalculator that implements the Calculator interface. This class should provide the functionality for adding and subtracting numbers. Write a code that satisfies the above requirements.

##### ***Input Format***

The first line of input consists of a single integer, representing the choice

If the choice is 1 or 2, the next two lines consist of 2 double values, representing the numbers to do addition or subtraction.

##### ***Output Format***

The output prints a float-value with one decimal value representing the sum of two number or difference of two number.

Refer to the sample output for format specification.

##### ***Sample Test Case***

Input: 1

5.5

3.5

Output: Result: 9.0

##### ***Answer***

```
import java.util.Scanner;
```

```
interface Calculator {  
    double add(double num1, double num2);  
    double subtract(double num1, double num2);  
}
```

```
class SimpleCalculator implements Calculator {
    public double add(double num1, double num2) {
        return num1 + num2;
    }
    public double subtract(double num1, double num2) {
        return num1 - num2;
    }
}
```

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

        SimpleCalculator calculator = new SimpleCalculator();

        int choice = scanner.nextInt();

        if (choice == 1) {
            double num1 = scanner.nextDouble();
            double num2 = scanner.nextDouble();
            double result = calculator.add(num1, num2);
            System.out.println("Result: " + result);
        } else if (choice == 2) {
            double num1 = scanner.nextDouble();
            double num2 = scanner.nextDouble();
            double result = calculator.subtract(num1, num2);
            System.out.println("Result: " + result);
        } else {
            System.out.println("Invalid choice. Please choose 1 for addition or 2 for subtraction.");
        }

        scanner.close();
    }
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### REC\_2028\_OOPS using Java\_Week 7\_CY

Attempt : 1

Total Mark : 40

Marks Obtained : 40

### **Section 1 : Coding**

#### **1. Problem Statement:**

Ray is developing a tax calculation program in Java. The program includes an interface named TaxCalculator with a method to calculate tax based on salary. The SimpleTaxCalculator class implements this interface and determines the tax to be paid based on the salary amount using progressive tax slabs.

Your task is to implement this system. The program first takes an integer T representing the number of test cases, followed by T salary values. For each salary, calculate the total tax to be paid based on the following progressive tax rules:

For the first 50,000 of salary, the tax rate is 5%. For the next 50,000 (i.e., from 50,001 to 1,00,000), the tax rate is 10%. For any amount above 1,00,000, the tax rate is 20%. (That is, only the amount above 1,00,000 is

taxed at 20%.)

### Example

Input

3

78000

110000

23000

Output

5300

9500

1150

### Explanation

For Salary Rs. 78,000

$$\text{Tax} = 0.1 * (78,000 - 50,000) + 0.05 * 50,000 = 5,300$$

For Salary Rs. 1,10,000

$$\text{Tax} = 0.2 * (110000 - 100000) + 0.1 * 50,000 + 0.05 * 50,000 = 9,500$$

For Salary Rs. 23,000

$$\text{Tax} = 0.05 * 23,000 = 1,150$$

### ***Input Format***

The first line of the input consists of an integer, T, representing the number of test cases.

The next T lines of the input consist of a single integer, representing the annual salary of an individual, separated by a line.

### ***Output Format***

The output displays the calculated tax as an integer for each test case, separated by a line.

Refer to the sample output for the formatting specifications.

### **Sample Test Case**

Input: 2

100

300

Output: 5

15

### **Answer**

```
import java.util.Scanner;
import java.util.*;
interface TaxCalculator {
    int calculateTax(int salary);
}
class SimpleTaxCalculator implements TaxCalculator {
    public int calculateTax(int salary) {
        int tax = 0;
        if (salary > 100000) {
            tax += (salary - 100000) * 20 / 100;
            salary = 100000;
        }
        if (salary > 50000) {
            tax += (salary - 50000) * 10 / 100;
            salary = 50000;
        }
        tax += salary * 5 / 100;
        return tax;
    }
}
class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        int T = scanner.nextInt();
        TaxCalculator taxCalculator = new SimpleTaxCalculator();
```

```
for (int i = 0; i < T; i++) {  
    int salary = scanner.nextInt();  
    int tax = taxCalculator.calculateTax(salary);  
    System.out.println(tax);  
}  
  
scanner.close();  
}  
}
```

**Status :** Correct

**Marks :** 10/10

## 2. Problem Statement

Jeevan is developing a fitness-tracking application to monitor daily physical activity.

The application incorporates a `FitnessTracker` class that implements two interfaces: `StepCounter` for tracking the number of steps taken and `CalorieCalculator` for estimating total calories burned based on total steps.

Jeevan needs your help creating a program.

### Note

The calorie calculation formula is:  $\text{Total caloriesBurned} = (\text{total steps} / 100.0) * 20.0$ .

### Input Format

The first line of input is an integer  $n$ , representing the number of days Jeevan wants to input data.

The second line consists of space-separated integers, representing the number of steps Jeevan took on each day.

### Output Format

The first line of output prints: "Total Steps: <totalSteps>", where '<totalSteps>' is the sum of steps (integer) taken over ' $n$ ' days.

The second line prints: "Calories Burned: <caloriesBurned>", where



'<caloriesBurned>' is the estimated total calories (double-point number) burned based on the total steps taken rounded off to two decimal places.

Refer to the sample output for the formatting specifications.

### **Sample Test Case**

Input: 3

340 234 987

Output: Total Steps: 1561

Calories Burned: 312.20

### **Answer**

```
import java.util.Scanner;

interface StepCounter {
    void countSteps(int steps);
    int getTotalSteps();
}

interface CalorieCalculator {
    double calculateCaloriesBurned(int totalSteps);
}

class FitnessTracker implements StepCounter, CalorieCalculator {
    private int totalSteps = 0;
    public void countSteps(int steps) { totalSteps += steps; }
    public int getTotalSteps() { return totalSteps; }
    public double calculateCaloriesBurned(int totalSteps) { return (totalSteps /
100.0) * 20.0; }
}

class Main
{

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

        FitnessTracker tracker = new FitnessTracker();

        int n = scanner.nextInt();

        for (int i = 0; i < n; i++) {
```

```

        int steps = scanner.nextInt();
        tracker.countSteps(steps);
    }

    int totalSteps = tracker.getTotalSteps();
    System.out.println("Total Steps: " + totalSteps);

    double caloriesBurned = tracker.calculateCaloriesBurned(totalSteps);
    System.out.printf("Calories Burned: %.2f%n", caloriesBurned);

    scanner.close();
}
}

```

**Status :** Correct

**Marks :** 10/10

### 3. Problem Statement

Alex and Bob are designing a control system for household appliances, and one of the appliances is a washing machine. You want to create a program to help them that models the washing machine as a motor and calculates its electricity consumption based on its capacity.

Define an interface named Motor with the following methods:

```
void run()
double consume(double capacity)
```

Create a class called WashingMachine that implements the Motor interface.

In the WashingMachine class:

Implement the run() method to print "Washing machine is running." Implement a consume() method to print "Washing machine is consuming electricity." Implement the consume(double capacity) method to calculate the electricity consumption (in kWh) of the washing machine based on its capacity. The formula for electricity consumption is (capacity \* 0.05).

#### **Input Format**

The input consists of a double value representing the capacity of the washing

machine in kW.

### **Output Format**

The first line of output prints "Washing machine is running."

The second line prints "Washing machine is consuming electricity."

The third line prints "Electricity consumption: X kWh" where X is a double value, rounded off to two decimal places, representing the electricity consumption.

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 2.5

Output: Washing machine is running.

Washing machine is consuming electricity.

Electricity consumption: 0.13 kWh

### **Answer**

```
import java.util.Scanner;
```

```
interface Motor {  
    void run();  
    void consume();  
    double consume(double capacity);  
}
```

```
class WashingMachine implements Motor {  
    public void run() { System.out.println("Washing machine is running."); }  
    public void consume() { System.out.println("Washing machine is consuming  
electricity."); }  
    public double consume(double capacity) { return capacity * 0.05; }  
}
```

```
public class Main {  
    public static void main(String[] args) {  
        Scanner scanner = new Scanner(System.in);  
  
        WashingMachine washingMachine = new WashingMachine();  
  
        double capacity = scanner.nextDouble();
```

```
washingMachine.run();
washingMachine.consume();

double consumption = washingMachine.consume(capacity);
System.out.printf("Electricity consumption: %.2f kWh", consumption);

scanner.close();
}
}
```

**Status :** Correct

**Marks :** 10/10

#### 4. Problem Statement

John is developing a car loan calculator and has structured his program using two interfaces, Principal and InterestRate, defining methods for principal and interest rate retrieval.

The Loan class implements these interfaces, taking principal and annual interest rates as parameters. User input is solicited for these values, and the program ensures their validity before performing calculations. If input values are invalid (less than or equal to zero), an error message is displayed.

Note: Total interest = principal \* interest rate \* years

##### **Input Format**

The first line of input consists of a double value P, representing the principal.

The second line consists of a double value R, representing the annual interest rate.

The third line consists of an integer value N, representing the loan duration in years.

##### **Output Format**

If the input values are valid, print "Total interest paid: Rs. " followed by a double

value, representing the total interest paid, rounded off to two decimal places.

If the input values are invalid (negative or zero values for principal, annual interest rate, or loan duration), print "Invalid input values!".

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 20000.00

0.05

5

Output: Total interest paid: Rs.5000.00

### **Answer**

```
import java.util.Scanner;

interface Principal {
    double getPrincipal();
}

interface InterestRate {
    double getAnnualInterestRate();
}

class Loan implements Principal, InterestRate {
    private double principal;
    private double interestRate;
    public Loan(double principal, double interestRate) {
        this.principal = principal;
        this.interestRate = interestRate;
    }
    public double getPrincipal() { return principal; }
    public double getAnnualInterestRate() { return interestRate; }
    public double calculateTotalInterest(int years) {
        return principal * interestRate * years;
    }
}

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

```
double carPrice = scanner.nextDouble();

double annualInterestRate = scanner.nextDouble();

int loanDuration = scanner.nextInt();

if (carPrice <= 0 || annualInterestRate <= 0 || loanDuration <= 0) {
    System.out.println("Invalid input values!");
    return;
}

Loan carLoan = new Loan(carPrice, annualInterestRate);
double totalInterest = carLoan.calculateTotalInterest(loanDuration);
System.out.printf("Total interest paid: Rs.%.2f%n", totalInterest);
}
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### REC\_2028\_OOPS using Java\_Week 8\_MCQ

Attempt : 1  
Total Mark : 15  
Marks Obtained : 15

#### Section 1 : MCQ

1. What will be the output for the following code?

```
import java.io.*;

class NegativeAgeException extends Exception {
    public NegativeAgeException(String message) {
        super(message);
    }
}

class Test {
    public static void main(String[] args) {
        try {
            int age = -5;
            if (age < 0) {
                throw new NegativeAgeException("Age cannot be negative");
            }
        }
    }
}
```

```

    }
    } catch (NegativeAgeException e) {
        System.out.println(e.getMessage());
    }
}

```

**Answer**

Age cannot be negative

**Status :** Correct

**Marks :** 1/1

2. What will be the output of the following code?

```

class MyException extends Exception {
    public MyException() {
        super("Default Exception Message");
    }
}

class Test {
    public static void main(String[] args) {
        try {
            throw new MyException();
        } catch (MyException e) {
            System.out.println(e.getMessage());
        }
    }
}

```

**Answer**

Default Exception Message

**Status :** Correct

**Marks :** 1/1

3. What is the purpose of a custom exception in Java?

**Answer**

To create user-defined exceptions for specific scenarios



**Status :** Correct

**Marks :** 1/1

4. What will be the output for the following code?

```
class InvalidUsernameException extends Exception {  
    public InvalidUsernameException(String message) {  
        super(message);  
    }  
}  
  
class Test {  
    public static void main(String[] args) {  
        try {  
            String username = "abc";  
            if (username.length() < 5) {  
                throw new InvalidUsernameException("Username must be at  
least 5 characters long");  
            }  
        } catch (InvalidUsernameException e) {  
            System.out.println(e.getMessage());  
        }  
    }  
}
```

**Answer**

Username must be at least 5 characters long

**Status :** Correct

**Marks :** 1/1

5. What will happen if a checked custom exception is thrown inside a method without being caught or declared?

**Answer**

Compilation Error

**Status :** Correct

**Marks :** 1/1

6. Which keyword is used to explicitly throw a custom exception?

**Answer**

throw

**Status :** Correct

**Marks :** 1/1

7. What will be the output for the following code?

```
class InvalidVotingAgeException extends Exception {  
    public InvalidVotingAgeException(String message) {  
        super(message);  
    }  
}  
  
class Test {  
    public static void main(String[] args) {  
        try {  
            int age = 15;  
            if (age < 18) {  
                throw new InvalidVotingAgeException("You are not eligible to  
vote");  
            }  
            System.out.println("Eligible to vote");  
        } catch (InvalidVotingAgeException e) {  
            System.out.println(e.getMessage());  
        }  
    }  
}
```

**Answer**

You are not eligible to vote

**Status :** Correct

**Marks :** 1/1

8. What will be the output for the following code?

```
import java.io.*;  
  
class UnderageException extends Exception {
```

```

    public UnderageException(String message) {
        super(message);
    }
}

class Test {
    public static void main(String[] args) {
        try {
            int age = 17;
            if (age < 18) {
                throw new UnderageException("Underage, cannot proceed");
            }
        } catch (UnderageException e) {
            System.out.println(e.getMessage());
        }
    }
}

```

**Answer**

Underage, cannot proceed

**Status :** Correct

**Marks :** 1/1

9. What will be the output for the following code?

```

import java.io.*;

class OutOfStockException extends Exception {
    public OutOfStockException(String message) {
        super(message);
    }
}

class Test {
    public static void main(String[] args) {
        try {
            int stock = 0;
            if (stock == 0) {
                throw new OutOfStockException("Item is out of stock");
            }
        }
    }
}

```

```

    }
} catch (OutOfStockException e) {
    System.out.println(e.getMessage());
}
}
}
}

```

**Answer**

Item is out of stock

**Status :** Correct

**Marks :** 1/1

10. How do you create an unchecked custom exception?

**Answer**

By extending RuntimeException

**Status :** Correct

**Marks :** 1/1

11. What will be the output for the following code?

```

class NegativeBalanceException extends Exception {
    public NegativeBalanceException(String message) {
        super(message);
    }
}

```

```

class Test {
    public static void main(String[] args) {
        try {
            double balance = -500;
            if (balance < 0) {
                throw new NegativeBalanceException("Balance cannot be
negative");
            }
        } catch (NegativeBalanceException e) {
            System.out.println("Error: " + e.getMessage());
        }
    }
}

```

**Answer**

Error: Balance cannot be negative

**Status :** Correct

**Marks :** 1/1

12. Which of the following is true about custom exceptions?

**Answer**

Custom exceptions must extend either Exception or RuntimeException

**Status :** Correct

**Marks :** 1/1

13. what is the output of the following code?

```
class MyException extends Exception {  
    public MyException(String message) {  
        super(message);  
    }  
}  
  
class Test {  
    public static void main(String[] args) {  
        try {  
            throw new MyException("Error occurred");  
        } catch (MyException e) {  
            System.out.println(e);  
        }  
    }  
}
```

**Answer**

MyException: Error occurred

**Status :** Correct

**Marks :** 1/1

14. What will be the output for the following code?

```
import java.io.*;

class TemperatureTooHighException extends Exception {
    public TemperatureTooHighException(String message) {
        super(message);
    }
}

class Test {
    public static void main(String[] args) {
        try {
            int temperature = 110;
            if (temperature > 100) {
                throw new TemperatureTooHighException("Temperature too
high");
            }
        } catch (TemperatureTooHighException e) {
            System.out.println(e.getMessage());
        }
    }
}
```

**Answer**

Temperature too high

**Status :** Correct

**Marks :** 1/1

15. what is the output of the following code?

```
class MyException extends Exception {
    public MyException(String message) {
        super(message);
    }
}

class Test {
    static void check() throws MyException {
```

```
        throw new MyException("Custom Exception Occurred");
    }

    public static void main(String[] args) {
        try {
            check();
        } catch (Exception e) {
            System.out.println(e.getMessage());
        }
    }
}
```

**Answer**

Custom Exception Occurred

**Status :** Correct

**Marks :** 1/1

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 8\_Q1

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

Write a program to validate the email address and display suitable exceptions if there is any mistake.

Create 3 custom exception classes as below

DotException AtTheRateException DomainException

A typical email address should have a "." character, and a "@" character, and also the domain name should be valid. Valid domain names for practice be 'in', 'com', 'net', or 'biz'.

