

RAJALAKSHMI ENGINEERING COLLEGE
RAJALAKSHMI NAGAR, THANDALAM 602 105



CS23333 OOPS Using Java

Laboratory Record Note Book

Name :

Year / Branch / Section :

University Register No. : ..

College Roll No. : .

Semester : .

Academic Year : .



**RAJALAKSHMI ENGINEERING
COLLEGE**
An Autonomous Institution

BONAFIDE CERTIFICATE

Name:

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*Certified that this is the bonafide record of work done by the above student in
the.....Laboratory
during the academic year 2025- 2026*

Signature of Faculty in-charge

Submitted for the Practical Examination held on.....

Internal Examiner

External Examiner

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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 : 15

Section 1 : MCQ

1. 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

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

Answer

string

Status : Correct

Marks : 1/1

3. 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

4. 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

5. 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

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 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

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

Answer

double

Status : Correct

Marks : 1/1

9. 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

10. 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

11. 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

12. 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

13. 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

15015

Status : Correct

Marks : 1/1

14. 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

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

Answer

char

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

        int diffN=Math.abs(100-N);
        int diffM=Math.abs(100-M);

        if (diffN <= diffM){
            System.out.println("The integer closer to 100 is "+N+"with a difference
of"+diffN);
        }
        else{
            System.out.println("The integer closer to 100 is "+M+"with a difference
of"+diffM);
        }
    }
}
```

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.*;
class main{
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);
        int a=sc.nextInt();
        int b=sc.nextInt();
        boolean condition=(a>0 && b%3!=0) || (b>0 && a%3!=0);
        if (condition){
            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.*;
class main{
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);
        String a=sc.nextLine();
        double b=Double.parseDouble(a);
        System.out.println("Original Integer: "+a);
        System.out.println("Converted Double: "+b);
    }
}
```

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.*;
class main{
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);
        int a=sc.nextInt();
        int b=sc.nextInt();
        int sum=a+b;
        int product=a*b;
        if (sum%product==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.

π (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.*;
class main{
    public static void main(String[] args){
        Scanner sc=new Scanner(System.in);
        double r=sc.nextDouble();
        double c=2*3.14159*r;
        double A=3.14159*r*r;
```

```
System.out.printf("Circumference: %.2f meters",c);  
System.out.printf("\nArea: %.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.*;
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.printf("Result: %d",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.*;
class main{
    public static void main(String[] args){
        Scanner sc= new Scanner(System.in);
        int a=sc.nextInt();
        int b=sc.nextInt();
        if ((a<=0 && a%2!=0) || (b<=0 && b%2!=0)){
            System.out.println("true");
        }
        else{
            System.out.println("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){
        Scanner sc=new Scanner(System.in);
        int a=sc.nextInt();
        int b=sc.nextInt();
        int c=sc.nextInt();
        float sum =a+b+c;
        float avg=sum/3;
        System.out.printf("%.2f\n",avg);
        if (avg>a && avg>b){
            System.out.printf("Average is greater than both %d and %d",a,b);
        }
    }
}
```

```
    else if (avg>a && avg>c){  
        System.out.printf("Average is greater than both %d and %d",a,c);  
    }  
    else if (avg>b && avg>c){  
        System.out.printf("Average is greater than both %d and %d",b,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){
        Scanner sc = new Scanner(System.in);
        int S1=sc.nextInt();
        int S2=sc.nextInt();
        int S3=sc.nextInt();
        if ((S1+S3)/2==S2){
            System.out.println("true");
            System.out.println("The second integer is halfway between the first and
third integers.");
        }
        else{
```

```
        System.out.println("false");
        System.out.println("The second integer is not 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.*;
class main{
    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();

        double rateA=1.0/x;
        double rateB=1.0/y;
        double rateC=1.0/z;
        double work1=d1*(rateA+rateB+rateC);
        double work2=d2*(rateA+rateB);
        double totalwork=1.0;
        double remaining=totalwork-(work1+work2);
        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",remaining);
    }
}
```

Status : Correct

Marks : 10/10

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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:

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.*;
class main{
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);
        int A=sc.nextInt();
        int B=sc.nextInt();
        int absA=Math.abs(A);
        int absB=Math.abs(B);
        int result;
        if (absA<absB){
            System.out.printf("The integer closest to zero is: %d",A);
        }
        else if (absB<absA){
            System.out.printf("The integer closest to zero is: %d",B);
        }
        else{
```

```
        System.out.println("The integer closest to zero is: 0");  
    }  
}
```

Status : Correct

Marks : 10/10

2. 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.*;
```

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

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.*;
class main{
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);
        int a=sc.nextInt();
        int b=sc.nextInt();
        if ((a%2==0 && b%2==0) || (a%2!=0 && b%2!=0)){
            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

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

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 : 40

Section 1 : Coding

1. Problem Statement

Mandy is working on a cybersecurity project that involves basic encryption techniques. She wants to write a program that takes an integer number and performs a bitwise XOR operation to flip all the bits.

Help Mandy in this encryption using bitwise operations.

Input Format

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

Output Format

The output displays "Result: " followed by an integer representing the result of the bitwise XOR operation to flip all the bits.

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 0

Output: Result: 255

Answer

```
import java.util.*;
class main{
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);
        int a=sc.nextInt();
        int result=a ^ 255;
        System.out.printf("Result: %d",result);
    }
}
```

Status : Correct

Marks : 10/10

2. Problem Statement

In a logistics company, each delivery pack contains a specific number of items, and the priority customer receives double the amount. Write a program to determine the total number of delivery packs required for the operation, considering the number of items per pack and the number of customers given as input by the user.

Example

Input:

Number of items per pack = 96

Number of customers = 8

Output:

10

Explanation:

Given the number of items per pack = 96 and the number of customers = 8, the calculations are as follows:

Total number of items needed = number of items per pack * number of customers = $96 * 8 = 768$. Priority customer's share = double the amount of items per pack = $2 * 96 = 192$. Total items with the priority customer = total items needed + priority share = $768 + 192 = 960$. Number of packs needed = $(960 + 96 - 1) / 96 = 10.98$. Since we cannot have a fraction of a pack, the output is 10.

Input Format

The input consists of two space-separated integers N and C, representing the number of items per pack and the number of customers.

Output Format

The output displays an integer, representing the total number of delivery packs required for the operation.

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 1 1

Output: 3

Answer

```
import java.util.*;
class main{
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);
        int n=sc.nextInt();
        int c=sc.nextInt();
        int number_items_needed=n*c;
        int priority=2*n;
        int items_priority=number_items_needed+priority;
        int packs_needed=(items_priority+n-1)/n;
        System.out.println(packs_needed);
    }
}
```

Status : Correct

Marks : 10/10

3. Problem Statement

In the faraway land of Arithmetica, there exists an ancient calculator that can only perform bitwise operations. The calculator is locked with a secret code that only works when the number is modified using a special operation called right shifting.

The ruler of Arithmetica, King Thales, needs your help to unlock the calculator. The lock on the calculator is encoded with a number, and the calculator will only open if you apply a right shift by 2 on the number. Your task is to help King Thales determine the magic number that will unlock the ancient calculator.

Input Format

The first line of input represents an integer.

Output Format

The output should display the right-shifted value by 2 bits.

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 16

Output: 4

Answer

```
import java.util.*;
class main{
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);
        int n=sc.nextInt();
        System.out.println(n>>2);
    }
}
```

Status : Correct

Marks : 10/10

4. 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.*;
class main{
    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

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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 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

2. 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

3. 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

4. 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

5. 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

6. 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

7. 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

8. 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

9. 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

10. 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

11. 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

12. 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

13. 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

14. 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

15. 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

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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.*;
class main{
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);
        int a=sc.nextInt();
        int b=sc.nextInt();
        int c=sc.nextInt();
        int d=sc.nextInt();
        int e=sc.nextInt();
        System.out.printf("Average score: %d",(a+b+c+d+e)/5);
        if ((a+b+c+d+e)/5 >=50 ){
            System.out.println("\nThe student has passed");
        }
        else{
            System.out.println("\nThe 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.*;
class main{
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);
        int n=sc.nextInt();
        if(n%5==0){
            System.out.printf("%d is a multiple of 5",n);
        }
        else if (n%7==0){
            System.out.printf("%d is a multiple of 7",n);
        }
        else{
            System.out.printf("%d is neither multiple of 5 nor 7",n);
        }
    }
}
```

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 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 = $\text{weight}/(\text{height} \times \text{height})$

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.*;
class main{
    public static void main(String [] args){
        Scanner sc = new Scanner(System.in);
        float h=sc.nextFloat();
        float w=sc.nextFloat();
        double bmi = w/(h*h);
        System.out.printf("BMI: %.2f\n",bmi);
        System.out.println("Classification: ");
        if (bmi<18.5){
            System.out.println("Underweight");
        }
        else if (bmi>18.6 && bmi<24.9){
            System.out.println("Normal Weight");
        }
        else if (bmi<25.0 && bmi>29.9){
            System.out.println("Overweight");
        }
    }
}
```

```
}  
else{  
    System.out.println("Obese");  
}  
}  
}
```

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 2_Q4

Attempt : 1

Total Mark : 10

Marks Obtained : 6.5

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;
class main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        int initialCost = scanner.nextInt();
        int years = scanner.nextInt();
        double depreciationRate = 0.15;
        double currentValue = initialCost * Math.pow(1 - depreciationRate, years);
        currentValue = Math.round(currentValue * 100.0) / 100.0;
        System.out.println("Current Value: " + 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 : Partially correct

Marks : 6.5/10

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

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

```
for(int i=1;i<=n;i++){  
    for(int j=1;j<=i;j++){  
        System.out.print("*");  
    }  
    System.out.println();  
}  
for(int i=n-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.*;
class main{
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);
        int n=sc.nextInt();
        for(int i=1;i<=n;i++){
            int num_count=2*i-1;
            for(int j=1;j<=num_count;j++){
                System.out.print(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 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.*;
class main{
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);
        int n=sc.nextInt();
        int count=0;
        for(int i=100;i<=999;i++){
            int a=i/100;
            int b=(i/10)%10;
            int c=i%10;
            if(a!=b && b!=c && a!=c){
                if(i%3==0){
                    System.out.println(i);
                    count++;
                    if(count==n){
                        break;
                    }
                }
            }
        }
    }
}
```

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 : 30

Section 1 : Coding

1. 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.*;
class main{
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);
        double e=sc.nextDouble();
        double w=sc.nextDouble();
        double g=sc.nextDouble();
        double ec=0.12;
        double wc=0.05;
        double gc=0.08;
        double total = (e*ec) + (w*wc) + (g*gc);
        if (total>=100){
            System.out.printf("%.2f",total-(total*10/100));
        }
        else if (total>=50 && total<=99.99){
            System.out.printf("%.2f",total-(total*5/100));
        }
        else{
            System.out.printf("%.2f",total);
        }
    }
}
```

Status : Correct

Marks : 10/10

2. 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.*;
class main{
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);
        int grade=sc.nextInt();
```

```
if (grade>=90){
    System.out.println("Letter Grade: A");
}
else if (grade>=80 && grade<=89){
    System.out.println("Letter Grade: B");
}
else if (grade>=70 && grade<=79){
    System.out.println("Letter Grade: C");
}
else if (grade>=60 && grade<=69){
    System.out.println("Letter Grade: D");
}
else{
    System.out.println("Letter Grade: F");
}
}
```

Status : Correct

Marks : 10/10

3. 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.*;
class main{
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);
        int n=sc.nextInt();
        int minOdd=10;
        int maxEven=-1;
        boolean hasOdd = false;
        boolean hasEven = false;
        while (n>0){
            int digit=n%10;
            if(digit%2==0){
                hasEven=true;
                if(digit>maxEven){
                    maxEven=digit;
                }
            }else{
                hasOdd=true;
                if(digit<minOdd){
                    minOdd=digit;
                }
            }
            n=n/10;
        }
        if (hasOdd){
```



```

        System.out.printf("Minimum odd digit: %d\n",minOdd);
    }
    else{
        System.out.printf("There are no odd digits in the number.\n");
    }
    if(hasEven){
        System.out.printf("Maximum even digit: %d\n",maxEven);
    }
    else{
        System.out.println("There are no even digits in the number.\n");
    }
}
}

```

Status : Correct

Marks : 10/10

4. 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.util.*;
class main{
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);
        int n=sc.nextInt();
        int num=1;
        for(int i=1;i<=n;i++){
            for(int t=0;t<n-i;t++){
                System.out.println("\t");
            }
            int[] row=new int[i];
            for(int j=0;j<i;j++){
                row[j]=num++;
            }
            if(i%2==0){
                for(int j=i-1;j>=0;j--){
                    System.out.print(row[j] + "\t");
                }
            }else{
                for(int j=0;j<i;j++){
                    System.out.print(row[j] + "\t");
                }
            }
            System.out.println();
        }
    }
}
```

Status : **Wrong**

Marks : 0/10

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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 : 36

Section 1 : Coding

1. Problem Statement

Raj is solving a physics problem involving projectile motion, where he needs to calculate the time a ball hits the ground using a quadratic equation of the form $ax^2 + bx + c = 0$. Depending on the coefficients, the ball may hit the ground once, twice, or not at all in real time.

Help Raj find all real roots of the equation, if any.

Note: discriminant = $b^2 - 4ac$

Input Format

The input consists of three space-separated doubles a, b, and c, representing the coefficients of the quadratic equation.

Output Format

If there are two real roots, print:

- "Two real solutions:"
- "Root1 = <value>"
- "Root2 = <value>"

If there is one real root, print:

- "One real solution:"
- "Root = <value>"

If there are no real roots, print:

- "There are no real solutions."

Note: values are rounded to two decimal places.

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 1 6 9

Output: One real solution:

Root = -3.00

Answer

```
import java.util.*;
class main{
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);
        double a=sc.nextDouble();
        double b=sc.nextDouble();
        double c=sc.nextDouble();
        double discriminant=b*b-4*a*c;
        if (discriminant>0){
            double root1=(-b+Math.sqrt(discriminant))/(2*a);
            double root2=(-b-Math.sqrt(discriminant))/(2*a);
            System.out.println("Two real solutions:");
            System.out.printf("Root1 = %.2f\n",root1);
            System.out.printf("Root2 = %.2f\n",root2);
        }
    }
}
```

```

    }
    else if (discriminant==0){
        double root=-b/(2*a);
        System.out.println("One real solution:");
        System.out.printf("Root = %.2f",root);
    }
    else{
        System.out.println("There are no real solutions.");
    }
}
}
}

```

Status : Correct

Marks : 10/10

2. Problem Statement

Joe has a favourite number, let's call it X. He wants to check if X is divisible by the sum of its digits. If it is, he considers it a lucky number. If not, he wants to find the closest smaller number, that is divisible by the sum of digits of X. Joe has challenged his friends to solve this puzzle at his birthday party.

Example

Input:

157

Output:

157 is not divisible by the sum of its digits.

The closest smaller number that is divisible: 156

Explanation:

The sum of the digits of X is $1+5+7=13$. Since 157 is not divisible by 13, we need to find the closest smaller number that is divisible by 13. 156 is divisible by 13, it is the closest smaller number that meets the requirement.

Input Format

The input consists of an integer X, representing Joe's favourite number.

Output Format

If X is a lucky number, then the output must be in the format: "X is divisible by the sum of its digits."

If not, then the output must be in the format:

"X is not divisible by the sum of its digits."

The closest smaller number that is divisible: Y",

where X is the entered number and Y is the closest number.

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 120

Output: 120 is divisible by the sum of its digits.

Answer

```
import java.util.*;
class main{
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);
        int x=sc.nextInt();
        int temp=x,sum=0;
        while(temp>0){
            sum+=temp%10;
            temp/=10;
        }
        if(x%sum==0){
            System.out.printf("%d is divisible by the sum of its digits.",x);
        }
        else{
            System.out.printf("%d is not divisible by the sum of its digits.\n",x);
            int closest=x-1;
            while(closest>0){
                int t=closest,s=0;
                while(t>0){
```

```

        s+=t%10;
        t/=10;
    }
    if(closest%s==0){
        break;
    }
    closest--;
}
System.out.printf("The closest smaller number that is divisible:
%d",closest);
}
}
}

```

Status : Partially correct

Marks : 6/10

3. 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.*;
class main{
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);
        int n=sc.nextInt();
        for(int i=1;i<=n;i++){
            for(int j=1;j<=i;j++){
                System.out.print("*");
            }
            System.out.println();
        }
        for(int i=n-1;i>=1;i--){
            for(int j=1;j<=i;j++){
```



```
        System.out.print("*");
    }
    System.out.println();
}
}
```

Status : Correct

Marks : 10/10

4. 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.*;
class main{
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);
        double h=sc.nextDouble();
        double w=sc.nextDouble();
        double bmi=w/(h*h);
        System.out.printf("BMI: %.2f",bmi);
        if (bmi<18.5){
            System.out.println("\nClassification: Underweight");
        }
        else if (bmi>18.6 && bmi<24.9){
            System.out.println("\nClassification: Normal Weight");
        }
        else if (bmi>25.0 && bmi<29.9){
            System.out.println("\nClassification: Overweight");
        }
        else{
            System.out.println("\nClassification: Obese");
        }
    }
}
```

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 : 15

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 = {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

3. 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

4. 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

5. 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

6. 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

7. 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

8. 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

9. 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

10. 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

11. 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

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 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

6

Status : Correct

Marks : 1/1

14. 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

15. 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

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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.*;
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 second_smallest=arr[1];
        int third_largest=arr[n-3];
        int sum=second_smallest+third_largest;
        System.out.println(sum);
    }
}
```

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.*;
class main{
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        int [][] m = new int[n][n];
        for(int i=0;i<n;i++){
            for(int j=0;j<n;j++){
                m[i][j]=sc.nextInt();
            }
        }
        int main_sum=0,secondary_sum=0;
        for(int i=0;i<n;i++){
            main_sum+=m[i][i];
            secondary_sum+=m[i][n-1-i];
        }
        System.out.printf("Sum of the main diagonal: %d",main_sum);
        System.out.printf("Sum of the secondary diagonal: %d",secondary_sum);
    }
}
```

}
}
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.*;
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();
        }
        System.out.printf("Sum of the first and last elements:
%d",arr[0]+arr[arr.length-1]);
    }
}
```

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.*;
class main{
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);
        int n=sc.nextInt();
        int m=sc.nextInt();
        int [][] a=new int[n][m];
        int [][] b=new int[n][m];
        for(int i=0;i<n;i++){
            for(int j=0;j<m;j++){
                a[i][j]=sc.nextInt();
            }
        }
        for(int i=0;i<n;i++){
            for(int j=0;j<m;j++){
                b[i][j]=sc.nextInt();
            }
        }
    }
}
```

```
}  
    for(int i=0;i<n;i++){  
        for(int j=0;j<m;j++){  
            System.out.print(a[i][j]+b[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.*;
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();
        }
        Integer first_repeated=null;
        for (int i=0;i<arr.length;i++){
            for(int j=i+1;j<arr.length;j++){
                if(arr[i]==arr[j]){
                    first_repeated=arr[i];
                    break;
                }
            }
        }
        if(first_repeated!=null){
            break;
        }
    }
    if(first_repeated!=null){
        System.out.printf("%d",first_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 : 37.5

Section 1 : Coding

1. 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.*;
class main{
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);
        int N = sc.nextInt();
        int M = sc.nextInt();
        int [][] matrix = new int[N][M];
        int sum=0;
        for(int i=0;i<N;i++){
            for(int j=0;j<M;j++){
                matrix[i][j]=sc.nextInt();
                sum+=matrix[i][j];
            }
        }
        System.out.println(sum);
    }
}
```

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.*;
class main{
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);
        int R1=sc.nextInt();
        int C1=sc.nextInt();
        int [][] m1=new int[R1][C1];
        for (int i=0;i<R1;i++){
            for (int j=0;j<C1;j++){
                m1[i][j]=sc.nextInt();
            }
        }
        int R2=sc.nextInt();
        int C2=sc.nextInt();
        int [][] m2=new int[R2][C2];
        for (int i=0;i<R2;i++){
            for (int j=0;j<C2;j++){
                m2[i][j]=sc.nextInt();
            }
        }
        if(C1!=R2){
            System.out.println("Matrix Multiplication is not possible");
            return;
        }
        int [][] result=new int[R1][C2];
        for(int i=0;i<R1;i++){
            for(int j=0;j<C2;j++){
                result[i][j]=0;
                for(int k=0;k<C1;k++){
                    result[i][j]+=m1[i][k]*m2[k][j];
                }
            }
        }
        for(int i=0;i<R1;i++){
            for(int j=0;j<C2;j++){
                System.out.print(result[i][j]);
                if(j != C2-1)
                    System.out.print(" ");
            }
        }
    }
}
```

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

Status : Partially correct

Marks : 7.5/10

3. 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.*;
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 [] unique = new int[n];
        int count=0;
        unique[count++]=arr[0];
        for(int i=1;i<n;i++){
            if(arr[i]!=arr[i-1]){
                unique[count++]=arr[i];
            }
        }
        for(int i=0;i<count;i++){
            System.out.print(unique[i]);
            if(i<count-1) System.out.print(" ");
        }
        System.out.println();
        System.out.println(count);
    }
}
```

Status : Correct

Marks : 10/10

4. 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.*;
class main{
    static boolean isPrime(int n){
        if(n<=1) return false;
        if(n==2) return true;
        if(n%2==0) return false;
        for(int i=3;i*i<=n;i+=2){
            if(n%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 total=0;
for(int i=0;i<n;i++){
    arr[i] = sc.nextInt();
    total+=arr[i];
}
boolean found=false;
for(int i=0;i<n;i++){
    int new_sum=total-arr[i];
    if(isPrime(new_sum)){
        System.out.println(new_sum);
        found=true;
        break;
    }
}
if(!found){
    System.out.println("No valid prime sum found");
}
}
```

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

Robin is a tech-savvy teenager who is diving into programming.

He is working on a project to find special elements in an array called 'leaders.' Leaders are those exceptional elements that are greater than the sum of all the elements to their right.

Assist Robin in writing this program.

Example

Input:

6

16 28 74 19 25 11

Output:

74 25 11

Explanation:

The element 16 is not greater than the sum of elements to its right ($28 + 74 + 19 + 25 + 11 = 157$)

The element 28 is not greater than the sum of elements to its right ($74 + 19 + 25 + 11 = 129$)

The element 74 is greater than the sum of elements to its right ($19 + 25 + 11 = 55$)

The element 19 is not greater than the sum of elements to its right ($25 + 11 = 36$)

The element 25 is greater than the sum of elements to its right (11)

The last element 11 is always a leader since there are no elements to its right.

So, the output is {74, 25, 11}.

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 elements of the array.

Output Format

The output prints the special elements in the given array, that are greater than the sum of all the elements to their right.

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 5

3 4 2 5 1

Output: 5 1

Answer

```
import java.util.*;
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 [] leaders = new int[n];
        int count=0;
        int rightSum=0;
        for(int i=n-1;i>=0;i--){
            if(arr[i]>rightSum){
                leaders[count++]=arr[i];
            }
            rightSum+=arr[i];
        }
        for(int i=count-1;i>=0;i--){
            System.out.print(leaders[i]);
            if(i>0)
                System.out.print(" ");
        }
    }
}
```

Status : Correct

Marks : 10/10

2. 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.*;
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);
    }
}
```

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

Status : Correct

Marks : 10/10

3. 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.*;
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 sum=0;
        for(int i=0;i<n;i++){
            sum+=arr[i];
        }
        System.out.println("Maximum Sum: "+sum);
    }
}
```

Status : Correct

Marks : 10/10

4. 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.*;
class main{
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        int [][] m = new int[n][n];
        for(int i=0;i<n;i++){
            for(int j=0;j<n;j++){
                m[i][j] = sc.nextInt();
            }
        }
        for(int i=0;i<n;i++){
```

```

        for(int j=i+1;j<n;j++){
            int temp = m[i][j];
            m[i][j]=m[j][i];
            m[j][i]=temp;
        }
    }
    for(int i=0;i<n;i++){
        for(int j=0;j<n/2;j++){
            int temp = m[i][j];
            m[i][j]=m[i][n-j-1];
            m[i][n-j-1]=temp;
        }
    }
    System.out.println("Rotated 2D Array:");
    for(int i=0;i<n;i++){
        for(int j=0;j<n;j++){
            System.out.print(m[i][j] + " ");
        }
        System.out.println();
    }
}
}

```

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 : 13

Section 1 : MCQ

1. 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 = HellocharAt(1) before = ebuffer after = HicharAt(1) after = 0

Status : Wrong

Marks : 0/1

2. 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

3. 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

4. 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

5. 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

6. 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 Hard

Status : Correct

Marks : 1/1

7. 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

8. 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

9. 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

10. 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 Javlike a!

Status : Correct

Marks : 1/1

11. 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

12. 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

appleorangepear

Status : Wrong

Marks : 0/1

13. 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

14. 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

15. 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 : 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.*;
class main{
    public static void main(String args[]){
        Scanner sc = new Scanner(System.in);
        int t = sc.nextInt();
        sc.nextLine();
        for(int i=0;i<t;i++){
            String passage = sc.nextLine();
            int commas = 0, periods=0, questions=0;
            for(int j=0;j<passage.length();j++){
                char c = passage.charAt(j);
                if (c==',') commas++;
                else if (c=='.') periods++;
                else if (c=='?') 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.*;
class main{
    public static void main(String args[]){
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        sc.nextLine();
        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(" ");
            }
        }
    }
}
```

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.*;
class main{
    public static void main(String args[]){
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        sc.nextLine();
        String pn;
        for(int i=0;i<n;i++){
            pn=sc.nextLine();
            boolean a = false;
            for(int j=0;j<pn.length();j++){
                char ch = pn.charAt(j);
                if(!Character.isDigit(ch)){
                    a=true;
                    break;
                }
            }
            if (pn.charAt(0)=='0' || (pn.length()!=10) || a){
                System.out.println("NO");
            }
            else{
                System.out.println("YES");
            }
        }
    }
}
```

2116240701322
}
}
}

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.*;
class main{
    public static void main(String args[]){
        Scanner sc = new Scanner(System.in);
        String sentence = sc.nextLine();
        String[] words = sentence.split(" ");
        String output = "";
        boolean first = true;
        for(String word : words){
            if(word.length() >= 2 && word.matches("[a-zA-Z]+")){
                if(first){
                    output = word;
                    first = false;
                }else{
                    output = output + " " + word;
                }
            }
        }
        if(output.isEmpty()){
            System.out.println("No valid words.");
        }else{
            System.out.println(output);
        }
    }
}
```

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.*;
class main{
    public static void main(String args[]){
        Scanner sc = new Scanner(System.in);
        int t =sc.nextInt();
        sc.nextLine();
        for(int i=0;i<t;i++){
            String pin = sc.nextLine();
            if(pin.length() != 4){
                System.out.println("NO");
                continue;
            }
            boolean allDigits = true;
            char firstChar = pin.charAt(0);
            boolean allSame = true;
            for(int j=0;j<4;j++){
                if(!Character.isDigit(pin.charAt(j))){
                    allDigits = false;
                    break;
                }
                if(pin.charAt(j) != firstChar){
                    allSame = false;
                }
            }
        }
    }
}
```

```
}
    if(!allDigits || allSame){
        System.out.println("NO");
    }

    else{
        System.out.println("YES");
    }
}
}
```

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

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.*;
class main{
    public static void main(String args[]){
        Scanner sc = new Scanner(System.in);
        String s = sc.nextLine();
        String[] words = s.split(" ");
        boolean found = false;
        for(int i=0;i<words.length;i++){
            if (isPalindrome(words[i])){
                if(found){
                    System.out.print(" ");
                }
                System.out.print(words[i]);
                found = true;
            }
        }
        if(!found){
            System.out.println("No palindromes found");
        }
    }
    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

2. 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.*;
class main{
    public static void main(String args[]){
        Scanner sc = new Scanner(System.in);
        String s = sc.nextLine();
        int uppercase = 0, lowercase = 0, digits=0;
```

```

for(int i=0;i<s.length();i++){
    char ch = s.charAt(i);
    if(ch>='A' && ch<='Z'){
        uppercase++;
    }
    else if (ch>='a' && ch<='z'){
        lowercase++;
    }
    else if (ch>='0' && ch<='9'){
        digits++;
    }
}
System.out.println(uppercase + " " + lowercase + " " + digits);
}
}

```

Status : Correct

Marks : 10/10

3. 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.*;
class main{
    public static void main(String args[]){
        Scanner sc = new Scanner(System.in);
        String s = sc.nextLine();
        String[] words = s.split(" ");
        boolean found = false;
        for(int i=0;i<words.length;i++){
            String word = words[i];
            if(word.length() > 0){
                char first = Character.toLowerCase(word.charAt(0));
                char last = Character.toLowerCase(word.charAt(word.length() - 1));
                if (first == last){
                    if(found){
                        System.out.print(" ");
                    }
                    System.out.print(word);
                    found = true;
                }
            }
        }
        if(!found){
            System.out.println("No special words found");
        }
    }
}
```

Status : Correct

Marks : 10/10

4. 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.*;
class main{
    public static void main(String args[]){
        Scanner sc = new Scanner(System.in);
        int t = sc.nextInt();
        sc.nextLine();
        for(int i=0;i<t;i++){
            String line = sc.nextLine();
            int count = 0;
```

```
for(int j=0;j<line.length();j++){  
    char ch = Character.toLowerCase(line.charAt(j));  
    if(ch=='a' || ch=='e' || ch=='i' || ch=='o' || ch=='u'){  
        count++;  
    }  
}  
System.out.println(count);  
}  
}
```

Status : Correct

Marks : 10/10

Rajalakshmi Engineering College

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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

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 ≥ 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.*;
class main{
    public static void main(String args[]){
        Scanner sc = new Scanner(System.in);
        String s = sc.nextLine();
        String[] words = s.split(" ");
        boolean found = false;
        for(int i=0;i<words.length;i++){
            if(words[i].length() >= 5){
                if(found){
                    System.out.println(" ");
                }
                System.out.print(words[i]);
                found = true;
            }
        }

        if(!found){
            System.out.println("No long words found");
        }
    }
}
```

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.*;
class main{
    public static void main(String args[]){
        Scanner sc = new Scanner(System.in);
        String s = sc.nextLine();
        String[] words = s.split(" ");
        boolean found = false;
        for(int i=0;i<words.length;i++){
            if(hasRepeated(words[i])){
                if(found){
```

```

        System.out.print(" ");
    }
    System.out.print(words[i]);
    found = true;
}
}
if(!found){
    System.out.println("No repetitive words found");
}
}
private static boolean hasRepeated(String word){
    int[] freq = new int[128];
    for(int i=0;i<word.length();i++){
        char ch = word.charAt(i);
        freq[ch]++;
        if(freq[ch] > 1){
            return true;
        }
    }
    return false;
}
}

```

Status : Correct

Marks : 10/10

3. Problem Statement

In a college, students are required to create unique usernames for accessing the digital library.

The librarian needs your help to verify whether the usernames entered by students are valid.

A username is considered valid if:

It contains only letters (a–z, A–Z) and digits (0–9). Its length is between 5 and 15 characters (inclusive). It must start with a letter (not a digit).

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

Input Format

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

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

Output Format

For each username 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

Alice123

Output: YES

Answer

```
import java.util.*;
class main{
    public static void main(String args[]){
        Scanner sc = new Scanner(System.in);
        int t = sc.nextInt();
        sc.nextLine();
        for(int i=0;i<t;i++){
            String username = sc.nextLine();
            if(isValid(username)){
                System.out.println("YES");
            }else{
                System.out.println("NO");
            }
        }
    }
    private static boolean isValid(String username){
        if(username.length() < 5 || username.length() > 15)
            return false;
        char first = username.charAt(0);
        if(!Character.isLetter(first))
            return false;
```



```
for(int i=0;i<username.length();i++){
    char ch = username.charAt(i);
    if(!Character.isLetterOrDigit(ch)){
        return false;
    }
}
return true;
}
```

Status : Correct

Marks : 10/10

4. Problem Statement

A library wants to analyze book titles to count the number of words that start with an uppercase letter. This helps the library track proper nouns and important words in titles.

Your task is to write a program that, for each given title, counts and prints the number of words that start with an uppercase letter.

Input Format

The first line contains an integer T, representing the number of book titles.

Each of the next T lines contains a single title (string).

Output Format

For each title, the output print a single integer representing the number of words starting with an uppercase letter.

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 1

The Chronicles of Narnia

Output: 3

Answer

```
import java.util.*;
class main{
    public static void main(String args[]){
        Scanner sc = new Scanner(System.in);
        int t = sc.nextInt();
        sc.nextLine();
        for(int i=0;i<t;i++){
            String line = sc.nextLine();
            String[] words = line.split(" ");
            int count=0;
            for(int j=0;j<words.length;j++){
                if(words[j].length() > 0 && Character.isUpperCase(words[j].charAt(0))){
                    count++;
                }
            }
            System.out.println(count);
        }
    }
}
```

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 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

2. 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

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 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

5. 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

6. 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

7. 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

8. 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

9. 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

10. 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

11. 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

12. 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

13. 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

14. 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

15. 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

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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){
            balance+=amount;
        }
    }
    public void withdraw(double amount){
        if(amount>=0 && 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 accNo = Integer.parseInt(sc.nextLine().trim());
            String custName = sc.nextLine().trim();
            double initialBalance = Double.parseDouble(sc.nextLine().trim());
```

```
double deposit = Double.parseDouble(sc.nextLine().trim());
double withdraw = Double.parseDouble(sc.nextLine().trim());
Account acc = new Account(accNo, custName, initialBalance);
acc.deposit(deposit);
acc.withdraw(withdraw);
System.out.println("Account Number: " + acc.getAccountNumber());
System.out.println("Customer Name: " + acc.getCustomerName());
System.out.printf("Final Balance: %.1f\n ",acc.getBalance());
    }
}
}
```

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.*;
```

```
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 > 200) {
            bill += (units - 200) * 10;
            units = 200;
        }
        if (units > 100) {
            bill += (units - 100) * 7;
            units = 100;
        }
        bill += units * 5;
        if (bill > 2000) {
            bill -= bill * 0.05;
        }
        return bill;
    }
}
```

```
}  
  
public class Main {  
    public static void main(String[] args) {  
        Scanner sc = new Scanner(System.in);  
        int n = sc.nextInt();  
        ArrayList<Customer> customers = new ArrayList<>();  
        for (int i = 0; i < n; i++) {  
            int id = sc.nextInt();  
            sc.nextLine();  
            String name = sc.nextLine();  
            double units = sc.nextDouble();  
            customers.add(new Customer(id, name, units));  
        }  
        for (Customer c : customers) {  
            System.out.println("Customer ID: " + c.getId());  
            System.out.println("Customer Name: " + c.getName());  
            System.out.printf("Final Bill: %.1f\n", c.calculateBill());  
        }  
    }  
}
```

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 fare = 50 + distance * 10;  
    if (distance > 20) 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();  
        ArrayList<Booking> bookings = new ArrayList<>();  
        for (int i = 0; i < n; i++) {  
            int id = sc.nextInt();  
            sc.nextLine();  
            String name = sc.nextLine();  
            double distance = sc.nextDouble();  
            bookings.add(new Booking(id, name, distance));  
        }  
        for (Booking b : bookings) {
```

```
System.out.println("Booking ID: " + b.getBookingId());  
System.out.println("Customer Name: " + b.getCustomerName());  
System.out.printf("Final Fare: %.1f\n", b.calculateFare());
```

```
}  
}  
}
```

Status : Correct

Marks : 10/10

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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 subjects;
```

```
public Student(int enrollmentId, String studentName, int subjects) {  
    this.enrollmentId = enrollmentId;  
    this.studentName = studentName;  
    this.subjects = subjects;  
}
```

```
public int getEnrollmentId() {  
    return enrollmentId;  
}
```

```
public String getStudentName() {  
    return studentName;  
}
```

```
public int getSubjects() {  
    return subjects;  
}
```

```
public double calculateFee() {  
    double fee = 1000 + subjects * 800;  
    if (subjects > 5) fee -= fee * 0.20;  
    return fee;  
}
```

```
public class Main {  
    public static void main(String[] args) {  
        Scanner sc = new Scanner(System.in);  
        int n = sc.nextInt();  
        ArrayList<Student> students = new ArrayList<>();  
        for (int i = 0; i < n; i++) {  
            int id = sc.nextInt();  
            sc.nextLine();  
            String name = sc.nextLine();  
            int subjects = sc.nextInt();  
            students.add(new Student(id, name, subjects));  
        }  
        for (Student s : students) {  
            System.out.println("Enrollment ID: " + s.getEnrollmentId());  
        }  
    }  
}
```

```
System.out.println("Student Name: " + s.getStudentName());  
System.out.printf("Final Fee: %.1f\n", s.calculateFee());
```

```
}  
}  
}
```