Display Invalid Dot usage, Invalid @ usage, or Invalid Domain message based on email id.

Get the email address from the user, validate the email by checking the



above-mentioned criteria, and print the validity status of the input email address.

### ***Input Format***

The first line of input contains the email to be validated.

### ***Output Format***

The output prints a Valid email address or an Invalid email address along with the suitable exception

If email ends with . or contains not exactly one . after @, it throws:

DotException: Invalid Dot usage

Invalid email address

If @ appears not exactly once, it throws:

AtTheRateException: Invalid @ usage

Invalid email address

If the part after the last dot is not among accepted domains:

DomainException: Invalid Domain

Invalid email address

If all conditions satisfied then print:

Valid email address

Refer to the sample input and output for format specifications.

### **Sample Test Case**

Input: sample@gmail.com

Output: Valid email address

### **Answer**

```
import java.util.Scanner;

class DomainException extends Exception {
    String expDescription;
    DomainException(String expDescription) {
        super(expDescription);
    }
}

class DotException extends Exception {
    String expDescription;
    DotException(String expDescription) {
        super(expDescription);
    }
}

class AtTheRateException extends Exception {
    String expDescription;
    AtTheRateException(String expDescription) {
        super(expDescription);
    }
}

class EmailValidationMain {
    public static void main(String[] args) {
        Scanner myObj = new Scanner(System.in);
        String email = myObj.next();
        boolean checkEndDot = false;
        checkEndDot = email.endsWith(".");
        int indexOfAt = email.indexOf('@');
        int lastIndexOfAt = email.lastIndexOf('.');
```

```

int countOfAt = 0;
for (int i = 0; i < email.length(); i++)
{
    if(email.charAt(i)=='@')
        countOfAt++;
}
String buffering = email.substring(email.indexOf('@')+1, email.length());
int len = buffering.length();
int countOfDotAfterAt = 0;
for (int i=0; i < len; i++) {
    if(buffering.charAt(i)=='.')
        countOfDotAfterAt++; }
String userName = email.substring(0, email.indexOf('@'));
String domainName = email.substring(email.indexOf('.')+1, email.length());
int domainCheck=0;
if((domainName.equals("in")) || (domainName.equals("com")) ||
(domainName.equals("net")) || (domainName.equals("biz")))
    domainCheck=1;

try {
    if((checkEndDot) || (countOfDotAfterAt!=1)) {
        throw new DotException("Invalid Dot usage");
    }

    if(countOfAt!=1) {
        throw new AtTheRateException("Invalid @ usage");
    }

    if(domainCheck!=1) {
        throw new DomainException("Invalid Domain");
    }

} catch(DotException e) {
    System.out.println(e);
} catch(AtTheRateException e) {
    System.out.println(e);
} catch(DomainException e) {
    System.out.println(e);
}

if ((countOfAt==1) && (userName.endsWith(".")==false) &&
(domainCheck==1) && (countOfDotAfterAt ==1) &&((indexOfAt+3) <=

```

```
(lastIndexOfAt) && !checkEndDot)) {  
    System.out.println("Valid email address");  
}  
  
    else {  
        System.out.println("Invalid email address");  
    }  
    myObj.close();  
}  
}
```

**Status :** Correct

**Marks :** 10/10

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Degree: B.E - CSE

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 8\_Q2

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

Elsa, a busy professional, is using a scheduling application to plan her meetings efficiently. The application requires users to input meeting durations in minutes, ensuring that the duration is a positive integer and does not exceed 240 minutes (4 hours). Elsa needs a program to assist her in scheduling meetings securely with proper exception handling.

Create a Java class named ElsaMeetingScheduler. Implement a custom exception: InvalidDurationException for invalid meeting duration entries. Implement the main method to interactively take user input for a meeting duration. Implement the validateMeetingDuration method to validate the meeting duration based on the specified rules and throw a custom exception if the validation fails. Print appropriate success or error messages based on the meeting duration.

Implement a custom exception, `InvalidDurationException`, to handle cases where the entered meeting duration does not meet the specified criteria.

### ***Input Format***

The input consists of an integer value 'n', representing the meeting duration.

### ***Output Format***

The output is displayed in the following format:

If the entered meeting duration meets the specified criteria, the program outputs

"Meeting scheduled successfully!"

If the entered meeting duration is invalid, the program outputs an error message indicating the issue.

"Error: Invalid meeting duration. Please enter a positive integer not exceeding 240 minutes (4 hours)."

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 120

Output: Meeting scheduled successfully!

### ***Answer***

```
import java.util.Scanner;
```

```
class InvalidDurationException extends Exception {  
    public InvalidDurationException(String message) {  
        super(message);  
    }  
}
```

```
class MeetingValidator {  
    public void validateMeetingDuration(int duration) throws  
InvalidDurationException {  
        if (duration <= 0 || duration > 240) {
```

```

        throw new InvalidDurationException(
            "Invalid meeting duration. Please enter a positive integer not exceeding
            240 minutes (4 hours).");
    }
}

```

```

class MeetingScheduler {
    private MeetingValidator validator = new MeetingValidator();

    public void scheduleMeeting() {
        Scanner scanner = new Scanner(System.in);

        try {
            int meetingDuration = scanner.nextInt();

            validator.validateMeetingDuration(meetingDuration);

            System.out.println("Meeting scheduled successfully!");
        } catch (InvalidDurationException | java.util.InputMismatchException e) {
            System.out.println("Error: " + e.getMessage());
        }
    }
}

public class Main {
    public static void main(String[] args) {
        MeetingScheduler scheduler = new MeetingScheduler();
        scheduler.scheduleMeeting();
    }
}

```

**Status :** Correct

**Marks :** 10/10

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Scan to verify results



## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 8\_Q3

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

In a user registration system, there is a requirement to implement a username validation module. Users attempting to register must adhere to specific criteria for their usernames to be considered valid.

Your task is to develop a program that takes user input for a desired username and validates it according to the following rules:

The username must not contain any spaces. The username must be at least 5 characters long.

Implement a custom exception, `InvalidUsernameException`, to handle cases where the entered username does not meet the specified criteria.

##### ***Input Format***



The input consists of a string S, representing the desired username.

### **Output Format**

If the username is valid, print "Username is valid: [S]".

If the username is invalid:

1. If the username is short, print "Invalid Username: Username must be at least 5 characters long"
2. If the username contains spaces, print "Invalid Username: Username cannot contain spaces"

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: John

Output: Invalid Username: Username must be at least 5 characters long

### **Answer**

```
import java.util.Scanner;
class InvalidUsernameException extends Exception {
    public InvalidUsernameException(String message) {
        super(message);
    }
}

class UsernameValidator {
    public static void validateUsername(String username) throws
InvalidUsernameException {
        if (username.contains(" ")) {
            throw new InvalidUsernameException("Username cannot contain
spaces");
        }

        if (username.length() < 5) {
            throw new InvalidUsernameException("Username must be at least 5
characters long");
        }
    }
}
```

```
}  
public class Main {  
    public static void main(String[] args) {  
        Scanner scanner = new Scanner(System.in);  
  
        String username = scanner.nextLine();  
  
        try {  
            UsernameValidator.validateUsername(username); // Method call from  
UsernameValidator  
            System.out.println("Username is valid: " + username);  
        } catch (InvalidUsernameException e) {  
            System.out.println("Invalid Username: " + e.getMessage());  
        }  
    }  
}
```

**Status :** Correct

**Marks :** 10/10

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Scan to verify results



## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 8\_Q4

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

A local municipality is implementing an online voting system for a community event and wants to ensure that only eligible voters (those aged 18 or older) can participate.

Your task is to develop a program that validates the age of individuals attempting to vote online. If the user's age is below 18, the program should throw a custom exception, `InvalidAgeException`, preventing them from casting their vote. If the input is invalid, catch the appropriate `InputMismatchException` and print the in-built exception message.

##### ***Input Format***

The input consists of an integer representing the age.

##### ***Output Format***

If the age is 18 or older, print "Eligible to vote"

If the age is below 18, print "Exception occurred: InvalidAgeException: Age is not valid to vote"

If there is any other type of exception, print "An error occurred: " followed by the in-built exception message.

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 20

Output: Eligible to vote

### **Answer**

```
import java.util.Scanner;
class Main {
    static void validate(int age) throws InvalidAgeException {
        if (age < 18) {
            throw new InvalidAgeException("Age is not valid to vote");
        } else {
            System.out.println("Eligible to vote");
        }
    }

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

        try {
            int userAge = scanner.nextInt();

            validate(userAge);
        } catch (InvalidAgeException ex) {
            System.out.println("Exception occurred: " + ex);
        } catch (Exception ex) {
            System.out.println("An error occurred: " + ex);
        } finally {
            scanner.close();
        }
    }
}
```

```
}  
}  
class InvalidAgeException extends Exception {  
    public InvalidAgeException(String str) {  
        super(str);  
    }  
}
```

**Status :** Correct

**Marks : 10/10**

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Scan to verify results



## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 8\_Q5

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

In a file management system, users are required to provide a valid file name when creating new files. The system enforces specific rules for file names to maintain consistency and avoid potential issues. Your task is to implement a Java program named `FileNameValidator` that takes user input for a file name and validates it according to the specified rules.

Rules for Valid File Name:

The file name must consist of alphanumeric characters (letters and digits) only. The file name must have a minimum length of 3 characters.

Implement a custom exception, `FileNameValidator`, to handle cases where the entered filename does not meet the specified criteria.

***Input Format***

The input consists of a string S, representing the desired filename.

### **Output Format**

The output is displayed in the following format:

If the entered file name meets the specified criteria, the program outputs

"Valid file name"

If the entered file name does not meet the criteria and triggers the `InvalidFileNameException`, the program outputs

"Error: Invalid file name. It must be alphanumeric and have a minimum length of 3 characters."

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: myfile123

Output: Valid file name

### **Answer**

```
import java.util.Scanner;
```

```
class InvalidFileNameException extends Exception {  
    public InvalidFileNameException(String message) {  
        super(message);  
    }  
}
```

```
class FileNameValidator {  
    public static void main(String[] args) {  
        Scanner scanner = new Scanner(System.in);  
  
        try {  
            String fileName = scanner.nextLine();  
            validateFileName(fileName);  
        }  
    }  
}
```

```
        System.out.println("Valid file name");
    } catch (InvalidFileNameException e) {

        System.out.println("Error: " + e.getMessage());
    } finally {

        scanner.close();
    }
}

private static void validateFileName(String fileName) throws
InvalidFileNameException {
    if (!fileName.matches("^[a-zA-Z0-9]{3,}$")) {
        throw new InvalidFileNameException("Invalid file name. It must be
        alphanumeric and have a minimum length of 3 characters.");
    }
}
}
```

**Status :** Correct

**Marks : 10/10**



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Scan to verify results



## 2024\_28\_III\_OOPS Using Java Lab

### REC\_2028\_OOPS using Java\_Week 8\_PAH

Attempt : 1  
Total Mark : 40  
Marks Obtained : 40

#### Section 1 : Coding

##### 1. Problem Statement

An HR software system is being developed to process employee payrolls. During payroll processing, the system must ensure that no employee has a negative salary and that no employee's salary exceeds 2,00,000. If either condition occurs, the system should throw a custom exception.

Create a custom exception InvalidSalaryException and a class Employee that processes salary according to the following rules:

If salary < 0, throw InvalidSalaryException with the message: "Salary cannot be negative". If salary > 200000, throw InvalidSalaryException with the message: "Salary exceeds threshold limit". Otherwise, display: "Salary processed successfully for <empName>: <salary>".

The payroll processing should always display: "Payroll process completed"

at the end, regardless of whether an exception occurs.

### ***Input Format***

The first line of input contains an integer representing the employee ID.

The second line contains a string representing the employee's name.

The third line contains a floating-point number representing the salary of the employee.

### ***Output Format***

If the salary is valid: "Salary processed successfully for <empName>: <salary>"

"Payroll process completed"

If the salary is invalid: "<Exception Message>"

"Payroll process completed"

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 101

Rahul

150000.0

Output: Salary processed successfully for Rahul: 150000.0

Payroll process completed

### ***Answer***

```
import java.util.Scanner;
```

```
class InvalidSalaryException extends Exception {  
    public InvalidSalaryException(String message) {  
        super(message);  
    }  
}
```

```
class Employee {
```

```
int empId;  
String empName;  
double salary;
```

```
public Employee(int empId, String empName, double salary) {  
    this.empId = empId;  
    this.empName = empName;  
    this.salary = salary;  
}
```

```
public void processSalary() throws InvalidSalaryException {  
    if (salary < 0) {  
        throw new InvalidSalaryException("Salary cannot be negative");  
    }  
    if (salary > 200000) {  
        throw new InvalidSalaryException("Salary exceeds threshold limit");  
    }  
    System.out.println("Salary processed successfully for " + empName + ": " +  
salary);  
}  
}
```

```
class Main {  
    public static void main(String[] args) {  
        Scanner scanner = new Scanner(System.in);  
        try {  
            int empId = scanner.nextInt();  
            scanner.nextLine();  
            String empName = scanner.nextLine();  
            double salary = scanner.nextDouble();  
            Employee employee = new Employee(empId, empName, salary);  
            try {  
                employee.processSalary();  
            } catch (InvalidSalaryException e) {  
                System.out.println(e.getMessage());  
            }  
        } finally {  
            System.out.println("Payroll process completed");  
            scanner.close();  
        }  
    }  
}
```

**Status :** Correct

**Marks :** 10/10

## 2. Problem Statement

Enigma is developing a simple web application that takes a user-input URL, validates it, and throws a custom exception `InvalidURLException` if the URL does not start with "http://" or "https://".

The main method prompts the user for input, validates the URL, and prints whether it is valid or not.

### *Input Format*

The input consists of a string, representing the URL entered by the user.

### *Output Format*

The output displays one of the following results:

If the entered URL is valid according to the specified format, the program prints:

"[URL] is a valid URL"

If the entered URL is not valid according to the specified format, the program prints:

"Invalid URL format: [URL]"

Refer to the sample output for formatting specifications.

### *Sample Test Case*

Input: `http://www.example.com`

Output: `http://www.example.com is a valid URL`

### *Answer*

```

import java.util.Scanner;
class WebApplication {
    public static void main(String[] args) {
        String userInputURL = getUserInputURL();
        try {
            validateURL(userInputURL);
            System.out.println(userInputURL+" is a valid URL");
        } catch (InvalidURLExceptionFormatException e) {
            System.out.println(e.getMessage()+userInputURL);
        }
    }

    private static String getUserInputURL() {
        Scanner scanner = new Scanner(System.in);
        return scanner.nextLine();
    }

    private static void validateURL(String url) throws InvalidURLExceptionFormatException {
        if (!(url.startsWith("http://") || url.startsWith("https://"))) {
            throw new InvalidURLExceptionFormatException("Invalid URL format: ");
        }
    }
}

class InvalidURLExceptionFormatException extends Exception {
    public InvalidURLExceptionFormatException(String message) {
        super(message);
    }
}

```

**Status :** Correct

**Marks :** 10/10

### 3. Problem Statement

Daniel is developing a program to verify the age of users. He wants to ensure that the entered age is within a valid range. Write a program to help Daniel implement this age-checking feature using custom exceptions.

Daniel needs a program that takes an integer input representing a person's age. If the age is between 0 and 150 (inclusive), the program should print "Age is valid!". If the age is less than 0 or greater than 150, the program

should throw a custom exception (InvalidAgeException) with the message "Invalid age. Please enter an age between 0 and 150."

Implement a custom exception, InvalidAgeException, to handle cases where the entered age does not meet the specified criteria.

### ***Input Format***

The input consists of an integer value 'n', representing the age.

### ***Output Format***

The output is displayed in the following format:

If the age is valid (between 0 and 150, inclusive), print

"Age is valid!".

If the age is invalid, print

"Error: Invalid age. Please enter an age between 0 and 150."

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 45

Output: Age is valid!

### ***Answer***

```
import java.util.Scanner;
class AgeChecker {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        try {
            int age = scanner.nextInt();
            checkAge(age);
            System.out.println("Age is valid!");
        } catch (InvalidAgeException | java.util.InputMismatchException e) {
            System.out.println("Error: " + e.getMessage());
        } finally {
```

```

        scanner.close();
    }
}

private static void checkAge(int age) throws InvalidAgeException {
    if (age < 0 || age > 150) {
        throw new InvalidAgeException("Invalid age. Please enter an age between
0 and 150.");
    }
}
}

class InvalidAgeException extends Exception {
    public InvalidAgeException(String message) {
        super(message);
    }
}
}

```

**Status :** Correct

**Marks :** 10/10

#### 4. Problem Statement

You are tasked to create a program that defines a custom exception GradeException. The program should include a Student class with fields for the student's name, age, and grade. Implement a method in the Student class that checks the grade, and if the grade is below 40, it should throw a GradeException. Otherwise, it should display the student's details.