Status : Correct

Marks : 10/10

Rajalakshmi Engineering College

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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

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
{
    private int bookingId;
    private String customerName;
    private int numberOfTickets;
    private String seatType;

    public Booking(int bookingId, String customerName, int numberOfTickets,
String seatType)
    {
        this.bookingId = bookingId;
        this.customerName = customerName;
        this.numberOfTickets = numberOfTickets;
        this.seatType = seatType;
    }

    public int getBookingId()
    {
        return bookingId;
    }

    public String getCustomerName()
    {
        return customerName;
    }

    public int getNumberOfTickets()
    {
        return numberOfTickets;
    }
}
```

```
}
```

```
public String getSeatType()
```

```
{
```

```
    return seatType;
```

```
}
```

```
public double calculateFinalAmount()
```

```
{
```

```
    double pricePerTicket = 0;
```

```
    switch (seatType)
```

```
{
```

```
        case "Standard": pricePerTicket = 250; break;
```

```
        case "Premium": pricePerTicket = 400; break;
```

```
        case "VIP": pricePerTicket = 600; break;
```

```
}
```

```
    double totalAmount = numberOfTickets * pricePerTicket;
```

```
    if (numberOfTickets > 4)
```

```
{
```

```
        totalAmount -= totalAmount * 0.10;
```

```
}
```

```
    if (seatType.equals("VIP") && totalAmount > 3000)
```

```
{
```

```
        totalAmount += totalAmount * 0.05;
```

```
}
```

```
    return totalAmount;
```

```
}
```

```

    }

    public class Main
    {

        public static void main(String[] args)

        {

            Scanner sc = new Scanner(System.in);
            int n = Integer.parseInt(sc.nextLine());
            ArrayList<Booking> bookings = new ArrayList<>();
            for (int i = 0; i < n; i++)
            {
                int bookingId = Integer.parseInt(sc.nextLine());
                String customerName = sc.nextLine();
                int numberOfTickets = Integer.parseInt(sc.nextLine());
                String seatType = sc.nextLine();
                bookings.add(new Booking(bookingId, customerName, numberOfTickets,
                seatType));
            }

            for (Booking b : bookings)
            {
                System.out.println("Booking ID: " + b.getBookingId());
                System.out.println("Customer Name: " + b.getCustomerName());
                System.out.println("Final Ticket Amount: " + String.format("%.1f",
                b.calculateFinalAmount()));
            }

        }

    }

```

Status : Correct

Marks : 10/10

2. 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
```

```
{
```

```
    private int participantId;
```

```
    private String participantName;
```

```
    private int[] scores;
```

```
    private int totalScore;
```

```
    private int averageScore;
```

```
    public Participant(int participantId, String participantName, int[] scores)
```

```
{
```

```
        this.participantId = participantId;
```

```
        this.participantName = participantName;
```

```
        this.scores = scores;
```

```
        calculateScores();
```

```
}
```

```
    public int getParticipantId()
```

```
{
    return participantId;
}

public String getParticipantName()
{
    return participantName;
}

public int getTotalScore()
{
    return totalScore;
}

public int getAverageScore()
{
    return averageScore;
}

private void calculateScores()
{
    totalScore = 0;
    boolean allAbove80 = true;
    for (int score : scores)
    {
        totalScore += score;
        if (score <= 80)
        {
            allAbove80 = false;
        }
    }
}
```

```
}
```

```
}
```

```
    if (allAbove80)
```

```
{
```

```
        totalScore += 10;
```

```
}
```

```
    averageScore = totalScore / 5;
```

```
}
```

```
}
```

```
public class Main
```

```
{
```

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

```
{
```

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

```
        int n = Integer.parseInt(sc.nextLine());
```

```
        ArrayList<Participant> participants = new ArrayList<>();
```

```
        for (int i = 0; i < n; i++)
```

```
{
```

```
            int id = Integer.parseInt(sc.nextLine());
```

```
            String name = sc.nextLine();
```

```
            int[] scores = new int[5];
```

```
            String[] parts = sc.nextLine().split(" ");
```

```

        for (int j = 0; j < 5; j++)
        {
            scores[j] = Integer.parseInt(parts[j]);
        }

        participants.add(new Participant(id, name, scores));

    }

    Participant topScorer = participants.get(0);
    for (Participant p : participants)
    {
        System.out.println("Participant ID: " + p.getParticipantId());
        System.out.println("Participant Name: " + p.getParticipantName());
        System.out.println("Total Score: " + p.getTotalScore());
        System.out.println("Average Score: " + p.getAverageScore());
        if (p.getTotalScore() > topScorer.getTotalScore() ||
            (p.getTotalScore() == topScorer.getTotalScore() && p.getParticipantId()
            < topScorer.getParticipantId()))
        {
            topScorer = p;
        }
    }

    System.out.println("Top Scorer: " + topScorer.getParticipantName() + " with "
    + topScorer.getTotalScore() + " points");
}

```

}
Status : Correct

Marks : 10/10

3. 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.Scanner;
```

```
class Account
```

```
{
```

```
    private int accountNumber;
```

```
    private String customerName;
```

```
    private double balance;
```

```
    public Account(int accountNumber, String customerName, double balance)
```

```
{
```

```
this.accountNumber = accountNumber;  
this.customerName = customerName;  
this.balance = balance;
```

```
}
```

```
public void setAccountNumber(int accountNumber)
```

```
{
```

```
this.accountNumber = accountNumber;
```

```
}
```

```
public void setCustomerName(String customerName)
```

```
{
```

```
this.customerName = customerName;
```

```
}
```

```
public void setBalance(double balance)
```

```
{
```

```
this.balance = balance;
```

```
}
```

```
public int getAccountNumber()
```

```
{
```



```
return accountNumber;
```

```
}
```

```
public String getCustomerName()
```

```
{
```

```
    return customerName;
```

```
}
```

```
public double getBalance()
```

```
{
```

```
    return balance;
```

```
}
```

```
public void deposit(double amount)
```

```
{
```

```
    if (amount >= 0) balance += amount;
```

```
}
```

```
public void withdraw(double amount)
```

```
{
```

```
    if (amount <= balance) balance -= amount;
```

```
}
```

```
}
```

```
class CityBankApp
```

```
{
```

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

```
    {
```

```
        Scanner sc = new Scanner(System.in);  
        int n = Integer.parseInt(sc.nextLine());  
        for (int i = 0; i < n; i++)
```

```
        {
```

```
            int accNo = Integer.parseInt(sc.nextLine());  
            String name = sc.nextLine();  
            double initBal = Double.parseDouble(sc.nextLine());  
            double depositAmt = Double.parseDouble(sc.nextLine());  
            double withdrawAmt = Double.parseDouble(sc.nextLine());
```

```
            Account acc = new Account(accNo, name, initBal);  
            acc.deposit(depositAmt);  
            acc.withdraw(withdrawAmt);
```

```
            System.out.println("Account Number: " + acc.getAccountNumber());  
            System.out.println("Customer Name: " + acc.getCustomerName());  
            System.out.println("Final Balance: " + String.format("%.1f",  
acc.getBalance()));
```

```
        }
```

```
        sc.close();
```

```
}  
}
```

Status : Correct

Marks : 10/10

4. 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
```

```
{
```

```
    private int userId;
```

```
    private String userName;
```

```
    private String password;
```

```
public User(int userId, String userName, String password)
```

```
{
```

```
    this.userId = userId;
```

```
    this.userName = userName;
```

```
    this.password = password;
```

```
}
```

```
public int getUserId()
```

```
{
```

```
    return userId;
```

```
}
```

```
public String getUserName()
```

```
{
```

```
    return userName;
```

```
}
```

```
public String getPassword()
```

```
{
```

```
    return password;
```

```
}
```

```
public void setUserId(int userId)
```

```
{
```

```
    this.userId = userId;
```

```
}
```

```
public void setUsername(String userName)
```

```
{
```

```
    this.userName = userName;
```

```
}
```

```
public void setPassword(String password)
```

```
{
```

```
    this.password = password;
```

```
}
```

```
public String checkPasswordStrength()
```

```
{
```

```
    if (password.length() < 8) return "Weak";
```

```
    boolean hasUpper = false, hasLower = false, hasDigit = false, hasSpecial = false;
```

```
    String specials = "!@#$%^&*";
```

```
    for (char c : password.toCharArray())
```

```
{  
    if (Character.isUpperCase(c)) hasUpper = true;  
    else if (Character.isLowerCase(c)) hasLower = true;  
    else if (Character.isDigit(c)) hasDigit = true;  
    else if (specials.indexOf(c) != -1) hasSpecial = true;  
}  
    if (hasUpper && hasLower && hasDigit && hasSpecial) return "Strong";  
    return "Weak";  
}  
}
```

```
public class Main
```

```
{
```

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

```
{
```

```
    Scanner sc = new Scanner(System.in);  
    int n = Integer.parseInt(sc.nextLine());  
    ArrayList<User> users = new ArrayList<>();  
    for (int i = 0; i < n; i++)
```

```
{
```

```
    int id = Integer.parseInt(sc.nextLine());  
    String name = sc.nextLine();  
    String pwd = sc.nextLine();  
    users.add(new User(id, name, pwd));
```

```

    }
    for (User u : users)
    {

        System.out.println("User ID: " + u.getUserId());
        System.out.println("User Name: " + u.getUserName());
        System.out.println("Password: " + u.getPassword());
        System.out.println("Password Strength: " + u.checkPasswordStrength());

    }
}
}
}

```

Status : Correct

Marks : 10/10

5. 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 sessions;
```

```
    public Member(int memberId, String memberName, String membershipType,  
int sessions)
```

```
{
```

```
    this.memberId = memberId;  
    this.memberName = memberName;  
    this.membershipType = membershipType;  
    this.sessions = sessions;
```

```
}
```

```
    public int getMemberId()
```

```
{
```

```
        return memberId;
```

```
}
```

```
public String getMemberName()
{
```

```
    return memberName;
```

```
}
```

```
public String getMembershipType()
```

```
{
```

```
    return membershipType;
```

```
}
```

```
public int getSessions()
```

```
{
```

```
    return sessions;
```

```
}
```

```
public double calculateFinalFee()
```

```
{
```

```
    double fee = 0;
    if (membershipType.equals("Basic")) fee = 1000;
    else if (membershipType.equals("Premium")) fee = 1500;
    else if (membershipType.equals("Elite")) fee = 2000;
    fee += sessions * 500;
    if (sessions > 5) fee -= fee * 0.10;
```

```
        if (membershipType.equals("Elite") && fee > 4000) fee += fee * 0.05;
        return fee;
    }
}
```

```
public class Main
```

```
{
```

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

```
{
```

```
    Scanner sc = new Scanner(System.in);
    int n = Integer.parseInt(sc.nextLine());
    ArrayList<Member> members = new ArrayList<>();
    for (int i = 0; i < n; i++)
```

```
{
```

```
    int id = Integer.parseInt(sc.nextLine());
    String name = sc.nextLine();
    String type = sc.nextLine();
    int sessions = Integer.parseInt(sc.nextLine());
    members.add(new Member(id, name, type, sessions));
```

```
}
```

```
    for (Member m : members)
```

```
{
```

```
        System.out.println("Member ID: " + m.getMemberId());
        System.out.println("Member Name: " + m.getMemberName());
        System.out.println("Final Monthly Fee: " + String.format("%.1f",
m.calculateFinalFee()));
```

2116240701322

}

}

}

Status : Correct

Marks : 10/10

2116240701322

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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

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 {  
    private int runnerId;  
    private String runnerName;  
    private int[] times;  
    private int averageTime;  
  
    public Runner(int runnerId, String runnerName, int[] times) {  
        this.runnerId = runnerId;  
        this.runnerName = runnerName;  
        this.times = times;  
        calculateAverage();  
    }  
  
    public int getRunnerId() {  
        return runnerId;  
    }  
  
    public String getRunnerName() {  
        return runnerName;  
    }  
  
    public int getAverageTime() {  
        return averageTime;  
    }  
  
    private void calculateAverage() {  
        int sum = 0;  
        for (int t : times) sum += t;  
        averageTime = sum / 5;  
    }  
}
```

```
public class Main {
```



```

public static void main(String[] args) {
    Scanner sc = new Scanner(System.in);
    int n = sc.nextInt();
    ArrayList<Runner> runners = new ArrayList<>();
    for (int i = 0; i < n; i++) {
        int id = sc.nextInt();
        sc.nextLine();
        String name = sc.nextLine();
        int[] times = new int[5];
        for (int j = 0; j < 5; j++) {
            times[j] = sc.nextInt();
        }
        runners.add(new Runner(id, name, times));
    }
    Runner fastest = runners.get(0);
    for (Runner r : runners) {
        System.out.println("Runner ID: " + r.getRunnerId());
        System.out.println("Runner Name: " + r.getRunnerName());
        System.out.println("Average Time: " + r.getAverageTime());
        if (r.getAverageTime() < fastest.getAverageTime() ||
            (r.getAverageTime() == fastest.getAverageTime() && r.getRunnerId() <
             fastest.getRunnerId())) {
            fastest = r;
        }
    }
    System.out.println("Fastest Runner: " + fastest.getRunnerName() + " with " +
        fastest.getAverageTime() + " minutes");
}
}

```

Status : Correct

Marks : 10/10

2. 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 {  
    private int customerId;  
    private String customerName;  
    private double litersConsumed;  
  
    public Customer(int customerId, String customerName, double  
litersConsumed) {  
        this.customerId = customerId;  
        this.customerName = customerName;  
        this.litersConsumed = litersConsumed;  
    }  
  
    public int getCustomerId() {  
        return customerId;  
    }  
  
    public String getCustomerName() {  
        return customerName;  
    }  
  
    public double getLitersConsumed() {  
        return litersConsumed;  
    }  
  
    public double calculateBill() {  
        double bill = 0;  
        double liters = litersConsumed;  
        if (liters > 1000) {  
            bill += (liters - 1000) * 5;  
            liters = 1000;  
        }  
    }  
}
```

```

    if (liters > 500) {
        bill += (liters - 500) * 3;
        liters = 500;
    }
    bill += liters * 2;
    if (bill > 3000) {
        bill = bill - (bill * 0.1);
    }
    return bill;
}
}

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        ArrayList<Customer> customers = new ArrayList<>();
        for (int i = 0; i < n; i++) {
            int id = sc.nextInt();
            sc.nextLine();
            String name = sc.nextLine();
            double liters = sc.nextDouble();
            customers.add(new Customer(id, name, liters));
        }
        for (Customer c : customers) {
            System.out.println("Customer ID: " + c.getCustomerId());
            System.out.println("Customer Name: " + c.getCustomerName());
            System.out.printf("Final Bill: %.1f\n", c.calculateBill());
        }
    }
}

```

Status : Correct

Marks : 10/10

3. Problem Statement

Meera is working as a developer for CityGas Supply Board, which wants to build a household gas billing system.

Each household's gas account has:

A Customer ID (integer) A Customer Name (string) Units Consumed in cubic meters (double)

The gas bill is calculated based on these rules:

For the first 50 units 4 per unit For the next 100 units (51–150) 6 per unit For units above 150 8 per unit If the total bill exceeds 2000, a 15% discount is applied on the final bill.

Meera 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> (The final bill must be rounded to one decimal place.)

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 1

1001

Ravi Kumar

30

Output: Customer ID: 1001

Customer Name: Ravi Kumar

Final Bill: 120.0

Answer

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

```
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 > 150) {  
            bill += (units - 150) * 8;  
            units = 150;  
        }  
    }  
}
```

```

    if (units > 50) {
        bill += (units - 50) * 6;
        units = 50;
    }
    bill += units * 4;
    if (bill > 2000) {
        bill -= bill * 0.15;
    }
    return bill;
}
}

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        ArrayList<Customer> customers = new ArrayList<>();
        for (int i = 0; i < n; i++) {
            int id = sc.nextInt();
            sc.nextLine();
            String name = sc.nextLine();
            double units = sc.nextDouble();
            customers.add(new Customer(id, name, units));
        }
        for (Customer c : customers) {
            System.out.println("Customer ID: " + c.getCustomerId());
            System.out.println("Customer Name: " + c.getCustomerName());
            System.out.printf("Final Bill: %.1f\n", c.calculateBill());
        }
    }
}

```

Status : Correct

Marks : 10/10

4. 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 {
```

```
    private int customerId;
```

```
    private String customerName;
```

```
    private double dataBalance;
```

```
    public Customer(int customerId, String customerName, double dataBalance) {
```

```
        this.customerId = customerId;
```

```
        this.customerName = customerName;
```

```
        this.dataBalance = dataBalance;
```

```
    }
```

```
    public int getCustomerId() {
```

```
        return customerId;
```

```
    }
```

```
    public String getCustomerName() {
```

```
        return customerName;
```

```
    }
```

```
    public double getDataBalance() {
```

```
        return dataBalance;
```

```
    }
```

```

public void recharge(double amount) {
    if (amount >= 0) dataBalance += amount;
}

public void useData(double amount) {
    if (amount <= dataBalance) dataBalance -= amount;
}

}

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        ArrayList<Customer> customers = new ArrayList<>();
        for (int i = 0; i < n; i++) {
            int id = sc.nextInt();
            sc.nextLine();
            String name = sc.nextLine();
            double balance = sc.nextDouble();
            double recharge = sc.nextDouble();
            double usage = sc.nextDouble();
            Customer c = new Customer(id, name, balance);
            c.recharge(recharge);
            c.useData(usage);
            customers.add(c);
        }
        for (Customer c : customers) {
            System.out.println("Customer ID: " + c.getCustomerId());
            System.out.println("Customer Name: " + c.getCustomerName());
            System.out.printf("Final Data Balance: %.1f GB\n", c.getDataBalance());
        }
    }
}

```

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 : 13

Section 1 : MCQ

1. 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

Method 2

Status : Correct

Marks : 1/1

2. Select the correct keyword for implementing inheritance through the class.

Answer

extends

Status : Correct

Marks : 1/1

3. 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

4. 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

8

Status : Wrong

Marks : 0/1

5. 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

6. 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

String method

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 A
Class B
Class C

Status : Correct

Marks : 1/1

8. 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

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 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

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 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

13. Which of the following is the correct way for class B to inherit from class A?

Answer

class B extends class A {}

Status : Wrong

Marks : 0/1

14. 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

15. 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

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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 baseMonthlyCost, double serviceTax) {  
        this.baseMonthlyCost = baseMonthlyCost;  
        this.serviceTax = serviceTax;  
    }  
  
    public double calculateMonthlyCost() {  
        return baseMonthlyCost + serviceTax;  
    }  
}
```

```
class PremiumSubscription extends Subscription {  
    private double extraFeatureCost;  
  
    public PremiumSubscription(double baseMonthlyCost, double serviceTax,  
double extraFeatureCost) {  
        super(baseMonthlyCost, serviceTax);  
        this.extraFeatureCost = extraFeatureCost;  
    }  
}
```

```
@Override
```

```
public double calculateMonthlyCost() {  
    double costWithTax = super.calculateMonthlyCost();  
    return costWithTax + 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 > 1.00) {  
            return -1.0;  
        }  
    }  
}
```

```
    }  
    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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Batch: 2028

Degree: B.E - CSE

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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) {  
        int taxAmount = (price * taxRate) / 100;  
        return price + taxAmount;  
    }  
}
```

```
public static double calculateFinalPrice(double price, double taxRate) {  
    double taxAmount = (price * taxRate) / 100.0;  
    return price + taxAmount;  
}  
}  
  
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.Scanner;  
  
class Cuboid {  
    protected double length;  
    protected double width;  
    protected double height;  
  
    public Cuboid(double length, double width, double height) {  
        this.length = length;  
        this.width = width;  
        this.height = height;  
    }  
}
```

```

    public double calculateVolume() {
        return length * width * height;
    }
}

class Cube extends Cuboid {
    public Cube(double side) {
        super(side, side, side);
    }

    @Override
    public double calculateVolume() {
        return length * length * length;
    }
}

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

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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;

class Item {
    protected String name;
    protected double price;

    public Item(String name, double price) {
        this.name = name;
        this.price = price;
    }

    public double calculateCost() {
        return price;
    }
}

class Produce extends Item {
```

```
    public Produce(String name, double price) {  
        super(name, price);  
    }  
}
```

```
class OrganicProduce extends Produce {  
    private static final double DISCOUNT_RATE = 0.10;  
  
    public OrganicProduce(String name, double price) {  
        super(name, price);  
    }  
}
```

```
@Override  
public double calculateCost() {  
    return price * (1 - DISCOUNT_RATE);  
}  
}
```

```
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

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:

Travel Distance = Speed * 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.lang.String;
```

```
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 this.speed * this.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

2. 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.Scanner;
```

```
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

3. 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;

class Employee {
    protected String name;
    protected int employeeID;

    public Employee(String name, int employeeID) {
        this.name = name;
        this.employeeID = employeeID;
    }

    public String getName() {
        return name;
    }

    public int getEmployeeID() {
        return employeeID;
    }
}

class Manager extends Employee {
    private double salary;

    public Manager(String name, int employeeID, double salary) {
        super(name, employeeID);
        this.salary = salary;
    }

    public double calculateAnnualSalary() {
        return this.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

4. 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.lang.Math;
```

```
import java.text.DecimalFormat;
```

```
class BMIcalculator {  
    protected double weight;  
    protected double height;
```

```
public BMICalculator(double weight, double height) {
    this.weight = weight;
    this.height = height;
}

public double calculateBMI() {
    return weight / (height * height);
}

public void displayBMI() {
    double bmi = calculateBMI();
    DecimalFormat df = new DecimalFormat("0.00");
    System.out.println("BMI: " + df.format(bmi));
}
}

class CustomBMICalculator extends BMICalculator {

    public CustomBMICalculator(double weight, double height) {
        super(weight, height);
    }

    public String calculateBMICategory() {
        double bmiValue = super.calculateBMI();
        String category;

        if (bmiValue < 18.5) {
            category = "Underweight";
        } else if (bmiValue < 24.9) {
            category = "Normal Weight";
        } else if (bmiValue < 29.9) {
            category = "Overweight";
        } else {
            category = "Obese";
        }
        return category;
    }

    public void displayCustomBMI() {
        String category = calculateBMICategory();
        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();
```

```
  
        BMlcalculator bmiCalculator = new BMlcalculator(weight, height);  
        System.out.println("Standard BMI Calculation:");  
        bmiCalculator.displayBMI();
```

```
        CustomBMlcalculator customBMlcalculator = new  
        CustomBMlcalculator(weight, height);  
        System.out.println("Custom BMI Calculation:");  
        customBMlcalculator.displayCustomBMI();
```

```
  
        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

Mary is managing a business and wants to analyze its profitability. She operates both a regular business model and a seasonal business model. To assess profitability, she uses a program that calculates and compares the profit margins for both models based on revenue and cost.

The program defines:

BusinessUtility class with a method calculateMargin(double revenue, double cost). SeasonalBusinessUtility (inherits from BusinessUtility) and overrides calculateMargin(double revenue, double cost), adding a seasonal adjustment of 10% to the base margin. ProfitabilityChecker class with a method checkProfitability(double regularMargin), which prints "Business is profitable." if the regular margin is 10% or more, otherwise prints "Business is not profitable.".

Mary inputs revenue and cost, and the program compute and display the regular and seasonal margins using:

$$\text{Margin} = ((\text{Revenue} - \text{Cost}) / \text{Revenue}) \times 100$$

$$\text{Seasonal Margin} = \text{Margin} + 10$$

Input Format

The first line of input consists of a double value *r*, representing the revenue.

The second line consists of a double value *c*, representing the cost.

Output Format

The first line prints a double value, representing the regular profit margin, rounded to two decimal places, in the format: "Regular Margin: X. XX%", where X.XX denotes the calculated regular margin.

The second line prints a double value, representing the seasonal profit margin, rounded to two decimal places, in the format: "Seasonal Margin: X. XX%", where X.XX denotes the calculated seasonal margin.

The third line prints a string, indicating whether the business is profitable or not profitable, based on the regular margin.

If the regular margin is less than 10, print "Business is not profitable.". If it is 10 or greater, print "Business is profitable."

Refer to the sample output for the formatting specifications.

Sample Test Case

Input: 1000.0

800.0

Output: Regular Margin: 20.00%

Seasonal Margin: 30.00%

Business is profitable.

Answer

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

```
class BusinessUtility {
    public double calculateMargin(double revenue, double cost) {
        if (revenue == 0) {
            return 0.0;
        }
        return ((revenue - cost) / revenue) * 100.0;
    }
}
```

```
class SeasonalBusinessUtility extends BusinessUtility {
    @Override
    public double calculateMargin(double revenue, double cost) {
        double regularMargin = super.calculateMargin(revenue, cost);
        return regularMargin + 10.0;
    }
}
```

```
class ProfitabilityChecker {
    public void checkProfitability(double regularMargin) {
        if (regularMargin >= 10.0) {
            System.out.println("Business is profitable.");
        } else {
            System.out.println("Business is not profitable.");
        }
    }
}
```

```
class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        double revenue = scanner.nextDouble();
        double cost = scanner.nextDouble();
        BusinessUtility business = new BusinessUtility();
        SeasonalBusinessUtility seasonalBusiness = new
SeasonalBusinessUtility();
        double regularMargin = business.calculateMargin(revenue, cost);
        double seasonalMargin = seasonalBusiness.calculateMargin(revenue,
cost);
    }
}
```

```

System.out.printf("Regular Margin: %.2f%%\n", regularMargin);
System.out.printf("Seasonal Margin: %.2f%%\n", seasonalMargin);

ProfitabilityChecker checker = new ProfitabilityChecker();
checker.checkProfitability(regularMargin);
scanner.close();
}
}

```

Status : Correct

Marks : 10/10

2. 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;
```

```
abstract class Account {  
    protected String accountHolder;  
    protected double principalAmount;
```

```
    public Account(String accountHolder, double principalAmount) {  
        this.accountHolder = accountHolder;  
        this.principalAmount = principalAmount;  
    }
```

```
    public abstract double calculateInterest();  
}
```

```
class FixedDeposit extends Account {  
    private int durationYears;  
    private double rateOfInterest;
```

```
    public FixedDeposit(String accountHolder, double principalAmount, int  
        durationYears, double rateOfInterest) {
```

```

        super(accountHolder, principalAmount);
        this.durationYears = durationYears;
        this.rateOfInterest = rateOfInterest;
    }

    @Override
    public double calculateInterest() {
        return (principalAmount * durationYears * rateOfInterest) / 100.0;
    }
}

class RecurringDeposit extends Account {
    private int durationMonths;
    private double rateOfInterest;

    public RecurringDeposit(String accountHolder, int monthlyDeposit, int
durationMonths, double rateOfInterest) {
        super(accountHolder, monthlyDeposit);
        this.durationMonths = durationMonths;
        this.rateOfInterest = rateOfInterest;
    }

    @Override
    public double calculateInterest() {
        double monthlyDeposit = principalAmount;
        double maturityAmount = monthlyDeposit * durationMonths;

        return (maturityAmount * durationMonths * rateOfInterest) / (12.0 * 100.0);
    }
}

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

3. Problem Statement

Teena's retail store has implemented a Loyalty Points System to reward customers based on their spending. The program calculates and displays the loyalty points based on whether the customer is a regular or a premium customer.

For regular customers (class Customer), the loyalty points are calculated as:

Loyalty points = amount spent / 10

For premium customers (class PremiumCustomer, which inherits from

Customer), the loyalty points are calculated as:

Loyalty points = $2 * (\text{amount spent} / 10)$

The program should use method overriding for premium customers to calculate their loyalty points. The method that needs to be overridden is calculateLoyaltyPoints in the Customer class.

Input Format

The first line of input consists of an integer representing the amount spent by the customer.

The second line consists of a string representing the premium customer status:

- "yes" if the customer is a premium customer.
- "no" if the customer is not a premium customer.

Output Format

The output should display the loyalty points earned based on the amount spent and the customer type.

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 50
yes

Output: 10

Answer

```
import java.util.Scanner;

class Customer {
    public int calculateLoyaltyPoints(int amountSpent) {
        return amountSpent / 10;
    }
}

class PremiumCustomer extends Customer {
    @Override
```

```

    public int calculateLoyaltyPoints(int amountSpent) {
        return 2 * super.calculateLoyaltyPoints(amountSpent);
    }
}

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

        int amountSpent = scanner.nextInt();

        String isPremium = scanner.next().toLowerCase();

        Customer customer;

        if (isPremium.equals("yes")) {
            customer = new PremiumCustomer();
        } else {
            customer = new Customer();
        }

        int loyaltyPoints = customer.calculateLoyaltyPoints(amountSpent);

        System.out.println(loyaltyPoints);
    }
}

```

Status : Correct

Marks : 10/10

4. 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;
```

```
import java.text.DecimalFormat;
```

```
class Shape {
```

```
    protected String shapeType;
```

```
    protected double radius;
```

```
    protected final double PI = 3.14;
```

```
    public void setShape(String s, Scanner scanner) {
```

```
        this.shapeType = s;
```

```
        if ("Sphere".equals(s)) {
```

```
            this.radius = scanner.nextDouble();
```

```

    } else {
        if (scanner.hasNextDouble()) {
            scanner.nextDouble();
        }
    }
}

```

```

class Area extends Shape {
    protected double area;

    public void calculateArea() {
        if ("Sphere".equals(shapeType)) {
            this.area = 4 * PI * radius * radius;
        } else {
            this.area = -1.0;
        }
    }
}

```

```

class Cost extends Area {
    private double costPerSqrMeter;
    private double totalCost;

    private static final DecimalFormat df = new DecimalFormat("0.00");

    public void setCost(double costToPaint) {
        this.costPerSqrMeter = costToPaint;
    }

    public void calculateCost() {
        if ("Sphere".equals(shapeType)) {
            this.totalCost = costPerSqrMeter * area;

            System.out.println("Area of Sphere is: " + df.format(area));
            System.out.println("Cost to paint the shape is: " + df.format(totalCost));
        } else {
            System.out.println("Invalid type");
        }
    }
}

```

```
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

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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. How do you call a static method from an interface MyInterface?

Answer

MyInterface.staticMethod();

Status : Correct

Marks : 1/1

2. 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

3. 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

4. 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

5. 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

6. Which of the following statements about Java interfaces is true?

Answer

A class can implement multiple interfaces.

Status : Correct

Marks : 1/1

7. 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

8. 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

9. 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

10. 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

11. 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

12. 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

13. Which of the following is the correct way to declare an interface in Java?

Answer

```
interface Vehicle { void start();}
```

Status : Correct

Marks : 1/1

14. 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

15. 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

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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.Scanner;
```

```
import java.util.ArrayList;
import java.util.List;
import java.util.Locale;
```

```
interface CostCalculator {
    void getEnergyDetails(Scanner scanner);

    void calculateAndDisplayCost();
}
```

```
class EnergyConsumptionTracker implements CostCalculator {
    private final double ratePerUnit;
    private final int numDays;
    private List<Double> dailyConsumption;

    public EnergyConsumptionTracker(double ratePerUnit, int numDays) {
        this.ratePerUnit = ratePerUnit;
        this.numDays = numDays;
        this.dailyConsumption = new ArrayList<>();
    }
```

@Override

```
public void getEnergyDetails(Scanner scanner) {
    for (int i = 0; i < numDays; i++) {
        if (scanner.hasNextDouble()) {
            dailyConsumption.add(scanner.nextDouble());
        } else {
            break;
        }
    }
}
```

@Override

```
public void calculateAndDisplayCost() {
    System.out.println("Day-wise Energy Cost:");
    double totalCost = 0.0;

    for (int i = 0; i < dailyConsumption.size(); i++) {
        double consumption = dailyConsumption.get(i);
        double dayCost = consumption * ratePerUnit;
        totalCost += dayCost;
    }
}
```

```

        System.out.printf(Locale.US, "Day %d: Rs. %.2f%n", (i + 1), dayCost);
    }

    System.out.printf(Locale.US, "Total Energy Cost: Rs. %.2f%n", totalCost);
}
}

```

```

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

        try {
            double ratePerUnit = scanner.nextDouble();

            int numDays = scanner.nextInt();

            CostCalculator tracker = new EnergyConsumptionTracker(ratePerUnit,
numDays);

            tracker.getEnergyDetails(scanner);

            tracker.calculateAndDisplayCost();

        } catch (Exception e) {
            System.err.println("An error occurred during input processing: " +
e.getMessage());
        } finally {
            scanner.close();
        }
    }
}

```

```

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

1.75

Output: BMI: 22.86

Answer

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

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

```
import java.util.Locale;
```

```
interface HealthCalculator {  
    double calculateBMI(double weight, double height);  
}
```

```
class BMICalculator implements HealthCalculator {  
  
    @Override  
    public double calculateBMI(double weight, double height) {  
        if (weight <= 0.0 || height <= 0.0) {  
            return -1.0;  
        }  
  
        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);
```

```
    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_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;
```

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

```
import java.util.Locale;
```

```
interface InterestCalculator {  
    double simpleInterest(double principal, double rate, int time);  
}
```

```
class SimpleInterestCalculator implements InterestCalculator {
```

```
    @Override
```

```
    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.Scanner;
```

```
interface Inventory {  
    void addProduct(String productName, double price, int quantity);  
    double calculateTotalValue();  
}
```

```
class SimpleInventory implements Inventory {  
    private Product[] products;  
    private int count;
```

```
    public SimpleInventory(int size) {  
        products = new Product[size];  
        count = 0;  
    }
```

```
    public void addProduct(String productName, double price, int quantity) {  
        if (count < products.length) {  
            products[count] = new Product(productName, price, quantity);  
            count++;  
            System.out.println("Product added to inventory.");  
        } else {  
            System.out.println("Inventory full. Cannot add more products.");  
        }  
    }
```

```
    public double calculateTotalValue() {
```



```

        double totalValue = 0;
        for (int i = 0; i < count; i++) {
            totalValue += products[i].getValue();
        }
        return totalValue;
    }
}

```

```

class Product {
    private String name;
    private double price;
    private int quantity;

    public Product(String name, double price, int quantity) {
        this.name = name;
        this.price = price;
        this.quantity = quantity;
    }
}

```

```

    public double getValue() {
        return price * quantity;
    }
}

```

```

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;
```

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

```
interface AgeCalculator {  
    int calculateAge(int birthYear);  
}
```

```
class HumanAgeCalculator implements AgeCalculator {  
    private static final int CURRENT_YEAR = 2024;
```

```
    @Override
```

```
    public int calculateAge(int birthYear) {  
        return CURRENT_YEAR - 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

Rajalakshmi Engineering College

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Scan to verify results



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

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 n);
}

class AutomorphicNumber implements NumberInput, AutomorphicChecker {

    @Override
    public int getInput() {
        try (Scanner scanner = new Scanner(System.in)) {
            if (scanner.hasNextInt()) {
                return scanner.nextInt();
            }
        }
        return -1;
    }

    @Override
    public boolean checkAutomorphic(int n) {
        if (n <= 0) {
            return false;
        }
    }
}
```

```

    }

    long square = (long) n * n;

    long magnitude = 1;
    int numDigits = String.valueOf(n).length();
    for (int i = 0; i < numDigits; i++) {
        magnitude *= 10;
    }

    return square % magnitude == n;
}
}

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

2. 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;
```

```
import java.util.Locale;
```

```
interface Calculator {  
    double add(double num1, double num2);  
  
    double subtract(double num1, double num2);  
}
```

```
class SimpleCalculator implements Calculator {
```

```
    @Override
```

```
    public double add(double num1, double num2) {  
        return num1 + num2;  
    }
```

```

    }
    @Override
    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

3. 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;
```

```
import java.util.InputMismatchException;
```

```
interface Matrix {  
    void diagonalsMinMax(int[][] matrix);  
}
```

```
class MatrixAnalyzer implements Matrix {
```

```
    @Override
```

```
    public void diagonalsMinMax(int[][] matrix) {  
        if (matrix == null || matrix.length == 0) {  
            System.err.println("Matrix is empty or null.");  
            return;  
        }
```

```
        int n = matrix.length;
```

```
        int minPrincipal = Integer.MAX_VALUE;  
        int maxPrincipal = Integer.MIN_VALUE;  
        int minSecondary = Integer.MAX_VALUE;  
        int maxSecondary = Integer.MIN_VALUE;
```

```
        for (int i = 0; i < n; i++) {  
            int principalElement = matrix[i][i];
```

```
            if (principalElement < minPrincipal) {  
                minPrincipal = principalElement;
```

```

    }
    if (principalElement > maxPrincipal) {
        maxPrincipal = principalElement;
    }

    int secondaryElement = matrix[i][n - 1 - i];

    if (secondaryElement < minSecondary) {
        minSecondary = secondaryElement;
    }
    if (secondaryElement > maxSecondary) {
        maxSecondary = secondaryElement;
    }
}

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

4. 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: $\text{hourly rate} * \text{hours worked}$.

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;
import java.util.InputMismatchException;

interface Employee {
    int computeSalary();

    void displayDetails();
}

class FullTimeEmployee implements Employee {
    private String name;
    private int monthlySalary;

    public FullTimeEmployee(String name, int monthlySalary) {
        this.name = name;
        this.monthlySalary = monthlySalary;
    }

    @Override
    public int computeSalary() {
        return 12 * monthlySalary;
    }

    @Override
    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: $" + computeSalary());
    }
}

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;
    }

    @Override
    public int computeSalary() {
        return hourlyRate * hoursWorked;
    }

    @Override
    public void displayDetails() {
        System.out.println("\nPart-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: $" + computeSalary());
    }
}