##### **Input Format**

The input consists of three parameters in separate lines:

1. A string representing the student's name.
2. An integer representing the student's age.
3. An integer representing the student's grade.

##### **Output Format**

The output will display the student's details if the grade is valid.

If the grade is below 40, the program will display an error message "Grade is below 40".

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: Alice

20

85

Output: Name: Alice

Age: 20

Grade: 85

### **Answer**

```
import java.util.Scanner;
class GradeException extends Exception {
    GradeException(String message) {
        System.out.println(message);
    }
}

class Student {
    String name;
    int age;
    int grade;

    Student(String studentName, int studentAge, int studentGrade) {
        name = studentName;
        age = studentAge;
        grade = studentGrade;
    }

    void validateGrade() throws GradeException {
        if (grade < 40) {
            throw new GradeException("Grade is below 40");
        }
    }

    void displayDetails() {
        System.out.println("Name: " + name);
        System.out.println("Age: " + age);
        System.out.println("Grade: " + grade);
    }
}
```



```
}  
}  
public class Main {  
    public static void main(String[] args) {  
        try {  
            java.util.Scanner scanner = new java.util.Scanner(System.in);  
            String studentName = scanner.nextLine();  
            int studentAge = scanner.nextInt();  
            int studentGrade = scanner.nextInt();  
            Student student = new Student(studentName, studentAge, studentGrade);  
            student.validateGrade();  
            student.displayDetails();  
            scanner.close();  
        } catch (GradeException e) {  
        }  
    }  
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### REC\_2028\_OOPS using Java\_Week 8\_CY

Attempt : 1  
Total Mark : 40  
Marks Obtained : 40

#### Section 1 : Coding

##### 1. Problem Statement

Theo is trying to update his payment information on a subscription-based streaming service. To proceed, the system requires Theo to provide a valid credit card number consisting of 16 digits. However, Theo wants to make sure that the credit card number he enters meets the specified criteria with proper exception handling.

The credit card number must consist of exactly 16 digits. If the entered credit card number does not meet the specified criteria, the program should throw a custom exception, `InvalidCreditCardException`, and provide Theo with specific error messages: If the length of the credit card number is not 16 digits, the exception message should be: "Invalid credit card number length." If the credit card number contains non-numeric characters, the exception message should be: "Invalid credit card number format."

Implement a custom exception, InvalidCreditCardException, to fulfill Theo's requirements and keep his payment information secure.

### ***Input Format***

The input consists of a string value 's', consisting of the 16-digit credit card number.

### ***Output Format***

The output is displayed in the following format:

If the entered credit card number is valid, the program should output a success message:

"Payment information updated successfully!"

If the entered credit card has more than 16 digits or less than 16 digits it displays

"Error: Invalid credit card number length."

If the entered 16-digit credit card has non-integers it displays

"Error: Invalid credit card number format."

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 1234567890123456

Output: Payment information updated successfully!

### ***Answer***

```
import java.util.Scanner;
```

```
class InvalidCreditCardException extends Exception {  
    public InvalidCreditCardException(String message) {  
        super(message);  
    }  
}
```

```

class CreditCardValidator {
    public void validateCreditCardNumber(String creditCardNumber) throws
InvalidCreditCardException {
        if (!creditCardNumber.matches("^\\d{16}$")) {
            if (creditCardNumber.length() != 16) {
                throw new InvalidCreditCardException("Invalid credit card number
length.");
            } else {
                throw new InvalidCreditCardException("Invalid credit card number
format.");
            }
        }
    }
}

class CreditCardUpdater {
    private CreditCardValidator validator = new CreditCardValidator();

    public void updateCreditCard() {
        Scanner scanner = new Scanner(System.in);
        try {
            String creditCardNumber = scanner.nextLine();

            validator.validateCreditCardNumber(creditCardNumber);

            System.out.println("Payment information updated successfully!");
        } catch (InvalidCreditCardException | java.util.InputMismatchException e) {
            System.out.println("Error: " + e.getMessage());
        } finally {
            scanner.close();
        }
    }
}

public class Main {
    public static void main(String[] args) {
        CreditCardUpdater updater = new CreditCardUpdater();
        updater.updateCreditCard();
    }
}

```

**Status :** Correct

**Marks :** 10/10

## 2. Problem Statement

Hemanth is designing a banking system for XYZ Bank. The system should allow customers to perform deposit, withdrawal, and balance inquiry operations. Implement exception handling for scenarios involving invalid transaction amounts or insufficient funds.

Create two custom exception classes, `InvalidAmountException` and `InsufficientFundsException`, both extending the `Exception` class. Throw an `InvalidAmountException` with a message if the deposit amount is less than or equal to zero. Throw an `InsufficientFundsException` if the withdrawal amount is greater than the available balance. Deduct the withdrawal amount from the balance if the withdrawal is successful.

Assist Hemanth in designing the program.

### ***Input Format***

The first line of input consists of a double value `B`, representing the initial balance.

The second line consists of a double value `D`, representing the deposit amount.

The third line consists of a double value `W`, representing the withdrawal amount.

### ***Output Format***

If the withdrawal is successful, print the amount withdrawn and the current balance, rounded off to one decimal place.

If an `InvalidAmountException` occurs, print "Error: `[D]` is not valid".

If an `InsufficientFundsException` occurs, print "Error: Insufficient funds".

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 1050.1  
270.2  
150.3

Output: Amount Withdrawn: 150.3  
Current Balance: 1170.0

**Answer**

```
import java.util.Scanner;

class InvalidAmountException extends Exception {
    public InvalidAmountException(String message) {
        super(message);
    }
}

class InsufficientFundsException extends Exception {
    public InsufficientFundsException(String message) {
        super(message);
    }
}

class HDFCBank {
    private double balance;

    public static void main(String[] args) {
        HDFCBank hdfcBank = new HDFCBank();
        hdfcBank.processTransactions();
    }

    public void processTransactions() {
        Scanner scanner = new Scanner(System.in);

        try {
            balance = scanner.nextDouble();
            double depositAmount = scanner.nextDouble();
            deposit(depositAmount);

            double withdrawAmount = scanner.nextDouble();
            double withdrawnAmount = withdraw(withdrawAmount);

            System.out.printf("Amount Withdrawn: %.1f\n", withdrawnAmount);
            balanceEnquiry();
        } catch (InvalidAmountException | InsufficientFundsException e) {
            System.out.println("Error: " + e.getMessage());
        } finally {
```

```

        scanner.close();
    }
}

public void deposit(double amount) throws InvalidAmountException {
    if (amount <= 0) {
        throw new InvalidAmountException(amount + " is not valid");
    }
    balance = balance + amount;
}

public double withdraw(double amount) throws InsufficientFundsException {
    if (balance < amount) {
        throw new InsufficientFundsException("Insufficient funds");
    }
    balance = balance - amount;
    return amount;
}

public void balanceEnquiry() {
    System.out.printf("Current Balance: %.1f\n", balance);
}
}

```

**Status :** Correct

**Marks :** 10/10

### 3. Problem Statement

Camila, a user of a social media platform, is looking to change her password to enhance account security. The platform enforces specific rules for password strength to ensure the safety of user accounts. Camila needs a program that prompts her to enter a new password and throws custom exceptions based on the strength of the password.

Password Strength Criteria:

Weak Password:

Length less than 8 characters.

Medium Password:

Length 8 or more characters. Missing a mix of uppercase letters, lowercase

letters, and digits.

Implement a custom exception, to assist Camila in changing her password securely. The program should interactively take user input for a new password, categorize its strength, and handle custom exceptions (`WeakPasswordException` and `MediumPasswordException`) if the password fails to meet the specified criteria.

### ***Input Format***

The input consists of a string `s`, representing the new password.

### ***Output Format***

The output is displayed in the following format:

If the entered password meets the strength criteria, the program outputs

"Password changed successfully!"

If the entered password is weak, the program outputs

"Error: Weak password. It must be at least 8 characters long."

If the entered password is of medium strength, the program outputs

"Error: Medium password. It must include a mix of uppercase letters, lowercase letters, and digits."

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: `ComplexP@ss1`

Output: Password changed successfully!

### ***Answer***

```
import java.util.Scanner;
```

```
// Custom Exception for Weak Password
class WeakPasswordException extends Exception {
```



```
    public WeakPasswordException(String message) {  
        super(message);  
    }  
}
```

```
// Custom Exception for Medium Password  
class MediumPasswordException extends Exception {  
    public MediumPasswordException(String message) {  
        super(message);  
    }  
}
```

```
class PasswordChangeSystem {  
    public static void main(String[] args) {  
        Scanner scanner = new Scanner(System.in);  
  
        try {  
            // Get user input for a new password  
            String newPassword = scanner.nextLine();  
  
            // Change the password and categorize its strength  
            categorizePassword(newPassword);  

```

```
            System.out.println("Password changed successfully!");  
        } catch (WeakPasswordException | MediumPasswordException e) {  
            // Catch and handle the custom exceptions  
            System.out.println("Error: " + e.getMessage());  
        } finally {  
            // Close the scanner  
            scanner.close();  
        }  
    }  
}
```

```
// Method to categorize password into Weak or Medium  
private static void categorizePassword(String newPassword) throws  
WeakPasswordException, MediumPasswordException {  
    // Check for password strength requirements  
    if (newPassword.length() < 8) {  
        throw new WeakPasswordException("Weak password. It must be at least  
8 characters long.");  
    } else if (!containsUppercase(newPassword) || !
```

```

containsLowercase(newPassword) || !containsDigit(newPassword)) {
    throw new MediumPasswordException("Medium password. It must
    include a mix of uppercase letters, lowercase letters, and digits.");
}
}

// Helper method to check if the password contains uppercase letters
private static boolean containsUppercase(String password) {
    return !password.equals(password.toLowerCase());
}

// Helper method to check if the password contains lowercase letters
private static boolean containsLowercase(String password) {
    return !password.equals(password.toUpperCase());
}

// Helper method to check if the password contains at least one digit
private static boolean containsDigit(String password) {
    for (char c : password.toCharArray()) {
        if (Character.isDigit(c)) {
            return true;
        }
    }
    return false;
}
}

```

**Status :** Correct

**Marks :** 10/10

#### 4. Problem Statement

A company is developing a user registration system that requires users to provide valid email addresses. The development team is implementing an EmailValidator program to ensure that the entered email addresses meet certain criteria using exception handling.

The email address must contain the "@" symbol. The email address must consist of a non-empty username (before "@" symbol) and a non-empty domain (after "@" symbol). The domain part of the email address must contain at least one period ("."). The email address must not contain

leading or trailing spaces.

Implement a custom exception, `InvalidEmailException`, to fulfill the company's requirements and validate it according to the specified rules.

### ***Input Format***

The input consists of a string value 's', which represents the email address.

### ***Output Format***

The output is displayed in the following format:

If the entered email address is valid according to the specified rules, the program prints:

"Email address is valid!"

If the entered email address misses the username or domain part or misses "@" symbol or has two or more "@" symbols or misses '.' in the domain part it outputs:

"Error: Invalid email format."

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: johndoe@example.com

Output: Email address is valid!

### ***Answer***

```
import java.util.Scanner;
class EmailValidator {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        try {
            String emailAddress = scanner.nextLine();
            validateEmailAddress(emailAddress);
            System.out.println("Email address is valid!");
        } catch (InvalidEmailException | java.util.InputMismatchException e) {
```

```

        System.out.println("Error: " + e.getMessage());
    } finally {
        scanner.close();
    }
}

private static void validateEmailAddress(String emailAddress) throws
InvalidEmailException {
    if (!emailAddress.contains("@")) {
        throw new InvalidEmailException("Invalid email format. ");
    }

    String[] parts = emailAddress.split("@");
    if (parts.length != 2 || parts[0].isEmpty() || parts[1].isEmpty() || !
parts[1].contains(".")) {
        throw new InvalidEmailException("Invalid email format. ");
    }
}

class InvalidEmailException extends Exception {
    public InvalidEmailException(String message) {
        super(message);
    }
}

```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### REC\_2028\_OOPS using Java\_Week 9\_MCQ

Attempt : 1

Total Mark : 15

Marks Obtained : 15

#### Section 1 : MCQ

1. What will be the output of the following code?

```
import java.util.*;
class Main {
    public static void main(String[] args) {
        ArrayList<String> list = new ArrayList<>();
        list.add("apple");
        list.add("banana");
        list.add("cherry");
        list.add("banana");
        System.out.println(list.lastIndexOf("banana"));
    }
}
```

Answer

3

**Status :** Correct

**Marks :** 1/1

2. What will be the output of the following code?

```
import java.util.ArrayList;

public class Main {
    public static void main(String[] args) {
        ArrayList<String> list = new ArrayList<>();
        list.add("Apple");
        list.add("Banana");
        list.remove("Apple");
        System.out.println(list);
    }
}
```

**Answer**

[Banana]

**Status :** Correct

**Marks :** 1/1

3. What will be the output of the following code?

```
import java.util.*;
public class Main {
    public static void main(String[] args) {
        Stack<Integer> stack = new Stack<>();
        for (int i = 1; i <= 3; i++)
            stack.push(i * 2);
        stack.pop();
        stack.push(10);
        System.out.println(stack.peek());
    }
}
```

**Answer**

10

**Status :** Correct

**Marks :** 1/1

4. How can you access the first element of an ArrayList named as list?

**Answer**

list.get(0);

**Status :** Correct

**Marks :** 1/1

5. What will be the output of the following code?

```
import java.util.*;
class Main {
    public static void main(String[] args) {
        ArrayList<Integer> list = new ArrayList<>();
        list.add(1);
        list.add(2);
        list.add(3);
        list.add(4);
        list.set(2, 10);
        System.out.println(list);
    }
}
```

**Answer**

[1, 2, 10, 4]

**Status :** Correct

**Marks :** 1/1

6. What will be the output of the following code?

```
import java.util.*;
class Main {
    public static void main(String[] args) {
        ArrayList<String> list = new ArrayList<>();
        list.add("Java");
        list.add("Python");
        list.add("Java");
    }
}
```

```
list.add("C++");  
System.out.println(list.indexOf("Java"));  
}  
}
```

**Answer**

0

**Status :** Correct

**Marks :** 1/1

7. What will be the output of the following code?

```
import java.util.*;  
class Main {  
    public static void main(String[] args) {  
        ArrayList<Integer> list = new ArrayList<>();  
        list.add(10);  
        list.add(20);  
        list.add(30);  
        list.remove(1);  
        System.out.println(list);  
    }  
}
```

**Answer**

[10, 30]

**Status :** Correct

**Marks :** 1/1

8. What will be the output of the following code?

```
import java.util.*;  
class Main {  
    public static void main(String[] args) {  
        ArrayList<Integer> list = new ArrayList<>();  
        list.add(1);  
        list.add(2);  
        list.add(3);  
        list.add(4);  
    }  
}
```



```
list.add(5);
System.out.println(list.get(3));
}
}
```

**Answer**

4

**Status :** Correct

**Marks :** 1/1

9. What is the correct way to create an ArrayList in Java?

**Answer**

```
ArrayList<String> list = new ArrayList<>();
```

**Status :** Correct

**Marks :** 1/1

10. What will be the output of the following code?

```
import java.util.*;
public class Main {
    public static void main(String[] args) {
        Stack<Integer> s = new Stack<>();
        s.push(10);
        s.push(20);
        s.push(30);
        System.out.println(s.peek());
    }
}
```

**Answer**

30

**Status :** Correct

**Marks :** 1/1

11. Which of the following methods removes and returns the last element from a LinkedList?

**Answer**

`removeLast()`

**Status : Correct**

**Marks : 1/1**

12. Which method is used to add an element to the top of the stack?

**Answer**

`push()`

**Status : Correct**

**Marks : 1/1**

13. What does the `addFirst()` method of `LinkedList` do?

**Answer**

Adds an element to the beginning of the list

**Status : Correct**

**Marks : 1/1**

14. What is Collection in Java?

**Answer**

A group of objects

**Status : Correct**

**Marks : 1/1**

15. What will be the output of the following code?

```
import java.util.ArrayList;
```

```
public class Main {  
    public static void main(String[] args) {  
        ArrayList<Integer> list = new ArrayList<>();  
        list.add(10);  
        list.add(20);  
        list.add(30);  
        System.out.println("Size of the list: " + list.size());  
    }  
}
```

}  
}

**Answer**

Size of the list: 3

**Status :** Correct

**Marks : 1/1**

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 9\_Q1

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

Bobby is tasked with processing a sequence of numbers from a monitoring system. He needs to extract a strictly increasing subsequence using an ArrayList. The program should dynamically add numbers to the ArrayList only if they are greater than the last number currently stored in the list. Bobby aims to efficiently utilize the dynamic resizing and indexing features of the ArrayList to solve this problem.

Help Bobby implement this solution.

##### ***Input Format***

The first line of input consists of an integer N, representing the number of elements.

The second line consists of N space-separated integers, representing the elements.

### **Output Format**

The output prints the list of integers in increasing sequence, ignoring out-of-order elements.

Refer to the sample output for the formatting specifications.

### **Sample Test Case**

Input: 7

3 5 9 1 11 7 13

Output: [3, 5, 9, 11, 13]

### **Answer**

```
import java.util.ArrayList;
import java.util.Scanner;
```

```
class NumberProcessor {
    private ArrayList<Integer> numList;

    public NumberProcessor(ArrayList<Integer> numList) {
        this.numList = numList;
    }

    public void processNumbers() {
        ArrayList<Integer> filteredList = new ArrayList<>();
        for (int num : numList) {
            if (filteredList.isEmpty() || num > filteredList.get(filteredList.size() - 1)) {
                filteredList.add(num);
            }
        }
        System.out.println(filteredList);
    }
}

public class Main {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        int number_of_elements = input.nextInt();
```

```
    if (number_of_elements <= 0) {  
        return;  
    }  
  
    ArrayList<Integer> numList = new ArrayList<>();  
    for (int ctr = 0; ctr < number_of_elements; ctr++) {  
        numList.add(input.nextInt());  
    }  
  
    NumberProcessor processor = new NumberProcessor(numList);  
    processor.processNumbers();  
}  
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 9\_Q2

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

Vikram loves listening to music and wants to create a simple playlist manager using Java Collections. The playlist supports the following operations:

"ADD <song>" Adds the song to the end of the playlist. "REMOVE <song>" Removes the first occurrence of the song from the playlist. If the song is not found, do nothing. "SHOW" Displays all songs in the playlist in order. If the playlist is empty, print "EMPTY". "NEXT" Moves to the next song in the playlist and prints its name. If the playlist is empty, print "EMPTY".

The playlist maintains a "current song" position that starts at the first song when it's added. The NEXT command moves to the next song and prints it, wrapping around to the first song after reaching the last song. When removing songs, the current position adjusts accordingly to maintain

proper navigation.

Help Vikram implement this playlist manager.

### ***Input Format***

The first line of the input consists of an integer n, the number of operations.

The next n lines, each containing a command:

- "ADD <song>"
- "REMOVE <song>"
- "SHOW"
- "NEXT"

### ***Output Format***

For each "SHOW" command, print the songs in order, separated by spaces.

For each "NEXT" command, print the next song in the playlist.

If no song exists, print "EMPTY".

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 7

ADD song1

ADD song2

SHOW

NEXT

REMOVE song2

SHOW

NEXT

Output: song1 song2

song2

song1

song1

### ***Answer***



```
import java.util.*;
class Playlist {
    private LinkedList<String> playlist;
    private int currentIndex;

    public Playlist() {
        playlist = new LinkedList<>();
        currentIndex = -1;
    }

    public void addSong(String song) {
        playlist.add(song);
        if (currentIndex == -1) {
            currentIndex = 0;
        }
    }

    public void removeSong(String song) {
        int idx = playlist.indexOf(song);
        if (idx != -1) {
            playlist.remove(idx);
            if (playlist.isEmpty()) {
                currentIndex = -1;
            } else if (idx <= currentIndex && currentIndex > 0) {
                currentIndex--;
            }
        }
    }

    public void showPlaylist() {
        if (playlist.isEmpty()) {
            System.out.println("EMPTY");
        } else {
            for (String s : playlist) {
                System.out.print(s + " ");
            }
            System.out.println();
        }
    }

    public void nextSong() {
        if (playlist.isEmpty()) {
            return;
        }
        if (currentIndex < playlist.size() - 1) {
            currentIndex++;
        }
    }
}
```

```

        System.out.println("EMPTY");
    } else {
        currentIndex++;
        if (currentIndex >= playlist.size()) {
            currentIndex = 0;
        }
        System.out.println(playlist.get(currentIndex));
    }
}
}

class PlaylistManager {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int n = Integer.parseInt(sc.nextLine());

        Playlist playlist = new Playlist();

        for (int i = 0; i < n; i++) {
            String command = sc.nextLine();

            if (command.startsWith("ADD ")) {
                String song = command.substring(4);
                playlist.addSong(song);
            } else if (command.startsWith("REMOVE ")) {
                String song = command.substring(7);
                playlist.removeSong(song);
            } else if (command.equals("SHOW")) {
                playlist.showPlaylist();
            } else if (command.equals("NEXT")) {
                playlist.nextSong();
            }
        }

        sc.close();
    }
}

```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 9\_Q3

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

Assist Pranitha in developing a program that takes an integer N as input, representing the number of names to be read. Then read N names and store them in an ArrayList. Finally, input a search string and output the frequency of that string in the list of names.

Note: Some parts of the code are provided as snippets, and you need to complete the remaining sections by writing the necessary code.

##### ***Input Format***

The first line of input consists of an integer N, representing the number of names to be read.

The following N lines consist of N names, as a string.

The last line consists of a string, representing the name to be searched.

### **Output Format**

The output prints a single integer, representing the frequency of the specified name in the given list.

If the specified name is not found, print 0.

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 5

Alice

Bob

Ankit

Alice

Pranitha

Alice

Output: 2

### **Answer**

```
import java.util.ArrayList;
```

```
import java.util.List;
```

```
import java.util.Scanner;
```

```
public class Main {
```

```
    public static void main(String[] args) {  
        Scanner sc = new Scanner(System.in);  
        int n = sc.nextInt();  
        sc.nextLine();
```

```
        List<String> names = new ArrayList<>();  
        for (int i = 0; i < n; i++) {  
            names.add(sc.nextLine());  
        }
```

```
        String search = sc.nextLine();
```

```
int count = 0;
for (String name : names) {
    if (name.equals(search)) {
        count++;
    }
}

System.out.println(count);
sc.close();
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### REC\_2028\_OOPS using Java\_Week 9\_PAH

Attempt : 1  
Total Mark : 30  
Marks Obtained : 30

#### Section 1 : Coding

##### 1. Problem Statement

Arun is building a task manager to keep track of tasks using a LinkedList. The task manager supports the following operations:

"ADD <task>" Adds the given task to the end of the list. "REMOVE" Removes the first task from the list. "SHOW" Displays all tasks in the list in order. If the list is empty, print "EMPTY".

Help Arun implement this functionality using a LinkedList.

##### ***Input Format***

The first line of the input consists of an integer n, the number of operations.

The next n lines, each containing a command:

- "ADD <task>"
- "REMOVE"
- "SHOW"

### **Output Format**

For each "SHOW" command, the output prints the tasks in order, separated by spaces.

If no tasks exist, print "EMPTY".

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 5

ADD homework

ADD project

SHOW

REMOVE

SHOW

Output: homework project

project

### **Answer**

```
import java.util.*;
```

```
class TaskManager {
```

```
    public static void main(String[] args) {  
        Scanner sc = new Scanner(System.in);  
        int n = sc.nextInt();  
        LinkedList<String> tasks;  
        sc.nextLine();  
        tasks = new LinkedList<>();
```

```
        for (int i = 0; i < n; i++) {  
            String command = sc.nextLine();
```

```
            if (command.startsWith("ADD")) {  
                String task = command.substring(4);
```

```

        tasks.add(task);
    } else if (command.equals("REMOVE")) {
        if (!tasks.isEmpty()) {
            tasks.removeFirst();
        }
    } else if (command.equals("SHOW")) {
        if (tasks.isEmpty()) {
            System.out.println("EMPTY");
        } else {
            System.out.println(String.join(" ", tasks));
        }
    }
}
}
}
sc.close();
}
}
}

```

**Status :** Correct

**Marks :** 10/10

## 2. Problem Statement

Aditi is analyzing stock market trends and wants to find the Next Greater Element (NGE) for each stock price in a list. The Next Greater Element for an element  $x$  in an array is the first element to the right that is greater than  $x$ . If no greater element exists, return -1 for that position.

Your task is to help Aditi by efficiently computing the Next Greater Element for each element in the given array using a Stack.

Example:

Input:

6

4 5 2 10 8 6

Output:

5 10 10 -1 -1 -1



Explanation:

For each element:

4 5 (next greater element)5 102 1010 -1 (No greater element)8 -16 -1

### ***Input Format***

The first line contains an integer n, representing the number of elements.

The second line contains n space-separated integers arr[i], where arr[i] is the stock price on the i-th day.

### ***Output Format***

The output prints n space-separated integers representing the Next Greater Element for each element in the array.

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 6

4 5 2 10 8 6

Output: 5 10 10 -1 -1 -1

### ***Answer***

```
import java.util.*;

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        int[] arr = new int[n];
        for (int i = 0; i < n; i++) {
            arr[i] = sc.nextInt();
        }
        sc.close();

        int[] nge = new int[n];
        Stack<Integer> stack = new Stack<>();
```

```

for (int i = n - 1; i >= 0; i--) {
    while (!stack.isEmpty() && stack.peek() <= arr[i]) {
        stack.pop();
    }
    nge[i] = stack.isEmpty() ? -1 : stack.peek();
    stack.push(arr[i]);
}

for (int i = 0; i < n; i++) {
    System.out.print(nge[i] + " ");
}
}

```

**Status :** Correct

**Marks :** 10/10

### 3. Problem Statement

Rekha is a teacher who wants to calculate the average of marks scored by her students in a test. She needs to store all the marks dynamically because the number of students may vary each time. Using an ArrayList allows her to easily add any number of marks without worrying about the initial size.

Help her implement the task.

#### **Input Format**

The first line of input is an integer  $n$ , representing the number of students..

The second line of input consists of  $n$  double values, representing the marks of each student, separated by a space.

#### **Output Format**

The output prints: "Average of the list: " followed by the average value formatted to two decimal places.

Refer to the sample output for the formatting specifications.

### Sample Test Case

Input: 5

1.0 2.0 3.0 4.0 5.0

Output: Average of the list: 3.00

### Answer

```
import java.util.ArrayList;
```

```
import java.util.List;
```

```
import java.util.Scanner;
```

```
class AverageCalculator {
```

```
    private List<Double> numbers;
```

```
    public AverageCalculator() {
```

```
        numbers = new ArrayList<>();
```

```
    }
```

```
    public void addNumber(double num) {
```

```
        numbers.add(num);
```

```
    }
```

```
    public double calculateAverage() {
```

```
        double sum = 0;
```

```
        for (double num : numbers) {
```

```
            sum += num;
```

```
        }
```

```
        return sum / numbers.size();
```

```
    }
```

```
}
```

```
class Main {
```

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

```
        Scanner input = new Scanner(System.in);
```

```
        int n = input.nextInt();
```

```
        AverageCalculator calculator = new AverageCalculator();
```

```
        for (int i = 0; i < n; i++) {
```

```
            double num = input.nextDouble();
```

```
            calculator.addNumber(num);
```

```
        }
```

```
double average = calculator.calculateAverage();
System.out.println("Average of the list: " + String.format("%.2f", average));

    input.close();
}
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### REC\_2028\_OOPS using Java\_Week 9\_CY

Attempt : 1  
Total Mark : 40  
Marks Obtained : 40

#### Section 1 : Coding

##### 1. Problem Statement

Rahul is working on a list manipulation problem where he needs to reverse a specific subarray using a stack. Given an array and two indices  $l$  and  $r$ , he wants to reverse only the portion of the array from index  $l$  to  $r$  (both inclusive) while keeping the rest of the array unchanged.

Since Rahul wants to solve this problem efficiently, he decides to use a stack to reverse the subarray in  $O(r - l)$  time.

Your task is to help Rahul by implementing this functionality.

##### ***Input Format***

The first line contains an integer  $n$ , the size of the array.

The second line contains n space-separated integers arr[i].

The third line contains two integers l and r, denoting the start and end indices of the subarray to reverse.

Note: The array follows 0-based indexing.

### **Output Format**

The output prints the modified array after reversing the subarray between indices l and r.

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 6

1 2 3 4 5 6

1 4

Output: 1 5 4 3 2 6

### **Answer**

```
import java.util.*;
```

```
public class Main {
```

```
    public static void main(String[] args) {  
        Scanner sc = new Scanner(System.in);  
        int n = sc.nextInt();  
        int[] arr = new int[n];
```

```
        for (int i = 0; i < n; i++) {  
            arr[i] = sc.nextInt();  
        }
```

```
        int l = sc.nextInt();  
        int r = sc.nextInt();  
        sc.close();
```

```
        Stack<Integer> stack = new Stack<>();
```

```
for (int i = l; i <= r; i++) {  
    stack.push(arr[i]);  
}  
  
for (int i = l; i <= r; i++) {  
    arr[i] = stack.pop();  
}  
  
for (int i = 0; i < n; i++) {  
    System.out.print(arr[i] + " ");  
}  
}  
}
```

**Status :** Correct

**Marks :** 10/10

## 2. Problem Statement

Sarah, a warehouse manager, is managing a list of product names in her store's inventory system. She needs to perform basic operations like adding (inserting) new products, removing products that are sold out or discontinued, displaying all the products in stock, and searching for a specific product in the inventory list.

Sarah's goal is to manage the inventory using a list of product names (strings). The system allows her to perform the following operations using ArrayList:

**Insert a Product:** Sarah adds a new product to the inventory.  
**Delete a Product:** Sarah removes a product from the inventory when it's sold or discontinued.  
**Display the Inventory:** Sarah checks all the products currently available in the inventory.  
**Search for a Product:** Sarah searches for a specific product in the inventory to check if it's available.

### **Input Format**

The input consists of multiple space-separated values representing different operations on a product list. Each operation follows a specific format:

1 <product\_name> - Adds <product\_name> to the product list.

2 <product\_name> - Removes <product\_name> from the product list if it exists.

3 - Print all products currently on the list.

4 <product\_name> - Checks if <product\_name> exists in the list.

### **Output Format**

The output displays,

For (choice 1) prints, " <item> has been added to the list."

For (choice 2) prints, " <item> has been removed from the list."

For (choice 3) prints, "Items in the list:" followed by each item in the list on a new line, or "The list is empty." if the list is empty.

For (choice 4) prints, " <item> is found in the list." or " <item> not found in the list."

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 1 apple 1 banana 2 apple 3 4 apple

Output: apple has been added to the list.

banana has been added to the list.

apple has been removed from the list.

Items in the list:

banana

apple not found in the list.

### **Answer**

```
import java.util.ArrayList;  
import java.util.Scanner;
```

```
class StringListOperations {  
    public static void insertItem(ArrayList<String> list, String item) {
```



```

        list.add(item);
        System.out.println(item + " has been added to the list.");
    }

    public static void deleteItem(ArrayList<String> list, String item) {
        if (list.contains(item)) {
            list.remove(item);
            System.out.println(item + " has been removed from the list.");
        } else {
            System.out.println(item + " not found in the list.");
        }
    }

    public static void displayList(ArrayList<String> list) {
        if (list.isEmpty()) {
            System.out.println("The list is empty.");
        } else {
            System.out.println("Items in the list:");
            for (String item : list) {
                System.out.println(item);
            }
        }
    }

    public static void searchItem(ArrayList<String> list, String item) {
        if (list.contains(item)) {
            System.out.println(item + " is found in the list.");
        } else {
            System.out.println(item + " not found in the list.");
        }
    }
}

```

```

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        ArrayList<String> list = new ArrayList<>();

        String input = sc.nextLine();
        String[] commands = input.split(" ");
    }
}

```

```

int i = 0;
while (i < commands.length) {
    int choice = Integer.parseInt(commands[i]);
    switch (choice) {
        case 1:
            if (i + 1 < commands.length) {
                StringListOperations.insertItem(list, commands[i + 1]);
                i += 2;
            } else {
                System.out.println("No string provided for insertion.");
                i++;
            }
            break;
        case 2:
            if (i + 1 < commands.length) {
                StringListOperations.deleteItem(list, commands[i + 1]);
                i += 2;
            } else {
                System.out.println("No string provided for deletion.");
                i++;
            }
            break;
        case 3:
            StringListOperations.displayList(list);
            i += 1;
            break;
        case 4:
            if (i + 1 < commands.length) {
                StringListOperations.searchItem(list, commands[i + 1]);
                i += 2;
            } else {
                System.out.println("No string provided for searching.");
                i++;
            }
            break;
    }
}
}
}
}

```

**Status :** Correct

**Marks :** 10/10

### 3. Problem Statement

Mesa, a store manager, needs a program to manage inventory items. Define a class ItemType with private attributes for name, deposit, and cost per day. Create an ArrayList in the Main class to store ItemType objects, allowing input and display.