```

```

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

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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;

interface TaxCalculator {
    int calculateTax(int salary);
}

class SimpleTaxCalculator implements TaxCalculator {
    public int calculateTax(int salary) {
        int tax = 0;

        if (salary <= 50000) {
            tax = (int) (0.05 * salary);
        } else if (salary <= 100000) {
            tax = (int) (0.1 * (salary - 50000) + 0.05 * 50000);
        } else {
            tax = (int) (0.2 * (salary - 100000) + 0.1 * 50000 + 0.05 * 50000);
        }

        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

Maria, an online store owner, is looking to implement a pricing system that calculates the final price of products after applying discounts. She needs a program that takes the original price of a product and the discount percentage as input and computes the final discounted price. The discount is applied as a percentage of the original price. Maria wants to ensure that the final price is formatted to display exactly two decimal places.

Implement this functionality using the PriceCalculator interface and the DiscountCalculator class.

Input Format

The first line of input consists of the original price (a double value).

The second line of input consists of a discount percentage (a double value).

Output Format

The output displays the final price after the discount, adhering to the following format: "Final Price after discount: \$[final_price]".

Here, [final_price] should be replaced with the calculated final price, formatted as a currency value with two decimal places.

Refer to the sample output for the formatting specifications.

Sample Test Case

Input: 100.0

10.0

Output: Final Price after discount: \$90.00

Answer

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

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

```
interface PriceCalculator {  
    double calculatePrice(double originalPrice, double discount);  
}
```

```
class DiscountCalculator implements PriceCalculator {  
    public double calculatePrice(double originalPrice, double discount) {  
        return originalPrice - (originalPrice * discount / 100);  
    }  
}
```

```
class Main {  
    public static void main(String[] args) {  
        Scanner scanner = new Scanner(System.in);  
        double originalPrice = scanner.nextDouble();  
        double discount = scanner.nextDouble();  
        PriceCalculator calculator = new DiscountCalculator();  
        double finalPrice = calculator.calculatePrice(originalPrice, discount);  
        System.out.printf("Final Price after discount: $%.2f\n", finalPrice); //  
        Formats output to 2 decimal places  
    }  
}
```

Status : Correct

Marks : 10/10

3. 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);  
}  
  
interface CalorieCalculator {  
    double calculateCaloriesBurned(int steps);  
}
```

```
class FitnessTracker implements StepCounter, CalorieCalculator {  
    private int totalSteps;
```

```
    public void countSteps(int steps) {  
        totalSteps += steps;  
    }
```

```
    public double calculateCaloriesBurned(int steps) {  
        double caloriesBurned = (steps / 100.0) * 20.0;  
        return caloriesBurned;  
    }
```

```
    public int getTotalSteps() {  
        return totalSteps;  
    }  
}
```

```
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

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 getInterestRate();  
}
```

```
class Loan implements Principal, InterestRate {  
    private double principal;  
    private double interestRate;
```

```
    public Loan(double p, double rate) {  
        this.principal = p;  
        this.interestRate = rate;  
    }
```

```
    public double getPrincipal() {  
        return principal;  
    }
```

```
    public double getInterestRate() {  
        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 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

2. 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

3. Which of the following is true about custom exceptions?

Answer

Custom exceptions must extend either Exception or RuntimeException

Status : Correct

Marks : 1/1

4. 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

5. 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

6. How do you create an unchecked custom exception?

Answer

By extending RuntimeException

Status : Correct

Marks : 1/1

7. 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

8. What is the purpose of a custom exception in Java?

Answer

To create user-defined exceptions for specific scenarios

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. 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

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. 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

13. 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

14. 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

15. Which keyword is used to explicitly throw a custom exception?

Answer

throw

Status : Correct

Marks : 1/1

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Scan to verify results



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;
import java.util.regex.Matcher;
import java.util.regex.Pattern;

class DotException extends Exception {
    public DotException(String message) {
        super(message);
    }
}

class AtTheRateException extends Exception {
    public AtTheRateException(String message) {
        super(message);
    }
}

class DomainException extends Exception {
    public DomainException(String message) {
        super(message);
    }
}

class EmailValidation {

    public static void validate(String email)
        throws AtTheRateException, DotException, DomainException {

        if (email == null || email.isEmpty()) {
            throw new IllegalArgumentException("Email cannot be empty.");
        }

        int atCount = 0;
```

```
int atIndex = -1;
for (int i = 0; i < email.length(); i++) {
    if (email.charAt(i) == '@') {
        atCount++;
        atIndex = i;
    }
}

if (atCount != 1) {
    throw new AtTheRateException("Invalid @ usage");
}

String domainPart = email.substring(atIndex + 1);

int lastDotIndex = domainPart.lastIndexOf('.');
int firstDotIndex = domainPart.indexOf('.');

if (email.endsWith(".")) {
    throw new DotException("Invalid Dot usage");
}

if (lastDotIndex == -1) {
    throw new DotException("Invalid Dot usage");
}

if (firstDotIndex != lastDotIndex) {
    throw new DotException("Invalid Dot usage");
}

String domainExtension = domainPart.substring(lastDotIndex + 1);

if (!domainExtension.equals("in") &&
    !domainExtension.equals("com") &&
    !domainExtension.equals("net") &&
    !domainExtension.equals("biz")) {
    throw new DomainException("Invalid Domain");
}
}
}

public class Main {
```



```

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

    try {
        email = scanner.nextLine().trim();

        EmailValidation.validate(email);

        System.out.println("Valid email address");

    } catch (AtTheRateException e) {
        System.out.println(e.getClass().getSimpleName() + ": " + e.getMessage());
        System.out.println("Invalid email address");
    } catch (DotException e) {
        System.out.println(e.getClass().getSimpleName() + ": " + e.getMessage());
        System.out.println("Invalid email address");
    } catch (DomainException e) {
        System.out.println(e.getClass().getSimpleName() + ": " + e.getMessage());
        System.out.println("Invalid email address");
    } catch (Exception e) {
        System.err.println("An unexpected error occurred: " + e.getMessage());
    } finally {
        if (scanner != null) {
            scanner.close();
        }
    }
}

```

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_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;
import java.util.InputMismatchException;

class InvalidDurationException extends Exception {
    public InvalidDurationException(String message) {
        super(message);
    }
}

public class Main {
    private static final String ERROR_MESSAGE =
```

"Error: Invalid meeting duration. Please enter a positive integer not exceeding 240 minutes (4 hours).";

```
public static void validateMeetingDuration(int durationMinutes) throws  
InvalidDurationException {
```

```
    if (durationMinutes <= 0) {  
        throw new InvalidDurationException(ERROR_MESSAGE);  
    }
```

```
    if (durationMinutes > 240) {  
        throw new InvalidDurationException(ERROR_MESSAGE);  
    }  
}
```

```
public static void main(String[] args) {  
    Scanner scanner = new Scanner(System.in);  
    int duration = 0;
```

```
    try {  
        if (scanner.hasNextInt()) {  
            duration = scanner.nextInt();  
  
            validateMeetingDuration(duration);
```

```
            System.out.println("Meeting scheduled successfully!");  
        } else {  
            System.out.println(ERROR_MESSAGE);  
        }
```

```
    } catch (InvalidDurationException e) {  
        System.out.println(e.getMessage());  
    } catch (InputMismatchException e) {  
        System.out.println(ERROR_MESSAGE);  
    } catch (Exception e) {  
        System.err.println("An unexpected error occurred.");  
    } finally {  
        if (scanner != null) {  
            scanner.close();
```

```
        }  
    }
```

```
}
```

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);  
    }  
}
```

```
public class Main {
```

```
    private static final String ERROR_SHORT =  
        "Invalid Username: Username must be at least 5 characters long";  
    private static final String ERROR_SPACES =  
        "Invalid Username: Username cannot contain spaces";
```

```
    public static void validateUsername(String username) throws  
        InvalidUsernameException {  
        if (username.contains(" ")) {  
            throw new InvalidUsernameException(ERROR_SPACES);  
        }  
    }
```

```

        if (username.length() < 5) {
            throw new InvalidUsernameException(ERROR_SHORT);
        }
    }

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

        try {
            if (scanner.hasNextLine()) {
                username = scanner.nextLine();

                validateUsername(username);

                System.out.println("Username is valid: " + username);
            }

        } catch (InvalidUsernameException e) {
            System.out.println(e.getMessage());
        } catch (Exception e) {
            System.err.println("An unexpected error occurred during processing.");
        } finally {
            if (scanner != null) {
                scanner.close();
            }
        }
    }
}

```

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;
import java.util.InputMismatchException;

class InvalidAgeException extends Exception {
    public InvalidAgeException(String message) {
        super(message);
    }
}

public class Main {

    private static final int MINIMUM_VOTING_AGE = 18;

    public static void validateAge(int age) throws InvalidAgeException {
        if (age < MINIMUM_VOTING_AGE) {
            throw new InvalidAgeException("Age is not valid to vote");
        }
    }

    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        int age = 0;

        try {
```

```

        if (scanner.hasNextInt()) {
            age = scanner.nextInt();

            validateAge(age);

            System.out.println("Eligible to vote");
        } else {
            throw new InputMismatchException("java.util.Input");
        }

    } catch (InvalidAgeException e) {
        System.out.println("Exception occurred: InvalidAgeException: " +
e.getMessage());
    } catch (InputMismatchException e) {
        System.out.println("An error occurred: " + e.getMessage() +
"MismatchException");
    } catch (Exception e) {
        System.out.println("An error occurred: " + e.getMessage());
    } finally {
        if (scanner != null) {
            scanner.close();
        }
    }
}
}
}

```

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);  
    }  
}
```

```
public class Main {
```

```
    private static final String ERROR_MESSAGE = "Error: Invalid file name. It must  
    be alphanumeric and have a minimum length of 3 characters.";
```

```
    public static void validateFileName(String fileName) throws  
    InvalidFileNameException {  
        if (fileName.length() < 3) {  
            throw new InvalidFileNameException(ERROR_MESSAGE);  
        }  
    }  
}
```

```

    }
    if (!fileName.matches("[a-zA-Z0-9]+")) {
        throw new InvalidFileNameException(ERROR_MESSAGE);
    }
}

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

    try {
        if (scanner.hasNextLine()) {
            fileName = scanner.nextLine();

            validateFileName(fileName);

            System.out.println("Valid file name");
        }
    } catch (InvalidFileNameException e) {
        System.out.println(e.getMessage());
    } catch (Exception e) {
        System.err.println("An unexpected error occurred: " + e.getMessage());
    } finally {
        if (scanner != null) {
            scanner.close();
        }
    }
}

```

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

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;
import java.util.InputMismatchException;

class InvalidAgeException extends Exception {
    public InvalidAgeException(String message) {
        super(message);
    }
}

public class Main {

    private static final String ERROR_MESSAGE = "Error: Invalid age. Please enter
an age between 0 and 150.";
    private static final int MIN_AGE = 0;
    private static final int MAX_AGE = 150;

    public static void validateAge(int age) throws InvalidAgeException {
        if (age < MIN_AGE || age > MAX_AGE) {
            throw new InvalidAgeException(ERROR_MESSAGE);
        }
    }
}
```



```

    }
}

public static void main(String[] args) {
    Scanner scanner = new Scanner(System.in);
    int age = 0;

    try {
        if (scanner.hasNextInt()) {
            age = scanner.nextInt();

            validateAge(age);

            System.out.println("Age is valid!");
        } else {
            System.err.println("Input is not an integer.");
        }
    } catch (InvalidAgeException e) {
        System.out.println(e.getMessage());
    } catch (Exception e) {
        System.err.println("An unexpected error occurred: " + e.getMessage());
    } finally {
        if (scanner != null) {
            scanner.close();
        }
    }
}
}

```

Status : Correct

Marks : 10/10

2. 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;
```

```
import java.util.InputMismatchException;
```

```
class InvalidSalaryException extends Exception {  
    public InvalidSalaryException(String message) {  
        super(message);  
    }  
}
```

```
class Employee {  
    private int empId;  
    private String empName;  
    private 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);  
    }  
}
```

```
public 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());
}

} catch (InputMismatchException e) {
    System.out.println("Input format error: Please ensure ID is integer, Name
is string, and Salary is a number.");
} catch (Exception e) {
    System.out.println("An unexpected error occurred during input: " +
e.getMessage());
} finally {
    System.out.println("Payroll process completed");
    if (scanner != null) {
        scanner.close();
    }
}
}
}
}

```

Status : Correct

Marks : 10/10

3. Problem Statement

Enigma is developing a simple web application that takes a user-input URL, validates it, and throws a custom exception `InvalidURLFormatException` 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 InvalidURLExceptionFormatException extends Exception {  
    public InvalidURLExceptionFormatException(String url) {  
        super("Invalid URL format: " + url);  
    }  
}
```

```
public class Main {
```

```
    public static void validateURL(String url) throws InvalidURLExceptionFormatException {  
        if (!url.startsWith("http://") && !url.startsWith("https://")) {  
            throw new InvalidURLExceptionFormatException(url);  
        }  
    }  
}
```

```

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

    try {
        if (scanner.hasNextLine()) {
            url = scanner.nextLine();
        }

        validateURL(url);

        System.out.println(url + " is a valid URL");
    } catch (InvalidURLException e) {
        System.out.println(e.getMessage());
    } catch (Exception e) {
        System.err.println("An unexpected error occurred: " + e.getMessage());
    } finally {
        if (scanner != null) {
            scanner.close();
        }
    }
}

```

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;
```

```
import java.util.InputMismatchException;
```

```
class GradeException extends Exception {  
    public GradeException(String message) {  
        super(message);  
    }  
}
```

```
class Student {  
    private String name;  
    private int age;  
    private int grade;  
  
    public Student(String name, int age, int grade) {  
        this.name = name;  
        this.age = age;  
        this.grade = grade;  
    }  
}
```

```

    public void validateAndDisplayDetails() throws GradeException {
        if (this.grade < 40) {
            throw new GradeException("Grade is below 40");
        } else {
            System.out.println("Name: " + this.name);
            System.out.println("Age: " + this.age);
            System.out.println("Grade: " + this.grade);
        }
    }
}

public class Main {

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

        try {
            String name = scanner.nextLine();

            int age = scanner.nextInt();

            int grade = scanner.nextInt();

            Student student = new Student(name, age, grade);

            student.validateAndDisplayDetails();

        } catch (GradeException e) {
            System.out.println(e.getMessage());
        } catch (InputMismatchException e) {
            System.err.println("Input error: Please ensure age and grade are integers.");
        } catch (Exception e) {
            System.err.println("An unexpected error occurred: " + e.getMessage());
        } finally {
            if (scanner != null) {
                scanner.close();
            }
        }
    }
}

```


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_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;  
import java.util.InputMismatchException;
```

```
class InvalidCreditCardException extends Exception {  
    public InvalidCreditCardException(String message) {  
        super(message);  
    }  
}
```

```
}
```

```
public class Main {
```

```
    public static void validateCreditCard(String cardNumber) throws  
    InvalidCreditCardException {
```

```
        if (cardNumber.length() != 16) {  
            throw new InvalidCreditCardException("Error: Invalid credit card number  
length.");  
        }
```

```
        try {  
            Long.parseLong(cardNumber);  
        } catch (NumberFormatException e) {  
            throw new InvalidCreditCardException("Error: Invalid credit card number  
format.");  
        }  
    }
```

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

```
        try {  
            String cardNumber = scanner.nextLine();
```

```
            validateCreditCard(cardNumber);
```

```
            System.out.println("Payment information updated successfully!");
```

```
        } catch (InvalidCreditCardException e) {
```

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

```
        } catch (Exception e) {
```

```
            System.err.println("An unexpected error occurred: " + e.getMessage());
```

```
        } finally {
```

```
            if (scanner != null) {
```

```
                scanner.close();
```

```
            }
```

```
        }
```

```
    }
```

Status : Correct

Marks : 10/10

2. Problem Statement

Tim was tasked with creating a user profile system that validates the user's date of birth input. The system should throw a custom exception, `InvalidDateOfBirthException`, if the date is not in the specified format "dd-mm-yyyy" or if it represents an invalid calendar date.

The main method takes user input, validates the date of birth, and prints whether it is valid or not.

Input Format

The input consists of a string, representing the date of birth of the user.

Output Format

The output displays one of the following results:

If the entered date of birth is valid according to the specified format, the program prints:

"[Date] is a valid date of birth"

If the entered date of birth is not valid according to the specified format, the program prints:

"Invalid date: [Date]"

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 01-01-2000

Output: 01-01-2000 is a valid date of birth

Answer

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

```
import java.util.InputMismatchException;
```

```
class InvalidDateOfBirthException extends Exception {  
    public InvalidDateOfBirthException(String dateStr) {  
        super("Invalid date provided: " + dateStr);  
    }  
}
```

```
public class Main {
```

```
    public static boolean isLeapYear(int year) {  
        return (year % 4 == 0) && (year % 100 != 0) || (year % 400 == 0);  
    }  
}
```

```
    public static void validateDate(String dateStr) throws  
InvalidDateOfBirthException {  
        if (dateStr.length() != 10 || dateStr.charAt(2) != '-' || dateStr.charAt(5) != '-') {  
            throw new InvalidDateOfBirthException(dateStr);  
        }  
    }
```

```
    int day, month, year;
```

```
    try {  
        day = Integer.parseInt(dateStr.substring(0, 2));  
        month = Integer.parseInt(dateStr.substring(3, 5));  
        year = Integer.parseInt(dateStr.substring(6, 10));  
    } catch (NumberFormatException e) {  
        throw new InvalidDateOfBirthException(dateStr);  
    }
```