Note: Use "%-20s%-20s%-20s" for formatting output in tabular format, display double values with 1 decimal place.

#### ***Input Format***

The first line of input consists of an integer n, representing the number of items.

For each of the n items, there are three lines:

1. The name of the item (a string)
2. The deposit amount (a double value)
3. The cost per day (a double value)

#### ***Output Format***

The output prints a formatted table with columns for name, deposit and cost per day.

Refer to the sample output for formatting specifications.

#### ***Sample Test Case***

Input: 3  
Laptop  
10000.0  
250.0  
Light  
1000.0  
50.0  
Fan  
1000.0  
100.0

Output: Name

Deposit

Cost Per Day

Laptop	10000.0	250.0
Light	1000.0	50.0
Fan	1000.0	100.0

### Answer

```
import java.util.ArrayList;
import java.util.List;
import java.util.Scanner;

class ItemType {
    private String name;
    private Double deposit;
    private Double costPerDay;

    public String toString() {
        return String.format("%-20s%-20s%-20s", name, deposit, costPerDay);
    }

    public ItemType(String name, Double deposit, Double costPerDay) {
        super();
        this.name = name;
        this.deposit = deposit;
        this.costPerDay = costPerDay;
    }
}

class ArrayListObjectMain {
    public static void main(String args[]) {
        List<ItemType> items = new ArrayList<>();
        Scanner sc = new Scanner(System.in);
        int n = Integer.parseInt(sc.nextLine());

        for (int i = 0; i < n; i++) {
            String name = sc.nextLine();
            Double deposit = Double.parseDouble(sc.nextLine());
            Double costPerDay = Double.parseDouble(sc.nextLine());
            items.add(new ItemType(name, deposit, costPerDay));
        }
        System.out.format("%-20s%-20s%-20s", "Name", "Deposit", "Cost Per Day");
        System.out.println();

        for (ItemType item : items) {
            System.out.println(item);
        }
    }
}
```

**Status :** Correct

**Marks :** 10/10

#### 4. Problem Statement

Sanjay is working on a program to merge two sorted linked lists into a single sorted list using Java's LinkedList class from the Collections framework. Given two sorted linked lists, he wants to merge them while maintaining the sorted order.

Write a Java program that:

Reads two sorted linked lists. Merges them into a single sorted linked list. Prints the merged list in ascending order.

##### **Input Format**

The first line contains an integer  $m$  (the size of the first linked list).

The second line contains  $m$  space-separated integers (sorted).

The third line contains an integer  $n$  (the size of the second linked list).

The fourth line contains  $n$  space-separated integers (sorted).

##### **Output Format**

The output prints the merged linked list as space-separated integers.

Refer to the sample output for formatting specifications.

##### **Sample Test Case**

Input: 2

5 10

3

1 3 8

Output: 1 3 5 8 10

**Answer**

```
import java.util.*;
class MergeSortedList {

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

        int m = sc.nextInt();
        LinkedList<Integer> list1 = new LinkedList<>();
        for (int i = 0; i < m; i++) {
            list1.add(sc.nextInt());
        }

        int n = sc.nextInt();
        LinkedList<Integer> list2 = new LinkedList<>();
        for (int i = 0; i < n; i++) {
            list2.add(sc.nextInt());
        }

        list1.addAll(list2); // Merge the two lists
        Collections.sort(list1); // Sort the combined list

        for (int num : list1) {
            System.out.print(num + " ");
        }

        sc.close();
    }
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### REC\_2028\_OOPS using Java\_Week 10\_MCQ

Attempt : 1  
Total Mark : 15  
Marks Obtained : 15

#### Section 1 : MCQ

1. What will happen if you add a null element to a TreeSet?

**Answer**

An exception occurs

**Status : Correct**

**Marks : 1/1**

2. Which of the following allows null keys in Java?

**Answer**

HashMap

**Status : Correct**

**Marks : 1/1**

3. What happens when you add duplicate elements to a HashSet?

**Answer**

The duplicate is ignored

**Status : Correct**

**Marks : 1/1**

4. What is the time complexity of retrieving an element from a HashSet?

**Answer**

O(1)

**Status : Correct**

**Marks : 1/1**

5. What will be the output of the following code?

```
import java.util.*;
class Main {
    public static void main(String[] args) {
        HashMap<String, Integer> map = new HashMap<>();
        map.put("A", 1);
        map.put("B", 2);
        map.put("C", 3);
        System.out.println(map.containsKey("B"));
    }
}
```

**Answer**

true

**Status : Correct**

**Marks : 1/1**

6. What will happen if you add elements in descending order in a TreeSet?

**Answer**

They are sorted in ascending order

**Status : Correct**

**Marks : 1/1**



7. Which of the following is true about HashMap?

**Answer**

It is not synchronized

**Status : Correct**

**Marks : 1/1**

8. How does HashSet check for duplicate elements?

**Answer**

Using equals() and hashCode()

**Status : Correct**

**Marks : 1/1**

9. What will be the output of the following code?

```
import java.util.*;
class Main {
    public static void main(String[] args) {
        HashMap<String, String> map = new HashMap<>();
        map.put("A", "Apple");
        map.put("B", "Banana");
        map.put("C", "Cherry");
        map.replace("B", "Blueberry");
        System.out.println(map);
    }
}
```

**Answer**

{A=Apple, B=Blueberry, C=Cherry}

**Status : Correct**

**Marks : 1/1**

10. What happens if two keys have the same hash code in a HashMap?

**Answer**

A linked list is used to store values with the same hash

**Status :** Correct

**Marks :** 1/1

11. Which statement is true about HashSet and TreeSet?

**Answer**

TreeSet provides sorted elements

**Status :** Correct

**Marks :** 1/1

12. Which method removes all elements from a Set?

**Answer**

clear()

**Status :** Correct

**Marks :** 1/1

13. What will be the output of the following code?

```
import java.util.*;
class Main {
    public static void main(String[] args) {
        HashMap<String, Integer> map = new HashMap<>();
        map.put("X", 10);
        map.put("Y", 20);
        map.put("Z", 30);
        map.remove("Y");
        System.out.println(map);
    }
}
```

**Answer**

{X=10, Z=30}

**Status :** Correct

**Marks :** 1/1

14. Which of the following is true about TreeMap?

**Answer**

It maintains natural ordering

**Status :** Correct

**Marks :** 1/1

15. Which method retrieves the lowest key in a TreeMap?

**Answer**

firstKey()

**Status :** Correct

**Marks :** 1/1

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 10\_Q1

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : COD

##### 1. Problem Statement

A city traffic management system needs to track vehicles entering a toll booth. Each vehicle is uniquely identified by its registration number. The system should allow adding vehicles to a record, ensuring that no duplicate registration numbers exist. The vehicles should be stored in a HashSet, which does not guarantee any specific order.

Your task is to implement a program using a HashSet that allows adding vehicle details and displaying the records.

##### ***Input Format***

The first line of input contains an integer N - the number of vehicles.

The next N lines contain details of each vehicle in the format: "RegNumber

OwnerName VehicleType"

1. RegNumber (String) - A unique registration number (Alphanumeric).
2. OwnerName (String) - The name of the vehicle owner.
3. VehicleType (String, Car, Bike, or Truck) - The type of vehicle.

If a vehicle with the same registration number is already present, ignore the duplicate entry.

### **Output Format**

The output prints the unique vehicle records in any order (since HashSet does not maintain order).

Output format: "RegNumber OwnerName VehicleType"

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 5

KA01AB1234 John Car

MH02CD5678 Alice Bike

DL03EF9012 Bob Truck

TN04GH3456 Mike Car

KA01AB1234 John Car

Output: TN04GH3456 Mike Car

KA01AB1234 John Car

MH02CD5678 Alice Bike

DL03EF9012 Bob Truck

### **Answer**

```
import java.util.*;
class Vehicle {
    String regNumber;
    String ownerName;
    String vehicleType;
    private static HashSet<Vehicle> vehicleSet = new HashSet<>();
    public Vehicle(String regNumber, String ownerName, String vehicleType) {
        this.regNumber = regNumber;
        this.ownerName = ownerName;
```

```

        this.vehicleType = vehicleType;
    }
    public static void addVehicle(String regNumber, String ownerName, String
vehicleType) {
        vehicleSet.add(new Vehicle(regNumber, ownerName, vehicleType));
    }
    public static void displayVehicles() {
        for (Vehicle v : vehicleSet) {
            System.out.println(v);
        }
    }
    public boolean equals(Object obj) {
        if (this == obj) return true;
        if (obj == null || getClass() != obj.getClass()) return false;
        Vehicle vehicle = (Vehicle) obj;
        return regNumber.equals(vehicle.regNumber);
    }
    public int hashCode() {
        return Objects.hash(regNumber);
    }
    public String toString() {
        return regNumber + " " + ownerName + " " + vehicleType;
    }
}class TollBoothSystem {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        sc.nextLine();
        for (int i = 0; i < n; i++) {
            String regNumber = sc.next();
            String ownerName = sc.next();
            String vehicleType = sc.next();
            Vehicle.addVehicle(regNumber, ownerName, vehicleType);
        }
        Vehicle.displayVehicles();
        sc.close();
    }
}

```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 10\_Q2

Attempt : 1

Total Mark : 10

Marks Obtained : 10

#### Section 1 : COD

##### 1. Problem Statement

John is organizing a fruit festival, and the quantities of various fruits are stored in a HashMap where fruit names are keys and quantities are values.

Help him develop a program to find the total quantity of fruits for the festival by summing up the values in the HashMap.

##### ***Input Format***

The input consists of fruit quantities in the format 'fruitName:quantity', where fruitName is the name of the fruit(a string), and quantity is a double value representing the quantity.

The input is terminated by entering "done".

##### ***Output Format***

The output prints a double value, representing the sum of values in the HashMap, rounded off to two decimal places.

If the value is not numeric, print "Invalid input".

If any special characters other than ':' are entered, print "Invalid format".

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: Banana:15.2

Orange:56.3

Mango:47.3

done

Output: 118.80

### **Answer**

```
import java.util.Scanner;
import java.util.Map;
import java.util.HashMap;
class ValueProcessor {
    public static Map<String, Double> readValues(Scanner scanner) {
        Map<String, Double> valueMap = new HashMap<>();
        while (true) {
            String input = scanner.nextLine();
            if (input.toLowerCase().equals("done")) {
                break;
            }
            String[] pair = input.split(":");
            if (pair.length == 2) {
                String key = pair[0].trim();
                try {
                    double value = Double.parseDouble(pair[1].trim());
                    valueMap.put(key, value);
                } catch (NumberFormatException e) {
                    System.out.println("Invalid input");
                    return null;
                }
            } else {
```



```

        System.out.println("Invalid format");
        return null;
    }
}
return valueMap;
}

public static double calculateSum(Map<String, Double> valueMap) {
    double sum = 0;
    for (double value : valueMap.values()) {
        sum += value;
    }
    return sum;
}
}

class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        Map<String, Double> valueMap = ValueProcessor.readValues(scanner);
        if (valueMap != null) {
            double sum = ValueProcessor.calculateSum(valueMap);
            System.out.printf("%.2f\n", sum);
        }
        scanner.close();
    }
}

```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 10\_Q3

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : COD

##### 1. Problem Statement

Priya is analyzing encrypted messages in a research project. She wants to analyze the frequency of each character in a given paragraph. The characters should be stored in a TreeMap so that the output is sorted in ascending order of characters automatically.

You are required to build a Java program that:

Uses a `TreeMap<Character, Integer>` to count how many times each character appears in the message. Ignores spaces and considers only alphabets (case-sensitive). Outputs the frequencies of characters in sorted order.

You must use a TreeMap in the class named MessageAnalyzer.

**Input Format**

The first line of input contains an integer n, the number of lines in the message.

The next n lines each contain a string (the encrypted message line).

### **Output Format**

The first line of output prints: "Character Frequency:"

Then print each character and its frequency in the format: "<character>: <count>"

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 2  
Hello World  
Java

Output: Character Frequency:

H: 1

J: 1

W: 1

a: 2

d: 1

e: 1

l: 3

o: 2

r: 1

v: 1

### **Answer**

```
import java.util.*;
class MessageAnalyzer {
    public void analyzeMessageFrequency(List<String> lines) {
        TreeMap<Character, Integer> frequencyMap = new TreeMap<>();

        for (String line : lines) {
            for (char ch : line.toCharArray()) {
                if (Character.isLetter(ch)) {
                    frequencyMap.put(ch, frequencyMap.getDefault(ch, 0) + 1);
                }
            }
        }
    }
}
```

```

    }
    System.out.println("Character Frequency:");
    for (Map.Entry<Character, Integer> entry : frequencyMap.entrySet()) {
        System.out.println(entry.getKey() + ": " + entry.getValue());
    }
}
}
public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int n = Integer.parseInt(sc.nextLine());
        List<String> lines = new ArrayList<>();
        for (int i = 0; i < n; i++) {
            lines.add(sc.nextLine());
        }

        MessageAnalyzer analyzer = new MessageAnalyzer();
        analyzer.analyzeMessageFrequency(lines);
    }
}

```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 10\_Q4

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : COD

##### 1. Problem Statement

In a ticket reservation system, you store the available seat numbers in a TreeSet. Users input their desired seat number, and the program checks whether the chosen seat is available.

Using a TreeSet ensures quick and efficient verification of seat availability, ensuring a smooth and organized ticket booking process.

##### ***Input Format***

The first line of input contains a single integer  $n$ , representing the number of available seats.

The second line contains  $n$  space-separated integers, representing the available seat numbers.

The third line contains an integer  $m$ , representing the seat number that needs to be searched.

### **Output Format**

The output displays "[ $m$ ] is present!" if the given seat is available. Otherwise, it displays "[ $m$ ] is not present!"

Refer to the sample output for the formatting specifications.

### **Sample Test Case**

Input: 4

2 4 5 6

5

Output: 5 is present!

### **Answer**

```
import java.util.Set;
import java.util.TreeSet;
import java.util.Scanner;
class NumberChecker {
    private Set<Integer> numberSet;

    public NumberChecker(Set<Integer> numberSet) {
        this.numberSet = numberSet;
    }

    public void addNumbers(int[] numbers) {
        for (int number : numbers) {
            numberSet.add(number);
        }
    }

    public String checkNumber(int number) {
        return numberSet.contains(number) ? number + " is present!" : number + " is not present!";
    }
}
class Main {
    public static void main(String[] args) {
```

```
Scanner scanner = new Scanner(System.in);
int numberOfElements = scanner.nextInt();
int[] numbers = new int[numberOfElements];

for (int i = 0; i < numberOfElements; i++) {
    numbers[i] = scanner.nextInt();
}

int elementToCheck = scanner.nextInt();
scanner.close();

Set<Integer> numberSet = new TreeSet<>();
NumberChecker numberChecker = new NumberChecker(numberSet);
numberChecker.addNumbers(numbers);

System.out.println(numberChecker.checkNumber(elementToCheck));
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### REC\_2028\_OOPS using Java\_Week 10\_PAH

Attempt : 1

Total Mark : 30

Marks Obtained : 30

### Section 1 : Coding

#### 1. Problem Statement

A university maintains a list of student records and wants to store them in a sorted manner based on their GPA. If two students have the same GPA, they should be further sorted by their name in lexicographical order. Implement a program that uses a TreeSet to store student records and ensures unique student IDs.

#### ***Input Format***

The first line contains an integer N - the number of students.

The next N lines contain details of each student in the format: "StudentID Name GPA"

- StudentID (Integer) - A unique identifier.
- Name (String) - The student's name (can contain spaces).



- GPA (Double) - The Grade Point Average.

### **Output Format**

The output prints the list of students in ascending order of GPA.

If two students have the same GPA, sort them by name.

Print details in the format: "StudentID Name GPA" in the output, GPA is rounded to two decimal places.