```
    if (year < 1 || month < 1 || month > 12 || day < 1 || day > 31) {  
        throw new InvalidDateOfBirthException(dateStr);  
    }
```

```
    int daysInMonth;
```

```
    switch (month) {  
        case 4:  
        case 6:  
        case 9:  
        case 11:  
            daysInMonth = 30;
```

```

        break;

    case 2:
        daysInMonth = isLeapYear(year) ? 29 : 28;
        break;

    default:
        daysInMonth = 31;
        break;
}

if (day > daysInMonth) {
    throw new InvalidDateOfBirthException(dateStr);
}

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

    try {
        dateStr = sc.nextLine();

        validateDate(dateStr);

        System.out.println(dateStr + " is a valid date of birth");
    } catch (InvalidDateOfBirthException e) {
        System.out.println("Invalid date: " + dateStr);
    } catch (Exception e) {
        System.out.println("Invalid date: " + dateStr);
    } finally {
        if (sc != null) {
            sc.close();
        }
    }
}

```

Status : Correct

Marks : 10/10

3. Problem Statement

Alice is designing a program that requires users to enter positive numbers. She wants to implement a solution that validates whether the entered number is positive. In case the input is not a positive number, she wants to throw a custom exception.

The number should be a positive integer. If this condition is violated, the program should throw a custom exception: `InvalidPositiveNumberException` with the message "Invalid input. Please enter a positive integer."

Implement a custom exception, `InvalidPositiveNumberException`, to handle cases where the entered number does not meet the specified criteria.

Input Format

The input consists of an integer value 'n', representing the entered number.

Output Format

The output is displayed in the following format:

If the validation passes, print

"Number {number} is positive."

The {number} represents the entered positive integer.

If the entered number is negative then it displays

"Error: Invalid input. Please enter a positive integer."

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 100

Output: Number 100 is positive.

Answer

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

class InvalidPositiveNumberException extends Exception {
    public InvalidPositiveNumberException(String message) {
        super(message);
    }
}

public class Main {

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

        try {
            int n = scanner.nextInt();

            if (n <= 0) {
                String errorMessage = "Invalid input. Please enter a positive integer.";
                throw new InvalidPositiveNumberException(errorMessage);
            }

            System.out.println("Number " + n + " is positive.");

        } catch (InvalidPositiveNumberException e) {
            System.out.println("Error: " + e.getMessage());
        } catch (InputMismatchException e) {
            System.out.println("Error: Input is not a valid integer.");
        } finally {
            scanner.close();
        }
    }
}
```

Status : Correct

Marks : 10/10

4. Problem Statement

In an online shopping cart system, users can apply coupon codes during checkout to avail of discounts. However, to ensure the validity and security of coupon codes, the system enforces specific rules for their format. Your task is to implement a Java program named `CouponCodeValidator` that takes user input for a coupon code and validates it according to the specified rules.

Rules for Valid Coupon Code:

The coupon code must consist of exactly 10 characters. The coupon code must contain at least one alphabet (uppercase or lowercase) and at least one digit (0-9). Special characters are not allowed in the coupon code.

Implement a custom exception, `InvalidCouponException`, to handle cases where the entered coupon code does not meet the specified criteria.

Input Format

The input consists of a string `s`, representing the coupon code.

Output Format

The output is displayed in the following format:

If the entered coupon code meets the specified criteria, the program outputs

"Coupon code applied successfully!"

If the entered coupon code has less than or more than 10 characters it outputs

"Error: Invalid coupon code length. It must be exactly 10 characters."

If the entered coupon code contains only numeric or only alphabets it outputs

"Error: Invalid coupon code format. It must contain at least one alphabet and one digit."

If the entered coupon code contains special characters it outputs

"Error: Coupon code should not contain special characters."

Refer to the sample output for formatting specifications.

Sample Test Case

Input: ABCD123456

Output: Coupon code applied successfully!

Answer

```
import java.util.Scanner;

class InvalidCouponException extends Exception {
    public InvalidCouponException(String message) {
        super(message);
    }
}

public class Main {

    public static void validateCouponCode(String couponCode) throws
InvalidCouponException {
        if (couponCode.length() != 10) {
            throw new InvalidCouponException("Invalid coupon code length. It must
be exactly 10 characters.");
        }

        boolean hasAlphabet = false;
        boolean hasDigit = false;

        for (char c : couponCode.toCharArray()) {
            if (!Character.isLetterOrDigit(c)) {
                throw new InvalidCouponException("Coupon code should not contain
special characters.");
            }

            if (Character.isLetter(c)) {
                hasAlphabet = true;
            } else if (Character.isDigit(c)) {
                hasDigit = true;
            }
        }
    }
}
```

```
        if (!hasAlphabet || !hasDigit) {  
            throw new InvalidCouponException("Invalid coupon code format. It must  
contain at least one alphabet and one digit.");  
        }
```

```
        System.out.println("Coupon code applied successfully!");  
    }
```

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

```
    String couponCode = "";  
    if (scanner.hasNextLine()) {  
        couponCode = scanner.nextLine();  
    }
```

```
    try {  
        validateCouponCode(couponCode);  
    } catch (InvalidCouponException e) {  
        System.out.println("Error: " + e.getMessage());  
    } finally {  
        scanner.close();  
    }
```

```
}
```

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 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("Java");
        list.add("Python");
        list.add("Java");
        list.add("C++");
        System.out.println(list.indexOf("Java"));
    }
}
```

Answer

0

Status : Correct

Marks : 1/1

2. 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

3. What does the addFirst() method of LinkedList do?

Answer

Adds an element to the beginning of the list

Status : Correct

Marks : 1/1

4. 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

5. Which method is used to add an element to the top of the stack?

Answer

push()

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("apple");
        list.add("banana");
        list.add("cherry");
        list.add("banana");
        System.out.println(list.lastIndexOf("banana"));
    }
}
```

Answer

3

Status : Correct

Marks : 1/1

7. How can you access the first element of an ArrayList named as list?

Answer

list.get(0);

Status : Correct

Marks : 1/1

8. Which of the following methods removes and returns the last element from a LinkedList?

Answer

removeLast()

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) {
        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

10. What is Collection in Java?

Answer

A group of objects

Status : Correct

Marks : 1/1

11. What is the correct way to create an ArrayList in Java?

Answer

```
ArrayList<String> list = new ArrayList<>();
```

Status : Correct

Marks : 1/1

12. 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

13. 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

14. 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

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

```
public class Main {
```

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

```
        try {
            int N = scanner.nextInt();
```

```
            List<Integer> resultList = new ArrayList<>();
```

```
            for (int i = 0; i < N; i++) {
                int currentNumber = scanner.nextInt();
```

```
                if (resultList.isEmpty()) {
                    resultList.add(currentNumber);
```

```
                } else {
                    int lastElement = resultList.get(resultList.size() - 1);
```

```
                    if (currentNumber > lastElement) {
                        resultList.add(currentNumber);
```

```
        }  
    }  
}  
  
    System.out.println(resultList.toString());  
  
    } catch (Exception e) {  
  
    } finally {  
        scanner.close();  
    }  
}  
}
```

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 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.LinkedList;
import java.util.List;
import java.util.Scanner;
```

```
public class Main {
```

```
    private List<String> playlist;
    private int currentSongIndex;
```

```
    public Main() {
        this.playlist = new LinkedList<>();
        this.currentSongIndex = -1;
    }
```

```
    public void processCommand(String commandLine) {
        String[] parts = commandLine.split(" ", 2);
        String operation = parts[0];
```

```
        switch (operation) {
            case "ADD":
                if (parts.length > 1) {
                    String song = parts[1];
                    playlist.add(song);
                    if (playlist.size() == 1) {
                        currentSongIndex = 0;
                    }
                }
            break;
```

```
            case "REMOVE":
                if (parts.length > 1) {
                    String songToRemove = parts[1];
                    int initialSize = playlist.size();
```

```
                    boolean removed = playlist.remove(songToRemove);
```

```
                    if (removed) {
                        if (initialSize > 0) {

                            if (playlist.isEmpty()) {
                                currentSongIndex = -1;
                            } else {
```

```

        if (currentSongIndex >= playlist.size()) {
            currentSongIndex = 0;
        }
    }
}
break;

case "SHOW":
    if (playlist.isEmpty()) {
        System.out.println("EMPTY");
    } else {
        for (int i = 0; i < playlist.size(); i++) {
            System.out.print(playlist.get(i) + (i < playlist.size() - 1 ? " " : ""));
        }
        System.out.println();
    }
    break;

case "NEXT":
    if (playlist.isEmpty()) {
        System.out.println("EMPTY");
    } else {
        currentSongIndex = (currentSongIndex + 1) % playlist.size();
        System.out.println(playlist.get(currentSongIndex));
    }
    break;

default:
    break;
}
}

```

```

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

    if (!scanner.hasNextInt()) {
        scanner.close();
        return;
    }
    int N = scanner.nextInt();
}

```

```
scanner.nextLine();

Main manager = new Main();

for (int i = 0; i < N; i++) {
    if (scanner.hasNextLine()) {
        String commandLine = scanner.nextLine().trim();
        manager.processCommand(commandLine);
    }
}

scanner.close();
}
```

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

```
        if (!scanner.hasNextInt()) {
```

```
            scanner.close();
```

```
            return;
```

```
        }
```

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

```
        scanner.nextLine();
```

```
        List<String> names = new ArrayList<>();
```

```
for (int i = 0; i < N; i++) {  
    if (scanner.hasNextLine()) {  
        String name = scanner.nextLine().trim();  
        names.add(name);  
    }  
}  
  
String searchName = "";  
if (scanner.hasNextLine()) {  
    searchName = scanner.nextLine().trim();  
}  
  
int frequency = 0;  
  
for (String name : names) {  
    if (name.equals(searchName)) {  
        frequency++;  
    }  
}  
  
System.out.println(frequency);  
  
scanner.close();  
}
```

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 9_PAH

Attempt : 1

Total Mark : 30

Marks Obtained : 30

Section 1 : Coding

1. 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;
import java.util.Locale;

public class Main {

    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in).useLocale(Locale.US);

        if (!scanner.hasNextInt()) {
            scanner.close();
            return;
        }

        int N = scanner.nextInt();

        List<Double> marks = new ArrayList<>();
        double sum = 0.0;

        for (int i = 0; i < N; i++) {
            if (scanner.hasNextDouble()) {
                double mark = scanner.nextDouble();
                marks.add(mark);
                sum += mark;
            }
        }
    }
}
```



```

    }
    double average = 0.0;
    if (N > 0) {
        average = sum / N;
    }

    System.out.printf("Average of the list: %.2f%n", average);

    scanner.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 10 2 10 10 -1 (No greater element) 8 -1 -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.Scanner;  
import java.util.Stack;
```

```
public class Main {  
    public static void main(String[] args) {  
        Scanner scanner = new Scanner(System.in);  
  
        if (!scanner.hasNextInt()) {  
            scanner.close();  
            return;  
        }  
  
        int N = scanner.nextInt();  
        int[] arr = new int[N];  
        int[] result = new int[N];  
  
        for (int i = 0; i < N; i++) {  
            if (scanner.hasNextInt()) {  
                arr[i] = scanner.nextInt();  
            }  
        }  
    }  
}
```

```

    }
}

scanner.close();

Stack<Integer> stack = new Stack<>();

for (int i = N - 1; i >= 0; i--) {
    while (!stack.isEmpty() && arr[stack.peek()] <= arr[i]) {
        stack.pop();
    }

    if (stack.isEmpty()) {
        result[i] = -1;
    } else {
        result[i] = arr[stack.peek()];
    }

    stack.push(i);
}

for (int i = 0; i < N; i++) {
    System.out.print(result[i] + (i == N - 1 ? "" : " "));
}
System.out.println();
}
}

```

Status : Correct

Marks : 10/10

3. 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.LinkedList;
import java.util.List;
import java.util.Scanner;

public class Main {

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

        if (!scanner.hasNextInt()) {
```

```

        scanner.close();
        return;
    }

    int N = scanner.nextInt();
    scanner.nextLine();

    List<String> taskList = new LinkedList<>();

    for (int i = 0; i < N; i++) {
        if (scanner.hasNextLine()) {
            String commandLine = scanner.nextLine().trim();
            String[] parts = commandLine.split(" ", 2);
            String command = parts[0];

            if (command.equalsIgnoreCase("ADD") && parts.length > 1) {
                String task = parts[1];
                taskList.add(task);
            } else if (command.equalsIgnoreCase("REMOVE")) {
                if (!taskList.isEmpty()) {
                    taskList.remove(0);
                }
            } else if (command.equalsIgnoreCase("SHOW")) {
                if (taskList.isEmpty()) {
                    System.out.println("EMPTY");
                } else {
                    System.out.println(String.join(" ", taskList));
                }
            }
        }
    }

    scanner.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, a stock trader, wants to analyze the stock prices of a company over several days. For each day, he wants to determine the stock span, which is the number of consecutive days (including the current day) where the stock price is less than or equal to the price on that day.

The stock span helps him understand how long a stock has been continuously increasing or staying the same. You need to help Rahul by computing the stock span for each day using a Stack data structure efficiently.

Example:

Input:

7

100 80 60 70 60 75 85

Output:

1 1 1 2 1 4 6

Explanation:

For each day:

Day 1: Price = 100 Span = 1 (Only this day)
Day 2: Price = 80 Span = 1 (Only this day)
Day 3: Price = 60 Span = 1 (Only this day)
Day 4: Price = 70 Span = 2 (Includes today and previous day)
Day 5: Price = 60 Span = 1 (Only this day)
Day 6: Price = 75 Span = 4 (Includes today and previous three days)
Day 7: Price = 85 Span = 6 (Includes today and previous five days)

Input Format

The first line contains an integer n, the number of days.

The second line contains n space-separated integers prices[i], where prices[i] represents the stock price on the i-th day.

Output Format

The output prints n space-separated integers representing the stock span for each day.

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 7

100 80 60 70 60 75 85

Output: 1 1 1 2 1 4 6

Answer

```
import java.util.Arrays;  
import java.util.Scanner;  
import java.util.Stack;
```

```
public class Main {
```

```

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

    if (!scanner.hasNextInt()) {
        scanner.close();
        return;
    }
    int N = scanner.nextInt();

    int[] prices = new int[N];
    for (int i = 0; i < N; i++) {
        if (scanner.hasNextInt()) {
            prices[i] = scanner.nextInt();
        }
    }

    scanner.close();

    int[] span = new int[N];
    Stack<Integer> stack = new Stack<>();

    for (int i = 0; i < N; i++) {
        while (!stack.isEmpty() && prices[stack.peek()] <= prices[i]) {
            stack.pop();
        }

        if (stack.isEmpty()) {
            span[i] = i + 1;
        } else {
            span[i] = i - stack.peek();
        }

        stack.push(i);
    }

    for (int i = 0; i < N; i++) {
        System.out.print(span[i] + (i == N - 1 ? "" : " "));
    }
    System.out.println();
}

```


Status : Correct

Marks : 10/10

2. Problem Statement

A teacher is filtering a list of words provided by students. Some words contain too many vowels, making them difficult for a spelling competition. The teacher decides to remove all words that contain more than two vowels.

Help the teacher to implement it using ArrayList.

Input Format

The first line contains an integer N, representing the number of words in the list.

The next N lines contain a string representing the words (one per line).

Output Format

The output consists of words that contain two or less than two vowels, printed in the same order they appeared in the input. Each word is printed on a new line.

Refer to the sample output for the formatting specifications.

Sample Test Case

Input: 1

sri

Output: sri

Answer

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

```
import java.util.ArrayList;  
import java.util.List;  
import java.util.Scanner;
```

```

class VowelFilter {
    public static void filterWords(int N, Scanner scanner) {
        List<String> resultWords = new ArrayList<>();

        for (int i = 0; i < N; i++) {
            if (scanner.hasNextLine()) {
                String word = scanner.nextLine().trim();

                if (word.isEmpty()) {
                    continue;
                }

                int vowelCount = 0;
                for (char c : word.toCharArray()) {
                    if (c == 'a' || c == 'e' || c == 'i' || c == 'o' || c == 'u') {
                        vowelCount++;
                    }
                }

                if (vowelCount <= 2) {
                    resultWords.add(word);
                }
            }
        }

        for (String word : resultWords) {
            System.out.println(word);
        }
    }
}

```

```

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        sc.nextLine();
        VowelFilter.filterWords(n, sc);
        sc.close();
    }
}

```

Status : Correct

Marks : 10/10

3. 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 scanner = new Scanner(System.in);
```

```
        int n = 0;  
        if (scanner.hasNextInt()) {  
            n = scanner.nextInt();  
        }
```

```
        int[] arr = new int[n];  
        for (int i = 0; i < n; i++) {  
            if (scanner.hasNextInt()) {  
                arr[i] = scanner.nextInt();  
            }  
        }
```

```
        int l = 0;  
        int r = 0;  
        if (scanner.hasNextInt()) {  
            l = scanner.nextInt();  
        }  
        if (scanner.hasNextInt()) {  
            r = scanner.nextInt();  
        }
```

```
        scanner.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] + (i == n - 1 ? "" : " "));  
        }
```

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

```
}
```

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 scanner = new Scanner(System.in);

        int m = 0;
        if (scanner.hasNextInt()) {
            m = scanner.nextInt();
        }
        LinkedList<Integer> list1 = readList(scanner, m);

        int n = 0;
        if (scanner.hasNextInt()) {
            n = scanner.nextInt();
        }
        LinkedList<Integer> list2 = readList(scanner, n);

        scanner.close();

        LinkedList<Integer> mergedList = new LinkedList<>();

        int i = 0;
        int j = 0;

        while (i < list1.size() && j < list2.size()) {
            int val1 = list1.get(i);
            int val2 = list2.get(j);

            if (val1 <= val2) {
                mergedList.add(val1);
                i++;
            }
        }
    }
}
```

```

    } else {
        mergedList.add(val2);
        j++;
    }
}

while (i < list1.size()) {
    mergedList.add(list1.get(i));
    i++;
}

while (j < list2.size()) {
    mergedList.add(list2.get(j));
    j++;
}

for (int k = 0; k < mergedList.size(); k++) {
    System.out.print(mergedList.get(k));
    if (k < mergedList.size() - 1) {
        System.out.print(" ");
    }
}
System.out.println();
}

private static LinkedList<Integer> readList(Scanner scanner, int size) {
    LinkedList<Integer> list = new LinkedList<>();
    for (int i = 0; i < size; i++) {
        if (scanner.hasNextInt()) {
            list.add(scanner.nextInt());
        }
    }
    return list;
}
}

```

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. Which of the following is true about HashMap?