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 5

101 John 8.5

102 Alice 9.1

103 Bob 8.5

104 Zoe 7.3

105 Charlie 9.1

Output: 104 Zoe 7.30

103 Bob 8.50

101 John 8.50

102 Alice 9.10

105 Charlie 9.10

### **Answer**

```
import java.util.*;
class Student implements Comparable<Student> {
    int studentID;
    String name;
    double gpa;

    public Student(int studentID, String name, double gpa) {
        this.studentID = studentID;
        this.name = name;
        this.gpa = gpa;
    }

    public int compareTo(Student other) {
```

```

        if (this.gpa != other.gpa) {
            return Double.compare(this.gpa, other.gpa);
        }
        return this.name.compareTo(other.name);
    }

    public String toString() {
        return studentID + " " + name + " " + String.format("%.2f", gpa);
    }
}

class UniversityRecords {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        sc.nextLine();
        TreeSet<Student> studentSet = new TreeSet<>();
        for (int i = 0; i < n; i++) {
            int id = sc.nextInt();
            String name = sc.next();
            double gpa = sc.nextDouble();
            studentSet.add(new Student(id, name, gpa));
        }
        for (Student s : studentSet) {
            System.out.println(s);
        }
        sc.close();
    }
}

```

**Status :** Correct

**Marks :** 10/10

## 2. Problem Statement

Riya is building a calendar event scheduler where each event is stored in chronological order using a TreeMap. The key represents the event time in 24-hour format (HH:MM), and the value is the event description.

She wants the system to:

Automatically sort events by time. Avoid duplicate time entries — if a duplicate time is entered, ignore the new entry. Print all scheduled events in

order.

Implement this logic using a class named EventManager.

### ***Input Format***

The first line of the input contains an integer n, representing the number of events.

The next n lines each contain a string in the format: "HH:MM Description"

(Example: 09:00 TeamMeeting).

### ***Output Format***

The first line of the output prints "Scheduled Events:"

The next k lines print each event in the format: "HH:MM - Description"

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 5

09:00 TeamMeeting

13:30 LunchBreak

11:00 ProjectUpdate

09:00 Standup

15:00 ClientCall

Output: Scheduled Events:

09:00 - TeamMeeting

11:00 - ProjectUpdate

13:30 - LunchBreak

15:00 - ClientCall

### ***Answer***

```
import java.util.*;
class EventManager {
    TreeMap<String, String> schedule;
    public EventManager() {
```

```

    schedule = new TreeMap<>();
}

public void addEvent(String time, String description) {
    if (!schedule.containsKey(time)) {
        schedule.put(time, description);
    }
}

public void printSchedule() {
    System.out.println("Scheduled Events:");
    for (Map.Entry<String, String> entry : schedule.entrySet()) {
        System.out.println(entry.getKey() + " - " + entry.getValue());
    }
}

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int n = Integer.parseInt(sc.nextLine());

        EventManager manager = new EventManager();

        for (int i = 0; i < n; i++) {
            String line = sc.nextLine();
            int spaceIndex = line.indexOf(' ');
            String time = line.substring(0, spaceIndex);
            String desc = line.substring(spaceIndex + 1);
            manager.addEvent(time, desc);
        }

        manager.printSchedule();
    }
}

```

**Status :** Correct

**Marks :** 10/10

### 3. Problem Statement

Sarah is working on a spam detection system that analyzes incoming messages for unique patterns. Spammers often use repetitive character

sequences, making it important to identify the first non-repeating character in a message.

Given a string, Sarah needs to determine the first character that appears only once. If all characters repeat, the system should return -1.

She decides to use a HashMap to efficiently track character frequencies and find the solution.

### ***Input Format***

The first line contains an integer N representing , the length of the string.

The second line contains a string of N lowercase English letters (a-z).

### ***Output Format***

The output prints a character representing the first non-repeating character. If none exist, print -1.

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 10  
abacabadac

Output: d

### ***Answer***

```
import java.util.*;
class NonRepeatingCharacterFinder {

    public char findFirstNonRepeatingCharacter(String str) {
        HashMap<Character, Integer> charCount = new HashMap<>();

        for (char ch : str.toCharArray()) {
            charCount.put(ch, charCount.getOrDefault(ch, 0) + 1);
        }

        for (char ch : str.toCharArray()) {
```

```

        if (charCount.get(ch) == 1) {
            return ch;
        }
    }

    return '\0';
}

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

        int N = sc.nextInt();
        String str = sc.next();

        NonRepeatingCharacterFinder finder = new NonRepeatingCharacterFinder();
        char result = finder.findFirstNonRepeatingCharacter(str);

        if (result == '\0') {
            System.out.println(-1);
        } else {
            System.out.println(result);
        }

        sc.close();
    }
}

```

**Status :** Correct

**Marks :** 10/10

# Rajalakshmi Engineering College

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Scan to verify results



## 2024\_28\_III\_OOPS Using Java Lab

### REC\_2028\_OOPS using Java\_Week 10\_CY

Attempt : 1  
Total Mark : 40  
Marks Obtained : 40

#### Section 1 : COD

##### 1. Problem Statement

A college professor wants to keep track of students who attend classes. Each student has a unique roll number and their attendance count increases every time they attend a class. The system should allow adding a student, marking their attendance, and displaying all students with their total attendance.

Your task is to implement a Java program using TreeSet to maintain students in sorted order of roll numbers and track their attendance count.

Operations:

A roll\_no name Add a student with roll number and name (if not already added).M roll\_no Mark attendance for the student with the given roll number (increase their count by 1).D Display all students in ascending order of roll number along with their attendance count.

### ***Input Format***

The first line contains an integer N - the number of students.

The next N lines contain one of the following commands:

A roll\_no name

M roll\_no

D

- A (Add) Adds a new student with a unique roll number and name.
- M (Mark) Increases attendance count for the given roll number.
- D (Display) Prints all students in ascending order of roll number.

### ***Output Format***

For D, output prints each student's roll number, name, and attendance count in ascending order of roll number.

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 5

A 101 Alice

A 102 Bob

M 101

M 101

D

Output: 101 Alice 2

102 Bob 0

### ***Answer***

```
import java.util.*;
class Student implements Comparable<Student> {
    int rollNo;
    String name;
    int attendance;
```



```
public Student(int rollNo, String name) {  
    this.rollNo = rollNo;  
    this.name = name;  
    this.attendance = 0;  
}
```

```
public void markAttendance() {  
    this.attendance++;  
}
```

```
public int compareTo(Student s) {  
    return Integer.compare(this.rollNo, s.rollNo);  
}
```

```
public boolean equals(Object obj) {  
    if (this == obj) return true;  
    if (obj == null || getClass() != obj.getClass()) return false;  
    Student student = (Student) obj;  
    return rollNo == student.rollNo;  
}
```

```
public int hashCode() {  
    return Objects.hash(rollNo);  
}
```

```
public String toString() {  
    return rollNo + " " + name + " " + attendance;  
}
```

```
class AttendanceTracker {  
    public static void main(String[] args) {  
        Scanner sc = new Scanner(System.in);  
        int n = sc.nextInt();  
        sc.nextLine();  
        TreeSet<Student> students = new TreeSet<>();  
        for (int i = 0; i < n; i++) {  
            String[] command = sc.nextLine().split(" ");  
            String operation = command[0];  
  
            if (operation.equals("A")) {  
                int rollNo = Integer.parseInt(command[1]);
```

```

        String name = command[2];
        students.add(new Student(rollNo, name));
    }
    else if (operation.equals("M")) {
        int rollNo = Integer.parseInt(command[1]);
        for (Student s : students) {
            if (s.rollNo == rollNo) {
                s.markAttendance();
                break;
            }
        }
    }
    else if (operation.equals("D")) {
        for (Student s : students) {
            System.out.println(s);
        }
    }
}
sc.close();
}
}

```

**Status :** Correct

**Marks :** 10/10

## 2. Problem Statement

A linguist named Meera is classifying a list of words based on their first character. She wants to store words grouped by their starting letter using a `TreeMap` so that the groups appear in sorted order of characters (i.e., 'a' to 'z'). For each letter, all words starting with that letter should be stored in the order they appear.

Implement the logic inside a class named `WordClassifier` using the `TreeMap<Character, List<String>>` collection.

### **Input Format**

The first line of the input contains an integer `n`, representing the number of words.

The next `n` lines each contain a word.

### **Output Format**

The first line of the output prints: "Grouped Words by Starting Letter:"

The next lines print each character key and its list of words in the format:

"letter: word1 word2 word3..."

..."

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 5

dog

deer

cat

cow

camel

Output: Grouped Words by Starting Letter:

c: cat cow camel

d: dog deer

### **Answer**

```
import java.util.*;
```

```
class WordClassifier {  
    public void classifyWords(List<String> words) {  
        TreeMap<Character, List<String>> map = new TreeMap<>();
```

```
        for (String word : words) {  
            char initial = word.charAt(0);  
            if (!map.containsKey(initial)) {  
                map.put(initial, new ArrayList<>());  
            }  
            map.get(initial).add(word);  
        }  
    }  
}
```

```
System.out.println("Grouped Words by Starting Letter:");  
for (Map.Entry<Character, List<String>> entry : map.entrySet()) {
```

```

        System.out.print(entry.getKey() + ": ");
        for (String word : entry.getValue()) {
            System.out.print(word + " ");
        }
        System.out.println();
    }
}

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int n = Integer.parseInt(sc.nextLine());

        List<String> words = new ArrayList<>();
        for (int i = 0; i < n; i++) {
            words.add(sc.nextLine());
        }

        WordClassifier classifier = new WordClassifier();
        classifier.classifyWords(words);
    }
}

```

**Status :** Correct

**Marks :** 10/10

### 3. Problem Statement

David is managing an employee database where each employee has a unique ID, name, and department. He wants to ensure that duplicate employee IDs are not added to the system. Implement a Java program that allows adding employees to the system, displaying all employees, and checking if an employee exists based on the given ID.

Implement a class `EmployeeDatabase` that contains a `HashSet` to store employee records. The `Employee` class should be a user-defined object containing employee details. The main class should handle user operations and interact with the `EmployeeDatabase` class.

**Input Format**

The first line contains an integer  $n$  representing the number of employees to be added.

The next  $n$  lines follow, each containing:

1. An integer `employee_id`
2. A string `name`
3. A string `department`

The next line contains an integer  $m$  representing the number of queries.

The next  $m$  lines follow, each containing an employee ID to check for existence.

### **Output Format**

The output prints a list of all employees added in the format:

"ID: <employee\_id>, Name: <name>, Department: <department>"

For each query, output "Employee exists" if the ID is found, otherwise "Employee not found".

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 3

101 John IT

102 Alice HR

103 Bob Finance

2

101

104

Output: ID: 101, Name: John, Department: IT

ID: 102, Name: Alice, Department: HR

ID: 103, Name: Bob, Department: Finance

Employee exists

Employee not found

### **Answer**

```
import java.util.*;
```

```
class Employee {
    int employeeId;
    String name, department;

    public Employee(int employeeId, String name, String department) {
        this.employeeId = employeeId;
        this.name = name;
        this.department = department;
    }

    public int hashCode() {
        return Objects.hash(employeeId);
    }

    public boolean equals(Object obj) {
        if (this == obj) return true;
        if (obj == null || getClass() != obj.getClass()) return false;
        Employee e = (Employee) obj;
        return this.employeeId == e.employeeId;
    }

    public String toString() {
        return "ID: " + employeeId + ", Name: " + name + ", Department: " +
        department;
    }
}
```

```
class EmployeeDatabase {
    HashSet<Employee> employees = new HashSet<>();

    public void addEmployee(int id, String name, String department) {
        employees.add(new Employee(id, name, department));
    }

    public void displayEmployees() {
        for (Employee e : employees) {
            System.out.println(e);
        }
    }

    public boolean checkEmployee(int id) {
        return employees.contains(new Employee(id, "", ""));
    }
}
```

```

    }
}

class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        EmployeeDatabase db = new EmployeeDatabase();
        int n = sc.nextInt();
        for (int i = 0; i < n; i++) {
            int id = sc.nextInt();
            String name = sc.next();
            String department = sc.next();
            db.addEmployee(id, name, department);
        }
        db.displayEmployees();
        int m = sc.nextInt();
        for (int i = 0; i < m; i++) {
            int id = sc.nextInt();
            if (db.checkEmployee(id))
                System.out.println("Employee exists");
            else
                System.out.println("Employee not found");
        }
        sc.close();
    }
}

```

**Status :** Correct

**Marks :** 10/10

#### 4. Problem Statement

Tony is an e-learning platform administrator, he oversees the user ratings for various online courses offered in the platform.

To enhance user experience, you should assist him in utilizing a HashMap to store course ratings given by learners. Regularly, he analyzes this data to identify the highest and lowest-rated courses, enabling targeted improvements and ensuring the quality of the educational content. This process assists in maintaining a competitive and engaging online learning environment for the users.

### ***Input Format***

The input consists of a string representing the course name followed by a double value representing the course's rating, in separate lines.

The input is terminated by entering "done".

### ***Output Format***

The first line of output prints the string "Highest Rated Course: " followed by the highest-rated course.

The second line prints the string "Lowest Rated Course: " followed by the lowest-rated courses.

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: DSA

4.0

OOPS

4.2

C

3.2

done

Output: Highest Rated Course: OOPS

Lowest Rated Course: C

### ***Answer***

```
import java.util.HashMap;
```

```
import java.util.Map;
```

```
import java.util.Scanner;
```

```
class CourseAnalyzer {  
    public Map<String, String>
```

```
    identifyHighestAndLowestRatedCourses(Map<String, Double> courseRatings) {
```

```
        double highestRating = Double.MIN_VALUE;
```

```
        double lowestRating = Double.MAX_VALUE;
```

```
        String highestRatedCourse = "";
```

```
        String lowestRatedCourse = "";
```



```

    for (Map.Entry<String, Double> entry : courseRatings.entrySet()) {
        String course = entry.getKey();
        double rating = entry.getValue();

        if (rating > highestRating) {
            highestRating = rating;
            highestRatedCourse = course;
        }
        if (rating < lowestRating) {
            lowestRating = rating;
            lowestRatedCourse = course;
        }
    }

    Map<String, String> result = new HashMap<>();
    result.put("highest", highestRatedCourse);
    result.put("lowest", lowestRatedCourse);
    return result;
}

}

public class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        Map<String, Double> courseRatings = new HashMap<>();

        while (true) {
            String courseName = scanner.nextLine();
            if (courseName.equalsIgnoreCase("done")) {
                break;
            }
            double rating = Double.parseDouble(scanner.nextLine().trim());
            courseRatings.put(courseName, rating);
        }

        CourseAnalyzer analyzer = new CourseAnalyzer();
        Map<String, String> result =
        analyzer.identifyHighestAndLowestRatedCourses(courseRatings);

        System.out.printf("Highest Rated Course: %s\n", result.get("highest"));
        System.out.printf("Lowest Rated Course: %s", result.get("lowest"));
    }
}

```

```
}  
    scanner.close();  
}
```

**Status :** Correct

**Marks :** 10/10

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Branch: REC

Department: CSE - Section 1

Batch: 2028

Degree: B.E - CSE

Scan to verify results



## 2024\_28\_III\_OOPS Using Java Lab

### REC\_2028\_OOPS using Java\_Week 11

Attempt : 1

Total Mark : 20

Marks Obtained : 20

### Section 1 : Project

#### 1. Problem Statement

In Café Central, the menu is cataloged and stored in a database.

To efficiently manage the restaurant's menu using Java and JDBC, you must build a Restaurant Management System that supports:

Adding new menu items

Updating menu item prices

Viewing details of a menu item

Displaying all menu items in sorted order

You are given two files:

File 1: MenuItem.java (POJO Class)

This class represents the MenuItem entity.

A MenuItem contains the following details:

Field	Description
itemId	Unique Menu Item ID (Integer)
name	Item Name (String)
category	Item Category (String)
price	Item Price (Double)

Students must write code in the marked area:

```
class MenuItem {  
    private int itemId;  
    private String name;  
    private String category;  
    private double price;  
  
    public MenuItem() {}  
  
    public MenuItem(int itemId, String name, String category, double price) {  
        // write your code here  
    }  
  
    // Include getters and setters  
}
```

Expected in this part:

Assign parameter values to instance variables inside the constructor.

Add getters and setters for all attributes.

File 2: MenuItemDAO.java (Data Access Layer)

This class handles all database operations using JDBC.

Students must complete the missing JDBC logic in the following methods:

```
class MenuItemDAO {

    public void addItem(Connection conn, MenuItem menuItem)
    throws SQLException {

        // write your code here

    }

    public void updateItemPrice(Connection conn, int itemId, double
    newPrice) throws SQLException {

        // write your code here

    }

    public void deleteMenuItem(Connection conn, int itemId) throws
    SQLException {

        // write your code here

    }

    public MenuItem viewItemDetails(Connection conn, int itemId) throws
    SQLException {

        // write your code here

    }

    public List<MenuItem> displayAllMenuItems(Connection conn) throws
    SQLException {

        // write your code here

    }

    private MenuItem mapToMenuItem(ResultSet rs) throws SQLException {
        return new MenuItem(
```

```
// write your code here  
);  
}  
}
```

Expected in this part:

Write SQL queries for INSERT, UPDATE, DELETE, SELECT.