Answer

It is not synchronized

Status : Correct

Marks : 1/1

2. Which of the following allows null keys in Java?

Answer

HashMap

Status : Correct

Marks : 1/1

3. How does HashSet check for duplicate elements?

Answer

Using equals() and hashCode()

Status : Correct

Marks : 1/1

4. Which of the following is true about TreeMap?

Answer

It maintains natural ordering

Status : Correct

Marks : 1/1

5. Which statement is true about HashSet and TreeSet?

Answer

TreeSet provides sorted elements

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) {
        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

7. 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

8. 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

9. Which method retrieves the lowest key in a TreeMap?

Answer

firstKey()

Status : Correct

Marks : 1/1

10. What happens when you add duplicate elements to a HashSet?

Answer

The duplicate is ignored

Status : Correct

Marks : 1/1

11. Which method removes all elements from a Set?

Answer

clear()

Status : Correct

Marks : 1/1

12. What will happen if you add a null element to a TreeSet?

Answer

An exception occurs

Status : Correct

Marks : 1/1

13. What is the time complexity of retrieving an element from a HashSet?

Answer

$O(1)$

Status : Correct

Marks : 1/1

14. 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

15. 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

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

```
class Vehicle {  
    private String regNumber;  
    private String ownerName;  
    private String vehicleType;
```

```

public Vehicle(String regNumber, String ownerName, String vehicleType) {
    this.regNumber = regNumber;
    this.ownerName = ownerName;
    this.vehicleType = vehicleType;
}

@Override
public boolean equals(Object o) {
    if (this == o) return true;
    if (o == null || getClass() != o.getClass()) return false;
    Vehicle vehicle = (Vehicle) o;
    return Objects.equals(regNumber, vehicle.regNumber);
}

@Override
public int hashCode() {
    return Objects.hash(regNumber);
}

@Override
public String toString() {
    return regNumber + " " + ownerName + " " + vehicleType;
}
}

public class Main {

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

        int n = 0;
        if (scanner.hasNextInt()) {
            n = scanner.nextInt();
        }

        scanner.nextLine();

        Set<Vehicle> vehicleRecords = new HashSet<>();

        for (int i = 0; i < n; i++) {
            if (scanner.hasNextLine()) {

```

```
String line = scanner.nextLine();

try (Scanner lineScanner = new Scanner(line)) {
    if (lineScanner.hasNext()) {
        String regNumber = lineScanner.next();
        String ownerName = lineScanner.next();
        String vehicleType = lineScanner.next();

        Vehicle newVehicle = new Vehicle(regNumber, ownerName,
vehicleType);

        vehicleRecords.add(newVehicle);
    }
} catch (Exception e) {
}
}

scanner.close();

for (Vehicle vehicle : vehicleRecords) {
    System.out.println(vehicle);
}
}
```

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 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.HashMap;
```

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

```
import java.text.DecimalFormat;
```

```
public class Main {
```

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

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

```
        HashMap<String, Double> fruitQuantities = new HashMap<>();
```

```
        double totalQuantity = 0.0;
```

```
        while (true) {
```

```
            String inputLine = scanner.nextLine();
```

```
            if (inputLine.equalsIgnoreCase("done")) {
```

```
                break;
```

```
            }
```

```
            if (inputLine.contains("-") || inputLine.contains("_") ||
```

```
                inputLine.contains("#") ||
```

```
                inputLine.contains("&") || inputLine.contains("@") ||
```

```
                inputLine.contains("!")) {
```

```

        System.out.println("Invalid format");
        scanner.close();
        return;
    }

    int colonCount = 0;
    for (char c : inputLine.toCharArray()) {
        if (c == ':') {
            colonCount++;
        }
    }

    if (colonCount != 1) {
        System.out.println("Invalid format");
        scanner.close();
        return;
    }

    String[] parts = inputLine.split(":");
    if (parts.length != 2) {
        System.out.println("Invalid format");
        scanner.close();
        return;
    }

    String fruitName = parts[0].trim();
    String quantityString = parts[1].trim();

    try {
        double quantity = Double.parseDouble(quantityString);

        fruitQuantities.put(fruitName, quantity);
        totalQuantity += quantity;

    } catch (NumberFormatException e) {
        System.out.println("Invalid input");
        scanner.close();
        return;
    }
}

scanner.close();

```

```
DecimalFormat df = new DecimalFormat("0.00");  
System.out.println(df.format(totalQuantity));
```

```
}  
}
```

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 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.Scanner;  
import java.util.TreeMap;  
import java.util.Map;  
import java.lang.Character;
```

```
class MessageAnalyzer {
```

```
    public static void analyze(int n, Scanner scanner) {  
        TreeMap<Character, Integer> charFrequencies = new TreeMap<>();
```

```
        for (int i = 0; i < n; i++) {
```

```

        if (scanner.hasNextLine()) {
            String line = scanner.nextLine();

            for (char c : line.toCharArray()) {
                if (Character.isLetter(c)) {
                    charFrequencies.put(c, charFrequencies.getOrDefault(c, 0) + 1);
                }
            }
        }
    }

    System.out.println("Character Frequency:");

    for (Map.Entry<Character, Integer> entry : charFrequencies.entrySet()) {
        System.out.println(entry.getKey() + ": " + entry.getValue());
    }
}

public class Main {

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

        int n = 0;
        if (scanner.hasNextInt()) {
            n = scanner.nextInt();
        }
        scanner.nextLine();

        MessageAnalyzer.analyze(n, scanner);

        scanner.close();
    }
}

```

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 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.Scanner;
```

```
import java.util.TreeSet;
```

```
public class Main {
```

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

```
        int n = 0;  
        if (scanner.hasNextInt()) {  
            n = scanner.nextInt();  
        }
```

```
        TreeSet<Integer> availableSeats = new TreeSet<>();
```

```
        for (int i = 0; i < n; i++) {  
            if (scanner.hasNextInt()) {  
                int seat = scanner.nextInt();  
                availableSeats.add(seat);  
            }  
        }
```

```
        int searchSeat = 0;
```

```
if (scanner.hasNextInt()) {  
    searchSeat = scanner.nextInt();  
}  
  
if (availableSeats.contains(searchSeat)) {  
    System.out.println(searchSeat + " is present!");  
} else {  
    System.out.println(searchSeat + " is not present!");  
}  
  
scanner.close();  
}  
}
```

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 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.Scanner;  
import java.util.TreeSet;  
import java.util.Locale;  
import java.text.DecimalFormat;
```

```
class Student implements Comparable<Student> {  
    private int studentId;  
    private String name;  
    private double gpa;  
  
    public Student(int studentId, String name, double gpa) {  
        this.studentId = studentId;  
        this.name = name;
```

```

        this.gpa = gpa;
    }

    @Override
    public int compareTo(Student other) {
        double diff = this.gpa - other.gpa;

        if (Math.abs(diff) > 0.0001) {
            return Double.compare(this.gpa, other.gpa);
        }

        int nameCompare = this.name.compareTo(other.name);
        if (nameCompare != 0) {
            return nameCompare;
        }

        return Integer.compare(this.studentId, other.studentId);
    }

    @Override
    public String toString() {
        DecimalFormat df = new DecimalFormat("0.00");
        return studentId + " " + name + " " + df.format(gpa);
    }
}

public class Main {

    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in).useLocale(Locale.US);

        int n = 0;
        if (scanner.hasNextInt()) {
            n = scanner.nextInt();
        }

        TreeSet<Student> studentRecords = new TreeSet<>();

        scanner.nextLine();

        for (int i = 0; i < n; i++) {
            if (scanner.hasNextLine()) {

```

```

String line = scanner.nextLine().trim();
if (line.isEmpty()) continue;

Scanner lineScanner = new Scanner(line).useLocale(Locale.US);
int studentId = lineScanner.nextInt();

double gpa = 0.0;
String[] parts = line.split("\\s+");
if (parts.length >= 3) {
    try {
        gpa = Double.parseDouble(parts[parts.length - 1]);
    } catch (NumberFormatException e) {
    }
}

String idStr = String.valueOf(studentId);
String gpaStr = parts[parts.length - 1];

int nameStartIndex = idStr.length();
while (nameStartIndex < line.length() && line.charAt(nameStartIndex)
== ' ') {
    nameStartIndex++;
}

int nameEndIndex = line.lastIndexOf(gpaStr);
while (nameEndIndex > 0 && line.charAt(nameEndIndex - 1) == ' ') {
    nameEndIndex--;
}

String name = line.substring(nameStartIndex, nameEndIndex).trim();

studentRecords.add(new Student(studentId, name, gpa));

lineScanner.close();
}

for (Student student : studentRecords) {
    System.out.println(student);
}

scanner.close();

```

Status : Correct

Marks : 10/10

2. 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.Scanner;
import java.util.HashMap;
import java.util.LinkedHashMap;
```

```
public class Main {
```

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

```
        int n = 0;
        if (scanner.hasNextInt()) {
            n = scanner.nextInt();
        }
```

```
        String input = "";
        if (scanner.hasNextLine()) {
            scanner.nextLine();
            if (scanner.hasNextLine()) {
                input = scanner.nextLine().trim();
            }
        }
```

```
        HashMap<Character, Integer> frequencyMap = new LinkedHashMap<>();
```

```
        for (int i = 0; i < input.length(); i++) {
            char ch = input.charAt(i);
            frequencyMap.put(ch, frequencyMap.getOrDefault(ch, 0) + 1);
        }
```

```
        char result = '-';
        boolean found = false;
```

```
        for (int i = 0; i < input.length(); i++) {
            char ch = input.charAt(i);
            if (frequencyMap.get(ch) == 1) {
                result = ch;
                found = true;
                break;
            }
        }
```

```
        if (found) {
```



```
        System.out.println(result);
    } else {
        System.out.println("-1");
    }

    scanner.close();
}
}
```

Status : Correct

Marks : 10/10

3. 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.Scanner;  
import java.util.TreeMap;
```

```
class EventManager {  
    private TreeMap<String, String> schedule;
```

```
    public EventManager() {  
        this.schedule = new TreeMap<>();  
    }
```

```
    public void addEvent(String time, String description) {  
        this.schedule.putIfAbsent(time, description);  
    }
```

```
    public void displaySchedule() {  
        System.out.println("Scheduled Events:");  
        for (String time : schedule.keySet()) {  
            String description = schedule.get(time);  
            System.out.println(time + " - " + description);  
        }
```

```
    }  
}
```

```
public class Main {
```

```

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

    int n = 0;
    if (scanner.hasNextInt()) {
        n = scanner.nextInt();
    }

    scanner.nextLine();

    EventManager eventManager = new EventManager();

    for (int i = 0; i < n; i++) {
        if (scanner.hasNextLine()) {
            String line = scanner.nextLine().trim();
            if (line.isEmpty()) continue;

            int firstSpaceIndex = line.indexOf(' ');

            if (firstSpaceIndex != -1) {
                String time = line.substring(0, firstSpaceIndex);
                String description = line.substring(firstSpaceIndex + 1);
                eventManager.addEvent(time, description);
            }
        }
    }

    eventManager.displaySchedule();

    scanner.close();
}

```

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 10_CY

Attempt : 1

Total Mark : 40

Marks Obtained : 40

Section 1 : COD

1. Problem Statement

Aryan is developing a voting system for a college election. Each vote is recorded as an entry in an array, where every student's vote is represented by a candidate's ID. Since it's a majority-rule election, the winner is the candidate who receives more than $n/2$ votes, where n is the total number of votes cast.

To quickly determine the winner, Aryan decides to use a HashMap to count the occurrences of each vote and identify the candidate who has received more than half of the total votes.

Example

Input

7

2 2 1 2 2 2 3

Output

2

Explanation

The votes are: 2, 2, 1, 2, 2, 3, 2

Count of each candidate:

2 appears 5 times 1 appears once 3 appears once

The majority element is the one that appears more than $N/2$ times. Since $7/2 = 3.5$, a number must appear at least 4 times to be the majority.

The number 2 appears 5 times, which is greater than 3.5, so the output is 2.

Input Format

The first line contains an integer N representing the number of votes cast.

The second line contains N space-separated integers representing the votes, where each integer corresponds to a candidate.

Output Format

The output prints an integer representing the majority element (the candidate who received more than $N/2$ votes).

If no such candidate exists, print -1.

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 7

2 2 1 2 2 2 3

Output: 2

Answer

```
import java.util.HashMap;
```

```

import java.util.Scanner;
import java.util.*;
class MajorityElementFinder {
    public static int findMajorityElement(int[] arr) {
        int n = arr.length;
        int majorityThreshold = n / 2;

        Map<Integer, Integer> counts = new HashMap<>();
        for (int element : arr) {
            counts.put(element, counts.getDefault(element, 0) + 1);
        }

        for (Map.Entry<Integer, Integer> entry : counts.entrySet()) {
            if (entry.getValue() > majorityThreshold) {
                return entry.getKey();
            }
        }

        return -1;
    }
}

```

```

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

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

        int result = MajorityElementFinder.findMajorityElement(arr);
        System.out.println(result);

        scanner.close();
    }
}

```

Status : Correct

Marks : 10/10

2. Problem Statement

Bob wants to develop a score-tracking application for a gaming tournament. Each player's score is stored in a HashMap with the player's name as the key and the score as the value.

Write a program to assist Bob that takes user input to enter player scores, calculates the maximum score from the HashMap, and prints the player with the highest score.

Input Format

The input consists of strings representing player details in the format "playerName:score".

The input is terminated by entering "done".

Output Format

The output displays a string, representing the player's name who scored the maximum.

If the value is not numeric, print "Invalid input".

If any special characters other than ':' are given, print "Invalid format".

Refer to the sample output for formatting specifications.

Sample Test Case

Input: Alice:15

Bob:56

done

Output: Bob

Answer

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

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

```
class ScoreTracker {
```

```
Map<String, Integer> scoreMap = new HashMap<>();
```

```
boolean processInput(String input) {  
    if (input.split(":").length != 2) {  
        System.out.println("Invalid format");  
        return false;  
    }  
}
```

```
String[] parts = input.split(":");  
String playerName = parts[0].trim();  
String scoreStr = parts[1].trim();
```

```
try {  
    int score = Integer.parseInt(scoreStr);  
  
    if (score < 1 || score > 100) {  
        System.out.println("Invalid input");  
        return false;  
    }  
}
```

```
    scoreMap.put(playerName, score);  
    return true;  
} catch (NumberFormatException e) {  
    System.out.println("Invalid input");  
    return false;  
}
```

```
}  
}
```

```
String findTopPlayer() {  
    int maxScore = Integer.MIN_VALUE;  
    String topPlayer = "";
```

```
    for (Map.Entry<String, Integer> entry : scoreMap.entrySet()) {  
        if (entry.getValue() > maxScore) {  
            maxScore = entry.getValue();  
            topPlayer = entry.getKey();  
        }  
    }  
}
```

```
    return topPlayer;  
}
```

```
}
```



```

public class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        ScoreTracker tracker = new ScoreTracker();
        boolean validInput = true;

        while (true) {
            String input = scanner.nextLine();

            if (input.toLowerCase().equals("done")) {
                break;
            }

            if (!tracker.processInput(input)) {
                validInput = false;
                break;
            }
        }

        if (validInput && !tracker.scoreMap.isEmpty()) {
            System.out.println(tracker.findTopPlayer());
        }

        scanner.close();
    }
}

```

Status : Correct

Marks : 10/10

3. 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.*;
```

```
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

4. Problem Statement

The city library maintains a record of books available for lending. Each book is uniquely identified by its ISBN number, along with its title and author. The librarian wants to efficiently store and manage these records, ensuring books can be listed in the order they were added.

Your task is to implement a Library Management System using HashSet where:

The librarian adds books with ISBN, title, and author. The librarian can remove books by providing an ISBN. Finally, the librarian displays the available books in the order they were added.

Implement a class Library that will handle these operations. The main function should manage user input and interact with the Library class accordingly.

Input Format

The first line contains an integer n – the number of books to be added.

The next n lines contain three values: ISBN (integer), Title (string without spaces), and Author (string without spaces).

1. An integer `employee_id`
2. A string `title`
3. A string `author name`

The next line contains an integer m – the number of books to be removed.

The next m lines follow, each contains an ISBN number to remove.

Output Format

The output prints a list of books available in the library after performing all operations in the format:

"ISBN: <isbn>, Title: <title>, Author: <author>"

If no books remain, print: "No books available"

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 3

1234 JavaCompleteGuide JohnDoe

5678 PythonBasics JaneDoe
9012 DataStructures AliceSmith

1

5679

Output: ISBN: 1234, Title: JavaCompleteGuide, Author: JohnDoe
ISBN: 9012, Title: DataStructures, Author: AliceSmith
ISBN: 5678, Title: PythonBasics, Author: JaneDoe

Answer

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

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

```
class Book {  
    int isbn;  
    String title;  
    String author;
```

```
    public Book(int isbn, String title, String author) {  
        this.isbn = isbn;  
        this.title = title;  
        this.author = author;  
    }
```

```
    @Override  
    public boolean equals(Object obj) {  
        if (this == obj)  
            return true;  
        if (obj == null || getClass() != obj.getClass())  
            return false;  
        Book book = (Book) obj;  
        return isbn == book.isbn;  
    }
```

```
    @Override  
    public int hashCode() {  
        return Objects.hash(isbn);  
    }  
}
```

```
class Library {  
    private LinkedHashSet<Book> books = new LinkedHashSet<>();
```

```

public void addBook(int isbn, String title, String author) {
    books.add(new Book(isbn, title, author));
}

public void removeBook(int isbn) {
    books.removeIf(book -> book.isbn == isbn);
}

public void displayBooks() {
    if (books.isEmpty()) {
        System.out.println("No books available");
    } else {
        for (Book book : books) {
            System.out.println("ISBN: " + book.isbn + ", Title: " + book.title + ",
Author: " + book.author);
        }
    }
}
}

```

```

class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        Library library = new Library();
        int n = sc.nextInt();
        for (int i = 0; i < n; i++) {
            int isbn = sc.nextInt();
            String title = sc.next();
            String author = sc.next();
            library.addBook(isbn, title, author);
        }
        int m = sc.nextInt();
        for (int i = 0; i < m; i++) {
            int isbn = sc.nextInt();
            library.removeBook(isbn);
        }
        library.displayBooks();
        sc.close();
    }
}

```

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 11

Attempt : 1

Total Mark : 20

Marks Obtained : 20

Section 1 : Project

1. Problem Statement

Create a JDBC-based Inventory Management System that handles runtime input to manage items in an inventory. The system should allow users to:

Add a new item (item ID, name, quantity, price).

Restock an item by increasing its quantity.

Reduce the stock of an item, ensuring sufficient quantity.

Display all items in the inventory in a sorted order by item ID.

Exit the application.

Half of the code is given here; Only the remaining part should be completed.

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 items table has already been created with the following structure:

Table Name: items

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 Item):

- The second line consists of an integer item_id.
- The third line consists of a string name.
- The fourth line consists of an integer quantity.
- The fifth line consists of a double price.

For choice 2 (Restock Item):

- The second line consists of an integer item_id.
- The third line consists of an integer quantity_to_add (must be positive).

For choice 3 (Reduce Stock):

- The second line consists of an integer item_id.
- The third line consists of an integer quantity_to_remove (must be positive).

For choice 4 (Display Inventory):

- No additional inputs are required.

For choice 5 (Exit):

- No additional inputs are required.

Output Format

For choice 1 (Add Item):

- Print "Item added successfully" if the item was added.
- Print "Failed to add item." if the insertion failed.

For choice 2 (Restock Item):

- Print "Item restocked successfully" if the restock was successful.
- Print "Item not found." if the specified item ID does not exist.

For choice 3 (Reduce Stock):

- Print "Stock reduced successfully" if the stock reduction was successful.
- Print "Not enough stock to remove." if there is insufficient quantity.
- Print "Item not found." if the specified item ID does not exist.

For choice 4 (Display Inventory):

- Display each item on a new line in the format:
- ID | Name | Quantity | Price
- If no items are available, print nothing (or handle with an appropriate message if desired).

For choice 5 (Exit):

- Print "Exiting Inventory Management System."

For invalid input:

- Print "Invalid choice. Please try again."

Sample Test Case

Input: 1
101
Laptop
50

1200.00

4

5

Output: Item added successfully

ID | Name | Quantity | Price

101 | Laptop | 50 | 1200.00

Exiting Inventory Management System.

Answer

```
import java.sql.*;
```

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

```
class InventoryManagementSystem {
```

```
    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:
```

```
                        addItem(conn, scanner);
```

```
                        break;
```

```
                    case 2:
```

```
                        restockItem(conn, scanner);
```

```
                        break;
```

```
                    case 3:
```

```
                        reduceStock(conn, scanner);
```

```
                        break;
```

```
                    case 4:
```

```
                        displayInventory(conn);
```

```
                        break;
```

```
                    case 5:
```

```
                        System.out.println("Exiting Inventory Management System.");
```

```
                        running = false;
```

```
                        break;
```

```
                    default:
```

```

        System.out.println("Invalid choice. Please try again.");
    }
}
} catch (SQLException e) {
    e.printStackTrace();
}
}
}

```

```

public static void addItem(Connection conn, Scanner scanner) {
    int itemId = scanner.nextInt();
    scanner.nextLine();

    String name = scanner.nextLine();
    int quantity = scanner.nextInt();
    double price = scanner.nextDouble();

    String insertQuery =
        "INSERT INTO items (item_id, name, quantity, price) VALUES (?, ?, ?, ?)";

    try (PreparedStatement stmt = conn.prepareStatement(insertQuery)) {
        stmt.setInt(1, itemId);
        stmt.setString(2, name);
        stmt.setInt(3, quantity);
        stmt.setDouble(4, price);

        int rowsInserted = stmt.executeUpdate();
        System.out.println(
            rowsInserted > 0 ? "Item added successfully" : "Failed to add item."
        );
    } catch (SQLException e) {
        System.out.println("Error adding item: " + e.getMessage());
    }
}

```

// -----

```

public static void restockItem(Connection conn, Scanner scanner) {
    int itemId = scanner.nextInt();
    int quantityToAdd = scanner.nextInt();

    if (quantityToAdd <= 0) {

```

```

        System.out.println("Quantity to add must be positive.");
        return;
    }

    String updateQuery =
        "UPDATE items SET quantity = quantity + ? WHERE item_id = ?";

    try (PreparedStatement stmt = conn.prepareStatement(updateQuery)) {
        stmt.setInt(1, quantityToAdd);
        stmt.setInt(2, itemId);

        int rowsUpdated = stmt.executeUpdate();
        System.out.println(
            rowsUpdated > 0 ? "Item restocked successfully" : "Item not found."
        );
    } catch (SQLException e) {
        System.out.println("Error during restock: " + e.getMessage());
    }
}

```

// -----

```

public static void reduceStock(Connection conn, Scanner scanner) {
    int itemId = scanner.nextInt();
    int quantityToRemove = scanner.nextInt();

    if (quantityToRemove <= 0) {
        System.out.println("Quantity to remove must be positive.");
        return;
    }
}

```

```

String checkQuantityQuery =
    "SELECT quantity FROM items WHERE item_id = ?";
String updateQuery =
    "UPDATE items SET quantity = quantity - ? WHERE item_id = ?";

```

```

try (PreparedStatement checkStmt =
    conn.prepareStatement(checkQuantityQuery)) {

    checkStmt.setInt(1, itemId);
    ResultSet rs = checkStmt.executeQuery();
}

```

```

        if (rs.next()) {
            int currentQuantity = rs.getInt("quantity");

            if (currentQuantity >= quantityToRemove) {

                try (PreparedStatement stmt =
                    conn.prepareStatement(updateQuery)) {

                    stmt.setInt(1, quantityToRemove);
                    stmt.setInt(2, itemId);

                    int rowsUpdated = stmt.executeUpdate();

                    System.out.println(
                        rowsUpdated > 0
                        ? "Stock reduced successfully"
                        : "Failed to reduce stock."
                    );
                }

            } else {
                System.out.println("Not enough stock to remove.");
            }

        } else {
            System.out.println("Item not found.");
        }

    } catch (SQLException e) {
        System.out.println("Error during stock reduction: " + e.getMessage());
    }
}

// -----

public static void displayInventory(Connection conn) {
    String displayQuery =
        "SELECT * FROM items ORDER BY item_id";

    try (Statement stmt = conn.createStatement();
        ResultSet rs = stmt.executeQuery(displayQuery)) {

```

```

        System.out.println("ID | Name | Quantity | Price");

        while (rs.next()) {
            System.out.printf("%d | %s | %d | %.2f%n",
                rs.getInt("item_id"),
                rs.getString("name"),
                rs.getInt("quantity"),
                rs.getDouble("price"));
        }

    } catch (SQLException e) {
        System.out.println("Error displaying inventory: " + e.getMessage());
    }
}
}

```

Status : Correct

Marks : 10/10

2. 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) {
    try {
        int itemId = scanner.nextInt();
        scanner.nextLine();
        String name = scanner.nextLine();
        String category = scanner.nextLine();
        double price = scanner.nextDouble();

```

```

        String sql = "INSERT INTO menu (item_id, name, category, price) VALUES
        (?, ?, ?, ?)";

```

```

        PreparedStatement pstmt = conn.prepareStatement(sql);

```

```

        pstmt.setInt(1, itemId);
        pstmt.setString(2, name);
        pstmt.setString(3, category);
        pstmt.setDouble(4, price);

```

```

        int rows = pstmt.executeUpdate();

```

```

        if (rows > 0) {
            System.out.println("Menu item added successfully");
        } else {
            System.out.println("Failed to add item.");
        }
    }
}

```

```
} catch (SQLException e) {  
    System.out.println("Failed to add item.");  
}  
}
```

```
// -----
```

```
public static void updateItemPrice(Connection conn, Scanner scanner) {  
    try {  
        int itemId = scanner.nextInt();  
        double newPrice = scanner.nextDouble();  
  
        String sql = "UPDATE menu SET price = ? WHERE item_id = ?";  
        PreparedStatement pstmt = conn.prepareStatement(sql);  
  
        pstmt.setDouble(1, newPrice);  
        pstmt.setInt(2, itemId);  
  
        int rows = pstmt.executeUpdate();  
  
        if (rows > 0) {  
            System.out.println("Item price updated successfully");  
        } else {  
            System.out.println("Item not found.");  
        }  
    } catch (SQLException e) {  
        System.out.println("Item not found.");  
    }  
}
```

```
// -----
```

```
public static void viewItemDetails(Connection conn, Scanner scanner) {  
    try {  
        int itemId = scanner.nextInt();  
  
        String sql = "SELECT * FROM menu WHERE item_id = ?";  
        PreparedStatement pstmt = conn.prepareStatement(sql);  
        pstmt.setInt(1, itemId);  
  
        ResultSet rs = pstmt.executeQuery();
```

```

        if (rs.next()) {
            System.out.printf("ID: %d | Name: %s | Category: %s | Price: %.2f%n",
                rs.getInt("item_id"),
                rs.getString("name"),
                rs.getString("category"),
                rs.getDouble("price"));
        } else {
            System.out.println("Item not found.");
        }

    } catch (SQLException e) {
        System.out.println("Item not found.");
    }
}

// -----

public static void displayAllMenuItems(Connection conn) {
    try {
        String sql = "SELECT * FROM menu ORDER BY item_id";
        Statement stmt = conn.createStatement();
        ResultSet rs = stmt.executeQuery(sql);

        System.out.println("ID | Name | Category | Price");

        while (rs.next()) {
            System.out.printf("%d | %s | %s | %.2f%n",
                rs.getInt("item_id"),
                rs.getString("name"),
                rs.getString("category"),
                rs.getDouble("price"));
        }

    } catch (SQLException e) {
        System.out.println("Failed to retrieve menu items.");
    }
}

// -----

```

```
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) {  
        this.itemId = itemId;  
        this.name = name;  
        this.category = category;  
        this.price = price;  
    }  
  
    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

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Scan to verify results



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 have more than one parameter?

Answer

Yes, it can have multiple parameters

Status : Correct

Marks : 1/1

2. What is a lambda expression in Java?

Answer

A way to define anonymous methods

Status : Correct

Marks : 1/1

3. Which of the following is a valid lambda expression in Java?

Answer

All of the mentioned options

Status : Correct

Marks : 1/1

4. Which of the following interfaces is NOT a functional interface in Java?

Answer

Iterable

Status : Correct

Marks : 1/1

5. 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

6. Which functional interface in Java takes two arguments and returns a result?

Answer

BiFunction

Status : Correct

Marks : 1/1

7. Which functional interface is commonly used with lambda expressions in Java?

Answer

Runnable

Status : Correct

Marks : 1/1

8. What is the syntax for a basic lambda expression in Java?

Answer

(parameters) -> expression

Status : Correct

Marks : 1/1

9. 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

10. 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

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Scan to verify results



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;
import java.util.Arrays;
import java.util.stream.IntStream;

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

        int N = scanner.nextInt();

        int[] arr = new int[N];
        for (int i = 0; i < N; i++) {
            arr[i] = scanner.nextInt();
        }

        long evenSum = Arrays.stream(arr)
            .filter(n -> n % 2 == 0)
            .sum();

        System.out.println(evenSum);

        scanner.close();
    }
}
```

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 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.Scanner;
import java.util.Arrays;
import java.util.function.Consumer;

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

        int N = scanner.nextInt();

        int[] arr = new int[N];
        for (int i = 0; i < N; i++) {
            arr[i] = scanner.nextInt();
        }

        Consumer<Integer> printSquare = n -> System.out.print(n * n + " ");

        Arrays.stream(arr)
            .boxed()
            .forEach(printSquare);

        System.out.println();

        scanner.close();
    }
}
```

Status : Correct

Marks : 10/10

Rajalakshmi Engineering College

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Department: CSE - Section 9

Batch: 2028

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Scan to verify results



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.*;
import java.util.function.Supplier;

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

        Scanner sc = new Scanner(System.in);
        String s = sc.nextLine();

        Supplier<String> p = () -> s;

        String h = p.get();
        String r = new StringBuilder(h).reverse().toString();

        System.out.print(r);
    }
}
```

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.Scanner;
import java.util.function.Function;

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

        String sentence = scanner.nextLine();

        scanner.close();

        Function<String, String> wordCategorizer = word -> {
            if (word.length() <= 3) {
                return "Short";
            } else {
                return "Long";
            }
        };

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

        StringBuilder result = new StringBuilder();

        for (String word : words) {
            String category = wordCategorizer.apply(word);
            result.append(category).append(" ");
        }
    }
}
```

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

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 : 40

Section 1 : COD

1. 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.Scanner;  
import java.util.ArrayList;  
import java.util.List;  
import java.util.function.Consumer;
```

```
class Product {  
    private final String name;  
    private final double originalPrice;  
    private final double discountedPrice;
```

```
    public Product(String name, double originalPrice, double discountedPrice) {  
        this.name = name;  
        this.originalPrice = originalPrice;  
        this.discountedPrice = discountedPrice;  
    }
```

```
    public String getName() { return name; }  
    public double getOriginalPrice() { return originalPrice; }  
    public double getDiscountedPrice() { return discountedPrice; }  
}
```

```

public class Main {

    private static final double DISCOUNT_RATE = 0.15;

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

        int n = 0;
        if (scanner.hasNextInt()) {
            n = scanner.nextInt();
        }

        if (n == 0) {
            System.out.println("No products available");
            scanner.close();
            return;
        }

        List<Product> products = new ArrayList<>();

        for (int i = 0; i < n; i++) {
            String name = scanner.next();
            double price = scanner.nextDouble();

            double discountedPrice = price * (1 - DISCOUNT_RATE);
            products.add(new Product(name, price, discountedPrice));
        }

        Consumer<Product> productPrinter = product -> {
            String formattedOutput = String.format(
                "Product: %s, Original Price: %.1f, Discounted Price: %.1f",
                product.getName(),
                product.getOriginalPrice(),
                product.getDiscountedPrice()
            );
            System.out.println(formattedOutput);
        };

        for (Product product : products) {
            productPrinter.accept(product);
        }
    }
}

```

```
        scanner.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.Scanner;  
import java.util.ArrayList;
```



```

import java.util.List;
import java.util.stream.Collectors;

public class Main {

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

        int N = 0;
        if (scanner.hasNextInt()) {
            N = scanner.nextInt();
        }

        List<Integer> numbers = new ArrayList<>();
        for (int i = 0; i < N; i++) {
            if (scanner.hasNextInt()) {
                numbers.add(scanner.nextInt());
            }
        }

        List<Integer> uniqueNumbers = numbers.stream()
            .distinct()
            .collect(Collectors.toList());

        String result = uniqueNumbers.stream()
            .map(String::valueOf)
            .collect(Collectors.joining(", ", "[", "]"));

        System.out.println(result);

        scanner.close();
    }
}

```

Status : Correct

Marks : 10/10

3. 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.*;
```

```
class main {
```

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

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

```

int n = sc.nextInt();
sc.nextLine();

String[] s = new String[n];

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

int m = sc.nextInt();
final int[] h = {0};

Supplier<String> p = () -> {
    String t = s[h[0]];
    h[0]++;
    if (h[0] == n) {
        h[0] = 0;
    }
    return t;
};

for (int j = 0; j < m; j++) {
    System.out.println(p.get());
}
}
}

```

Status : Correct

Marks : 10/10

4. 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 ≥ 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.Scanner;
import java.util.ArrayList;
import java.util.List;
import java.util.function.Predicate;
import java.util.stream.Collectors;

class Employee {
    private final String name;
    private final int salary;

    public Employee(String name, int salary) {
        this.name = name;
        this.salary = salary;
    }
}
```

```

    }

    public String getName() {
        return name;
    }

    public int getSalary() {
        return salary;
    }
}

public class Main {

    private static final int SALARY_THRESHOLD = 50000;

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

        int n = 0;
        if (scanner.hasNextInt()) {
            n = scanner.nextInt();
        }

        List<Employee> employees = new ArrayList<>();

        for (int i = 0; i < n; i++) {
            if (scanner.hasNext()) {
                String name = scanner.next();
                if (scanner.hasNextInt()) {
                    int salary = scanner.nextInt();
                    employees.add(new Employee(name, salary));
                }
            }
        }

        Predicate<Employee> salaryFilter = employee -> employee.getSalary() >=
        SALARY_THRESHOLD;

        List<String> filteredNames = employees.stream()
            .filter(salaryFilter)
            .map(Employee::getName)
            .collect(Collectors.toList());
    }
}

```

```
        if (filteredNames.isEmpty()) {  
            System.out.println("No employee found with salary >= " +  
SALARY_THRESHOLD);  
        } else {  
            filteredNames.forEach(System.out::println);  
        }  
  
        scanner.close();  
    }  
}
```

Status : Correct

Marks : 10/10

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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

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;
```

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

```
public 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> display = c ->
        System.out.println("Customer: " + c.name + ", Feedback Score: " +
c.feedback);
    customers.forEach(display);
    double avg = customers.stream()
        .mapToInt(c -> c.feedback)
        .average()
        .orElse(0.0);
    System.out.printf("Average Feedback: %.2f%n", avg);
    sc.close();
}
}

class Customer {
    String name;
    int feedback;
    Customer(String name, int feedback) {
        this.name = name;
        this.feedback = feedback;
    }
}

```

Status : Correct

Marks : 10/10

2. 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;
```

```
public 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[] seq = { start };

Supplier<String> rollSupplier = () -> {
    String roll = String.format("%s-%d-%04d", dept, year, seq[0]);
    seq[0] = (seq[0] + 1) % 10000;
    return roll;
};

for (int i = 0; i < n; i++) {
    System.out.println(rollSupplier.get());
}
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.*;
import java.util.function.Predicate;

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

        Predicate<String> isPalindrome = s -> s.equalsIgnoreCase(new
        StringBuilder(s).reverse().toString());

        if (isPalindrome.test(word))
            System.out.println(word + " is palindrome");
        else
            System.out.println(word + " is not palindrome");
        sc.close();
    }
}
```

Status : Correct

Marks : 10/10

4. 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;

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

```
        readings[i] = sc.nextDouble();
    }

    Function<double[], Double> average = arr -> {
        double sum = 0;
        for (double v : arr) sum += v;
        return sum / arr.length;
    };

    double avg = average.apply(readings);
    System.out.printf("%.2f%n", avg);
    sc.close();
}
}
```

Status : Correct

Marks : 10/10