Execute queries using PreparedStatement or Statement.

Map ResultSet rows to MenuItem objects using mapToMenuItem().

Return a List<MenuItem> where required.

The system should connect to a MySQL database using the following default credentials:

DB URL: jdbc:mysql://localhost/ri\_db

USER: test

PWD: test123

The menu table has already been created with the following structure:

Table Name: menu

### ***Input Format***

The first line of input consists of an integer choice, representing the operation to be performed (1 for Add Item, 2 for Restock item, 3 for reduce item, 4 for Display, 5 for Exit).

For choice 1 (Add Menu Item):

- The second line consists of an integer item\_id.
- The third line consists of a string name.
- The fourth line consists of a string category.
- The fifth line consists of a double price.

For choice 2 (Update Item Price):

- The second line consists of an integer item\_id.
- The third line consists of a double new\_price.

For choice 3 (View Item Details):

- The second line consists of an integer item\_id.

For choice 4 (Display All Menu Items):

- No additional inputs are required.

For choice 5 (Exit):

- No additional inputs are required.

### ***Output Format***

For choice 1 (Add Menu Item):

- Print "Menu item added successfully" if the item was added.
- Print "Failed to add item." if the insertion failed.

For choice 2 (Update Item Price):

- Print "Item price updated successfully" if the price update was successful.
- Print "Item not found." if the specified item ID does not exist.

For choice 3 (View Item Details):

- Display the item details in the format:
- ID: [item\_id] | Name: [name] | Category: [category] | Price: [price]
- Print "Item not found." if the specified item ID does not exist.

For choice 4 (Display All Menu Items):

- Display each item on a new line in the format:
- ID | Name | Category | Price
- If no items are available, print nothing (or handle with an appropriate message if desired).

For choice 5 (Exit):

- Print "Exiting Restaurant Management System."

For invalid input:

- Print "Invalid choice. Please try again."

### **Sample Test Case**

Input: 1

11

Margherita Pizza

Main Course

12.99

4

5

Output: Menu item added successfully

ID | Name | Category | Price

11 | Margherita Pizza | Main Course | 12.99

Exiting Restaurant Management System.

### **Answer**

```
import java.sql.*;
```

```
import java.util.Scanner;
```

```
class RestaurantManagementSystem {
```

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

```
        try (Connection conn = DriverManager.getConnection("jdbc:mysql://localhost/ri_db", "test", "test123"));
```

```
            Scanner scanner = new Scanner(System.in)) {
```

```
                boolean running = true;
```

```
                while (running) {
```

```
                    int choice = scanner.nextInt();
```

```
                    switch (choice) {
```

```
                        case 1:
```

```
                            addMenuItem(conn, scanner);
```

```
                            break;
```

```
                        case 2:
```

```
                            updateItemPrice(conn, scanner);
```

```
                            break;
```



```

        case 3:
            viewItemDetails(conn, scanner);
            break;
        case 4:
            displayAllMenuItems(conn);
            break;
        case 5:
            System.out.println("Exiting Restaurant Management System.");
            running = false;
            break;
        default:
            System.out.println("Invalid choice. Please try again.");
    }
}
} catch (SQLException e) {
    e.printStackTrace();
}
}

public static void addMenuItem(Connection conn, Scanner scanner) {
    int itemId = scanner.nextInt();
    scanner.nextLine(); // Consume newline

    String name = scanner.nextLine();
    String category = scanner.nextLine();
    double price = scanner.nextDouble();

    MenuItem menuItem = new MenuItem(itemId, name, category, price); //
    Using POJO

    String insertQuery = "INSERT INTO menu (item_id, name, category, price)
VALUES (?, ?, ?, ?)";
    try (PreparedStatement stmt = conn.prepareStatement(insertQuery)) {
        stmt.setInt(1, menuItem.getItemId());
        stmt.setString(2, menuItem.getName());
        stmt.setString(3, menuItem.getCategory());
        stmt.setDouble(4, menuItem.getPrice());

        int rowsInserted = stmt.executeUpdate();
        System.out.println(rowsInserted > 0 ? "Menu item added successfully" :
"Failed to add item.");
    } catch (SQLException e) {
        System.out.println("Error adding item: " + e.getMessage());
    }
}

```

```

    }
}

public static void updateItemPrice(Connection conn, Scanner scanner) {
    int itemId = scanner.nextInt();
    double newPrice = scanner.nextDouble();

    String updateQuery = "UPDATE menu SET price = ? WHERE item_id = ?";
    try (PreparedStatement stmt = conn.prepareStatement(updateQuery)) {
        stmt.setDouble(1, newPrice);
        stmt.setInt(2, itemId);

        int rowsUpdated = stmt.executeUpdate();
        System.out.println(rowsUpdated > 0 ? "Item price updated successfully" :
"Item not found.");
    } catch (SQLException e) {
        System.out.println("Error updating price: " + e.getMessage());
    }
}

```

```

public static void viewItemDetails(Connection conn, Scanner scanner) {
    int itemId = scanner.nextInt();

    String selectQuery = "SELECT * FROM menu WHERE item_id = ?";
    try (PreparedStatement stmt = conn.prepareStatement(selectQuery)) {
        stmt.setInt(1, itemId);

        ResultSet rs = stmt.executeQuery();
        if (rs.next()) {
            MenuItem menuItem = new MenuItem(
                rs.getInt("item_id"),
                rs.getString("name"),
                rs.getString("category"),
                rs.getDouble("price")
            );

            System.out.printf("ID: %d | Name: %s | Category: %s | Price: %.2f%n",
                menuItem.getItemId(),
                menuItem.getName(),
                menuItem.getCategory(),
                menuItem.getPrice());
        } else {

```

```

        System.out.println("Item not found.");
    }
} catch (SQLException e) {
    System.out.println("Error retrieving item details: " + e.getMessage());
}
}

public static void displayAllMenuItems(Connection conn) {
    String displayQuery = "SELECT * FROM menu ORDER BY item_id";
    try (Statement stmt = conn.createStatement();
        ResultSet rs = stmt.executeQuery(displayQuery)) {

        System.out.println("ID | Name | Category | Price");
        while (rs.next()) {
            MenuItem menuItem = new MenuItem(
                rs.getInt("item_id"),
                rs.getString("name"),
                rs.getString("category"),
                rs.getDouble("price")
            );

            System.out.printf("%d | %s | %s | %.2f\n",
                menuItem.getItemId(),
                menuItem.getName(),
                menuItem.getCategory(),
                menuItem.getPrice());
        }
    } catch (SQLException e) {
        System.out.println("Error displaying menu items: " + e.getMessage());
    }
}
}

```

```

class MenuItem {
    private int itemId;
    private String name;
    private String category;
    private double price;

    // Constructor
    public MenuItem(int itemId, String name, String category, double price) {
        this.itemId = itemId;
    }
}

```

```

        this.name = name;
        this.category = category;
        this.price = price;
    }

    // Getters and Setters
    public int getItemId() { return itemId; }
    public void setItemId(int itemId) { this.itemId = itemId; }

    public String getName() { return name; }
    public void setName(String name) { this.name = name; }

    public String getCategory() { return category; }
    public void setCategory(String category) { this.category = category; }

    public double getPrice() { return price; }
    public void setPrice(double price) { this.price = price; }
}

//

```

**Status :** Correct

**Marks :** 10/10

## 2. Problem Statement

Create a JDBC-based School Management System that handles runtime input to manage student records. The system should allow users to:

Add a new student (student ID, name, grade level, GPA).

Update a student's GPA, ensuring the GPA value is within the valid range (0.0 - 4.0).

View a specific student's record by student ID.

Display all students in the database.

Exit the application.

The system should connect to a MySQL database using the following default credentials:

DB URL: jdbc:mysql://localhost/ri\_db

USER: test

PWD: test123

The students table has already been created with the following structure:

Table Name: students

### ***Input Format***

The first line of input consists of an integer choice, representing the operation to be performed:

(1 for Add Student, 2 for Update GPA, 3 for View Student Record, 4 for Display All Students, 5 for Exit)

For choice 1 (Add Student):

- The second line consists of an integer student\_id.
- The third line consists of a string name.
- The fourth line consists of a string grade\_level.
- The fifth line consists of a double gpa (must be between 0.0 and 4.0).

For choice 2 (Update GPA):

- The second line consists of an integer student\_id.
- The third line consists of a double new\_gpa (must be between 0.0 and 4.0).

For choice 3 (View Student Record):

- The second line consists of an integer student\_id.

For choice 4 (Display All Students):

- No additional inputs are required.

For choice 5 (Exit):

- No additional inputs are required.

### **Output Format**

The output displays:

For choice 1 (Add Student):

- Print "Student added successfully" if the student was added.
- Print "Failed to add student." if the insertion failed.

For choice 2 (Update GPA):

- Print "GPA updated successfully" if the GPA update was successful.
- Print "Student not found." if the specified student ID does not exist.
- Print "GPA must be between 0.0 and 4.0." if the provided GPA is out of the valid range.

For choice 3 (View Student Record):

- Display the student details in the format:  
ID: [student\_id] | Name: [name] | Grade Level: [grade\_level] | GPA: [gpa]
- Print "Student not found." if the specified student ID does not exist.

For choice 4 (Display All Students):

- Display each student on a new line in the format:  
ID | Name | Grade Level | GPA
- If there are no records, print nothing (or handle with an appropriate message if desired).

For choice 5 (Exit):

- Print "Exiting School Management System."

For invalid input:

- Print "Invalid choice. Please try again."

### **Sample Test Case**

Input: 1

101

Alice Johnson

10

3.8

5

Output: Student added successfully  
Exiting School Management System.

**Answer**

```
import java.sql.*;
import java.util.Scanner;

class SchoolManagementSystem {
    public static void main(String[] args) {
        try (Connection conn = DriverManager.getConnection("jdbc:mysql://
localhost/ri_db", "test", "test123");
        Scanner scanner = new Scanner(System.in)) {

            boolean running = true;

            while (running) {

                int choice = scanner.nextInt();

                switch (choice) {
                    case 1:
                        addStudent(conn, scanner);
                        break;
                    case 2:
                        updateGrades(conn, scanner);
                        break;
                    case 3:
                        viewStudentRecord(conn, scanner);
                        break;
                    case 4:
                        displayAllStudents(conn);
                        break;
                    case 5:
                        System.out.println("Exiting School Management System.");
                        running = false;
                        break;
                    default:
                        System.out.println("Invalid choice. Please try again.");
                }
            }
        }
    }
}
```

```

    } catch (SQLException e) {
        e.printStackTrace();
    }
}

public static void addStudent(Connection conn, Scanner scanner) {
    int studentId = scanner.nextInt();
    scanner.nextLine(); // Consume newline

    String name = scanner.nextLine();

    String gradeLevel = scanner.nextLine();

    double gpa = scanner.nextDouble();

    String insertQuery = "INSERT INTO students (student_id, name, grade_level,
gpa) VALUES (?, ?, ?, ?)";
    try (PreparedStatement stmt = conn.prepareStatement(insertQuery)) {
        stmt.setInt(1, studentId);
        stmt.setString(2, name);
        stmt.setString(3, gradeLevel);
        stmt.setDouble(4, gpa);

        int rowsInserted = stmt.executeUpdate();
        System.out.println(rowsInserted > 0 ? "Student added successfully" :
"Failed to add student.");
    } catch (SQLException e) {
        System.out.println("Error adding student: " + e.getMessage());
    }
}

public static void updateGrades(Connection conn, Scanner scanner) {
    int studentId = scanner.nextInt();

    double newGpa = scanner.nextDouble();

    // Validate GPA range
    if (newGpa < 0.0 || newGpa > 4.0) {
        System.out.println("GPA must be between 0.0 and 4.0.");
        return;
    }

    String updateQuery = "UPDATE students SET gpa = ? WHERE student_id
= ?";

```



```

try (PreparedStatement stmt = conn.prepareStatement(updateQuery)) {
    stmt.setDouble(1, newGpa);
    stmt.setInt(2, studentId);

    int rowsUpdated = stmt.executeUpdate();
    System.out.println(rowsUpdated > 0 ? "GPA updated successfully" :
"Student not found.");
} catch (SQLException e) {
    System.out.println("Error updating GPA: " + e.getMessage());
}
}

public static void viewStudentRecord(Connection conn, Scanner scanner) {
    int studentId = scanner.nextInt();

    String selectQuery = "SELECT * FROM students WHERE student_id = ?";
    try (PreparedStatement stmt = conn.prepareStatement(selectQuery)) {
        stmt.setInt(1, studentId);

        ResultSet rs = stmt.executeQuery();
        if (rs.next()) {
            System.out.printf("ID: %d | Name: %s | Grade Level: %s | GPA: %.2f%n",
                rs.getInt("student_id"),
                rs.getString("name"),
                rs.getString("grade_level"),
                rs.getDouble("gpa"));
        } else {
            System.out.println("Student not found.");
        }
    } catch (SQLException e) {
        System.out.println("Error retrieving student record: " + e.getMessage());
    }
}

public static void displayAllStudents(Connection conn) {
    String displayQuery = "SELECT * FROM students ";
    try (Statement stmt = conn.createStatement();
        ResultSet rs = stmt.executeQuery(displayQuery)) {

        System.out.println("ID | Name | Grade Level | GPA");
        while (rs.next()) {
            System.out.printf("%d | %s | %s | %.2f%n",

```

```
        rs.getInt("student_id"),
        rs.getString("name"),
        rs.getString("grade_level"),
        rs.getDouble("gpa"));
    }
} catch (SQLException e) {
    System.out.println("Error displaying students: " + e.getMessage());
}
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### REC\_Week 12\_Java\_Lamba Expressions\_MCQ

Attempt : 1

Total Mark : 10

Marks Obtained : 10

#### Section 1 : MCQ

1. Can a lambda expression in Java have a body with multiple statements?

**Answer**

Yes, if the statements are enclosed in curly braces

**Status : Correct**

**Marks : 1/1**

2. What is the return type of a lambda expression in Java?

**Answer**

The return type is inferred from the context

**Status : Correct**

**Marks : 1/1**

3. Which functional interface in Java takes two arguments and returns a result?

**Answer**

BiFunction

**Status :** Correct

**Marks :** 1/1

4. Can a lambda expression in Java have a body with multiple statements?

**Answer**

Yes, if the statements are enclosed in curly braces

**Status :** Correct

**Marks :** 1/1

5. Can a lambda expression have more than one parameter?

**Answer**

Yes, it can have multiple parameters

**Status :** Correct

**Marks :** 1/1

6. What is a lambda expression in Java?

**Answer**

A way to define anonymous methods

**Status :** Correct

**Marks :** 1/1

7. What is the syntax for a basic lambda expression in Java?

**Answer**

(parameters) -> expression

**Status :** Correct

**Marks :** 1/1

8. Which of the following is a valid lambda expression in Java?

**Answer**

All of the mentioned options

**Status : Correct**

**Marks : 1/1**

9. Which functional interface is commonly used with lambda expressions in Java?

**Answer**

Runnable

**Status : Correct**

**Marks : 1/1**

10. Which of the following interfaces is NOT a functional interface in Java?

**Answer**

Iterable

**Status : Correct**

**Marks : 1/1**

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 12\_Q1

Attempt : 1

Total Mark : 10

Marks Obtained : 10

### Section 1 : Coding

#### 1. Problem Statement

Sabrina is working on a project that involves analyzing a set of numbers. In her exploration, she encounters scenarios where extracting even numbers and finding their sum is essential.

Create a program that calculates the sum of even numbers from a given array of integers using a lambda expression.

#### ***Input Format***

The first line of input consists of an integer N, representing the size of the array.

The second line consists of N space-separated integers, representing the elements of the array.

#### ***Output Format***

The output prints the sum of the even integers from the array.

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 3

29 37 45

Output: 0

### **Answer**

```
import java.util.Scanner;
class EvenSumCalculator {
    public static int calculateEvenSum(int[] numbers) {
        return java.util.Arrays.stream(numbers)
            .filter(n -> n % 2 == 0)
            .sum();
    }
}
class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        int count = scanner.nextInt();
        int[] numbers = new int[count];

        for (int i = 0; i < count; i++) {
            numbers[i] = scanner.nextInt();
        }
        int sum = EvenSumCalculator.calculateEvenSum(numbers);
        System.out.println(sum);

        scanner.close();
    }
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 12\_Q2

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

Alex is learning about Java's functional interfaces and lambda expressions.

He wants to write a simple program that prints the square of each number in an array using a predefined functional interface.

Help Alex complete this task using the Consumer functional interface.

##### ***Input Format***

- The first line contains an integer N, the number of elements in the array.
- The second line contains N space-separated integers.

##### ***Output Format***

- Print the squares of all elements in the array, separated by a space.



Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 4

1 2 3 4

Output: 1 4 9 16

### **Answer**

```
import java.util.*;
import java.util.function.Consumer;

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

        // Read number of elements
        int n = sc.nextInt();
        int[] arr = new int[n];

        // Read array elements
        for (int i = 0; i < n; i++) {
            arr[i] = sc.nextInt();
        }

        // Define a Consumer functional interface using lambda expression
        Consumer<Integer> printSquare = x -> System.out.print((x * x) + " ");

        // Apply the lambda for each element
        for (int num : arr) {
            printSquare.accept(num);
        }
    }
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 12\_Q3

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

In the mystical realm of programming, there exists a magical incantation to reveal hidden words.

Elara, the skilled enchantress, wishes to summon a word using her spell and then reverse its characters to uncover its enchanted reflection.

Write a program that uses the predefined functional interface `Supplier<String>` and a lambda expression to:

Supply (generate) a string, and

Display its reversed form.

**Input Format**

No input is required from the user.

The string must be supplied internally using a Supplier<String>.

### **Output Format**

Print the reversed version of the supplied string.

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: Wizard!!

Output: !!draziW

### **Answer**

```
import java.util.Scanner;

public class Main {

    // Interface for the Lambda Expression
    interface ReverseStringFunction {
        String reverse(String input);
    }

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

        String input = scanner.nextLine();

        // Use Lambda Expression to reverse the string
        String reversed = ((ReverseStringFunction) s -> new
        StringBuilder(s).reverse().toString()).reverse(input);

        System.out.println(reversed);

        scanner.close();
    }
}
```

**Status : Correct**

**Marks : 10/10**

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 12\_Q4

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

Abi is working on a text analysis project where she needs to categorize words based on their length.

Words that have three or fewer characters are considered "Short", while words with more than three characters are classified as "Long."

Write a Java program that takes a sentence as input, analyzes each word, and prints a list showing whether each word is "Short" or "Long."

Use the predefined functional interface `Function<String, String>` along with a lambda expression for categorization.

##### ***Input Format***

A single line containing a sentence (words separated by spaces).

### **Output Format**

- A single line with each word categorized as "Short" or "Long", separated by spaces.

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: I love my cat

Output: Short Long Short Short

### **Answer**

```
import java.util.*;
import java.util.function.Function;

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

        // Read input sentence
        String sentence = sc.nextLine();

        // Split sentence into words
        String[] words = sentence.split(" ");

        // Define Function interface using lambda
        Function<String, String> categorize = word ->
            (word.length() <= 3) ? "Short" : "Long";

        // Analyze and print results
        for (String word : words) {
            System.out.print(categorize.apply(word) + " ");
        }
    }
}
```

**Status :** Correct

**Marks :** 10/10

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## 2024\_28\_III\_OOPS Using Java Lab

### REC\_Week 12\_Java\_Lamba Expressions\_PAH

Attempt : 1  
Total Mark : 40  
Marks Obtained : 37.5

#### Section 1 : COD

##### 1. Problem Statement

Aditya is developing a reading app that recommends books to users based on a predefined list.

Each time a user opens the app, it should supply the next book title in the list, one at a time, using a lambda expression and the Supplier functional interface.

When all books have been recommended, the list should start again from the beginning.

##### ***Input Format***

The first line contains an integer  $n$  — the total number of available book titles.

The next n lines each contain a book title (a string).

The next line contains an integer m — the number of times users open the app (i.e., the number of recommendations to be made).

### ***Output Format***

Print the supplied book title for each recommendation, one per line.

If  $m > n$ , repeat the list from the start.

### ***Sample Test Case***

Input: 3

The Alchemist

Atomic Habits

Ikigai

5

Output: The Alchemist

Atomic Habits

Ikigai

The Alchemist

Atomic Habits

### ***Answer***

```
import java.util.*;
```

```
import java.util.function.Supplier;
```

```
class Main {
```

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

```
        Scanner sc = new Scanner(System.in);
```

```
        // Read number of books
```

```
        int n = sc.nextInt();
```

```
        sc.nextLine(); // consume newline
```

```
        List<String> books = new ArrayList<>();
```

```
        for (int i = 0; i < n; i++) {
```

```
            books.add(sc.nextLine());
```

```
        }
```

```
        // Read number of recommendations (times user opens app)
```

```
        int m = sc.nextInt();
```

```

// Index tracker for current book
final int[] index = {0};

// Supplier to provide next book
Supplier<String> bookSupplier = () -> {
    String book = books.get(index[0]);
    index[0] = (index[0] + 1) % books.size(); // Loop back to start
    return book;
};

// Print book recommendations
for (int i = 0; i < m; i++) {
    System.out.println(bookSupplier.get());
}

sc.close();
}
}

```

**Status :** Correct

**Marks :** 10/10

## 2. Problem Statement

Emily, an analyst at a data processing firm, is tasked with cleaning up datasets to remove duplicate values from lists of integers.

Create a Java program that allows Emily to input a series of integers, with the program then utilizing a lambda expression to efficiently remove any duplicates.

### **Input Format**

The first line of input consists of an integer N, representing the size of the array.

The second line consists of N space-separated integers, each denoting an array element.

### **Output Format**

The output prints the array elements after removing the duplicates inside the square bracket separated by a comma and space.



Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 15

1 2 3 4 3 2 1 2 3 4 4 4 5 5 6

Output: [1, 2, 3, 4, 5, 6]

### **Answer**

```
import java.util.*;
import java.util.function.Function;
import java.util.stream.Collectors;

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

        int n = sc.nextInt();
        List<Integer> numbers = new ArrayList<>();
        for (int i = 0; i < n; i++) {
            numbers.add(sc.nextInt());
        }

        Function<List<Integer>, List<Integer>> removeDuplicates =
            list -> list.stream().distinct().collect(Collectors.toList());

        List<Integer> uniqueNumbers = removeDuplicates.apply(numbers);

        System.out.println(uniqueNumbers);

        sc.close();
    }
}
```

**Status :** Correct

**Marks :** 10/10

### **3. Problem Statement**

Rishi is working as an HR analyst in a software company. He wants to filter

a list of employees based on their salary using modern Java techniques. He has a list of employee names and salaries and wants to use lambda expressions to filter those who earn more than a specific threshold.

Implement a program using lambda expressions and functional interfaces to print the names of employees whose salary is greater than or equal to 50,000.

### ***Input Format***

The first line of input consists of an integer n, representing the number of employees.

The next n lines. Each line contains a String (employee name) and an int (salary).

### ***Output Format***

The output prints the names of employees whose salary is greater than or equal to 50000, each on a new line.

If no employee found with salary greater than 50000, print: No employee found with salary  $\geq$  50000

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 4  
Amit 45000  
Sneha 50000  
Ravi 60000  
Priya 30000  
Output: Sneha  
Ravi

### ***Answer***

```
import java.util.*;  
import java.util.function.Predicate;  
import java.util.stream.Collectors;  
  
class Employee {
```

```

String name;
int salary;

Employee(String name, int salary) {
    this.name = name;
    this.salary = salary;
}

class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        List<Employee> employees = new ArrayList<>();

        for (int i = 0; i < n; i++) {
            String name = sc.next();
            int salary = sc.nextInt();
            employees.add(new Employee(name, salary));
        }

        Predicate<Employee> highSalary = e -> e.salary >= 50000;

        List<String> result = employees.stream()
            .filter(highSalary)
            .map(e -> e.name)
            .collect(Collectors.toList());

        if (result.isEmpty()) {
            System.out.println("No employee found with salary >= 50000");
        } else {
            result.forEach(System.out::println);
        }
    }
}

```

**Status :** Correct

**Marks :** 10/10

#### 4. Problem Statement

Sneha is developing a feature for an e-commerce application that helps

display product details after applying a seasonal discount.

She decides to use lambda expressions with the Consumer functional interface to print each product's name, original price, and discounted price neatly.

The program should:

Accept a list of product names and their prices. Apply a 15% discount on all products. Use a Consumer lambda expression to display the details in a formatted manner.

### ***Input Format***

The first line of input consists of an integer n, representing the number of products.

The next n lines each contain a String (product name) and a double (price) separated by a space.

### ***Output Format***

For each product, print the details in the format:

Product: <name>, Original Price: <price>, Discounted Price: <discounted price>

If there are no products, print:

No products available

### ***Sample Test Case***

Input: 1

Phone 60000

Output: Product: Phone, Original Price: 60000.0, Discounted Price: 51000.0

### ***Answer***

```
import java.util.*;  
import java.util.function.Consumer;
```

```
class Product {  
    String name;  
    double price;
```

```
Product(String name, double price) {  
    this.name = name;  
    this.price = price;  
}  
}
```

```
class Main {  
    public static void main(String[] args) {  
        Scanner sc = new Scanner(System.in);
```

```
        int n = sc.nextInt();  
        sc.nextLine(); // Consume newline
```

```
        if (n == 0) {  
            System.out.println("No products available");  
            return;  
        }
```

```
        List<Product> products = new ArrayList<>();
```

```
        for (int i = 0; i < n; i++) {  
            String[] input = sc.nextLine().split(" ");  
            String name = input[0];  
            double price = Double.parseDouble(input[1]);  
            products.add(new Product(name, price));  
        }
```

```
        // Define Consumer functional interface using lambda expression  
        Consumer<Product> displayProduct = product -> {  
            double discountedPrice = product.price * 0.85;  
            System.out.println("Product: " + product.name +  
                               ", Original Price: " + product.price +  
                               ", Discounted Price: " + discountedPrice);  
        };  
    }
```

```
    // Apply Consumer to each product  
    products.forEach(displayProduct);
```

```
    sc.close();  
}
```

Status : Partially correct

Marks : 7.5/10

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## 2024\_28\_III\_OOPS Using Java Lab

### REC\_Week 12\_Java\_Lambda Expressions\_CY

Attempt : 1  
Total Mark : 40  
Marks Obtained : 40

#### Section 1 : Coding

##### 1. Problem Statement

Riya is developing a college admission system that assigns unique roll numbers to each newly admitted student.

Each roll number should follow this fixed format:

<DEPT>-<YEAR>-<4-digit-sequence>

where:

<DEPT> is the department code (in uppercase, e.g., CSE, ECE, MECH). <YEAR> is the admission year (e.g., 2025). <4-digit-sequence> starts from a given number and increases sequentially for each student. Write a Java program using a Supplier<String> lambda to generate and print the roll numbers for n students.

**Input Format**

First line: integer n — number of roll numbers to generate

Second line: string DEPT — department code (uppercase letters only)

Third line: integer YEAR — admission year

Fourth line: integer start — starting sequence number ( $0 \leq \text{start} \leq 9999$ )

### **Output Format**

Print n roll numbers, one per line, in the required format

Sequence must be zero-padded to 4 digits

If sequence exceeds 9999, wrap around to 0000

### **Sample Test Case**

Input: 5

CSE

2025

98

Output: CSE-2025-0098

CSE-2025-0099

CSE-2025-0100

CSE-2025-0101

CSE-2025-0102

### **Answer**

```
import java.util.*;
```

```
import java.util.function.Supplier;
```

```
class Main {
```

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

```
        Scanner sc = new Scanner(System.in);
```

```
        int n = sc.nextInt();
```

```
        String dept = sc.next();
```

```
        int year = sc.nextInt();
```

```
        int start = sc.nextInt();
```

```
        final int[] current = { start };
```

```
        Supplier<String> rollNumberSupplier = () -> {
```



```

String roll = String.format("%s-%d-%04d", dept, year, current[0]);
current[0] = (current[0] + 1) % 10000;
return roll;
};

for (int i = 0; i < n; i++) {
    System.out.println(rollNumberSupplier.get());
}

sc.close();
}
}

```

**Status :** Correct

**Marks :** 10/10

## 2. Problem Statement

### Problem Statement

Sophia, a data analyst, is studying experimental results collected from various lab sensors. Each sensor provides a list of numeric readings, and Sophia wants to calculate the average of these readings to analyze consistency.

She decides to use lambda expressions and the Function functional interface to compute the average of all the recorded values efficiently.

### Your Task

Write a Java program that:

Reads the total number of measurements. Reads all the measurement values as doubles. Uses a `Function<double[], Double>` lambda expression to calculate the average value. Displays the final average, formatted to two decimal places.

### Input Format

The first line of input consists of an integer `N`, representing the number of measurements.

The second line contains `N` space-separated double values.

### **Output Format**

Print the average of the entered values, rounded to two decimal places.

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 6

2.2 1.2 5.4 4.6 2.9 55.7

Output: 12.00

### **Answer**

```
import java.util.*;
import java.util.function.Function;

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

        int n = sc.nextInt();
        double[] values = new double[n];

        for (int i = 0; i < n; i++) {
            values[i] = sc.nextDouble();
        }

        // Function to calculate average using lambda expression
        Function<double[], Double> calculateAverage = arr -> {
            double sum = 0;
            for (double val : arr) {
                sum += val;
            }
            return sum / arr.length;
        };

        double average = calculateAverage.apply(values);
        System.out.printf("%.2f", average);

        sc.close();
    }
}
```

**Status : Correct**

**Marks : 10/10**

### 3. Problem Statement

Nethra is a researcher working on a project that involves analyzing experimental data. As part of her analysis, she needs to determine whether a given word is a palindrome or not.

Create a Java program that allows Nethra to input a word, and then check and display whether the entered word is a palindrome. Use lambda expressions to perform the palindrome check.

#### ***Input Format***

The first line of input consists of a word.

#### ***Output Format***

The output prints whether the given word is a palindrome or not in the following format:

"<input> is palindrome" or "<input> is not palindrome".

Refer to the sample output for formatting specifications.

#### ***Sample Test Case***

Input: malayalam

Output: malayalam is palindrome

#### ***Answer***

```
import java.util.Scanner;
import java.util.function.Predicate;

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

```

Scanner scanner = new Scanner(System.in);

String inputString = scanner.nextLine();

Predicate<String> isPalindrome = str -> {
    String reversed = new StringBuilder(str).reverse().toString();
    return str.equalsIgnoreCase(reversed);
};

if (isPalindrome.test(inputString)) {
    System.out.println(inputString + " is palindrome");
} else {
    System.out.println(inputString + " is not palindrome");
}

scanner.close();
}
}

```

**Status :** Correct

**Marks :** 10/10

#### 4. Problem Statement

A company named TechNova is collecting feedback from its customers. Each customer gives a feedback score (an integer between 1 and 10) along with their name.

The company wants to:

Display each customer's name along with their feedback in a formatted way using a lambda expression and a Consumer functional interface. After displaying all feedbacks, calculate and display the average feedback score. You need to implement this functionality using Java lambda expressions and streams, emphasizing the Consumer interface for displaying formatted output.

#### **Input Format**

The first line of input contains an integer  $n$ , representing the number of customers.

The next n lines each contain a String (customer name) followed by an int (feedback score).

### **Output Format**

- Each line prints a customer's name and feedback in the format:
- Customer: <name>, Feedback Score: <score>

- After all customers are displayed, print the average feedback as:
- Average Feedback: <average\_value>

(Average should be displayed up to two decimal places.)

### **Sample Test Case**

Input: 3

Ravi 7

Ananya 9

Kiran 8

Output: Customer: Ravi, Feedback Score: 7

Customer: Ananya, Feedback Score: 9

Customer: Kiran, Feedback Score: 8

Average Feedback: 8.00

### **Answer**

```
import java.util.*;
import java.util.function.Consumer;
```

```
class Customer {
    String name;
    int feedback;
```

```
    Customer(String name, int feedback) {
        this.name = name;
        this.feedback = feedback;
    }
}
```

```
class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);

        int n = sc.nextInt();
        List<Customer> customers = new ArrayList<>();

        for (int i = 0; i < n; i++) {
            String name = sc.next();
            int feedback = sc.nextInt();
            customers.add(new Customer(name, feedback));
        }

        Consumer<Customer> displayFeedback = c ->
            System.out.println("Customer: " + c.name + ", Feedback Score: " +
                c.feedback);

        customers.forEach(displayFeedback);

        double avgFeedback = customers.stream()
            .mapToInt(c -> c.feedback)
            .average()
            .orElse(0.0);

        System.out.printf("Average Feedback: %.2f", avgFeedback);
        sc.close();
    }
}
```

**Status :** Correct

**Marks :** 10/10