Rajalakshmi Engineering College

Name: T.Siva Sankari
Email: 241901108@rajalakshmi.edu.in
Roll no: 241901108
Phone: 7397332706
Branch: REC
Department: CSE (CS) - Section 1
Batch: 2028
Degree: B.E - CSE (CS)

Scan to verify results

2024_28_III_OOPS Using Java Lab

REC_Week 12_Java_Lamba Expressions_CY

Attempt : 1
Total Mark : 40
Marks Obtained : 40

Section 1 : Coding

1. Problem Statement

Riya is developing a college admission system that assigns unique roll numbers to each newly admitted student.

Each roll number should follow this fixed format:

<DEPT>-<YEAR>-<4-digit-sequence>

where:

<DEPT> is the department code (in uppercase, e.g., CSE, ECE, MECH).<YEAR> is the admission year (e.g., 2025).<4-digit-sequence> starts from a given number and increases sequentially for each student.Write a Java program using a Supplier<String> lambda to generate and print the roll numbers for n students.

Input Format

First line: integer n — number of roll numbers to generate

Second line: string DEPT — department code (uppercase letters only)

Third line: integer YEAR — admission year

Fourth line: integer start — starting sequence number (0 ≤ start ≤ 9999)

Output Format

Print n roll numbers, one per line, in the required format

Sequence must be zero-padded to 4 digits

If sequence exceeds 9999, wrap around to 0000

Sample Test Case

Input: 5
CSE
2025
98

Output: CSE-2025-0098
CSE-2025-0099
CSE-2025-0100
CSE-2025-0101
CSE-2025-0102

Answer

```
import java.util.*;
import java.util.function.Supplier;

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

        int n = sc.nextInt();
        String dept = sc.next();
        int year = sc.nextInt();
        int start = sc.nextInt();

        final int[] current = { start };

        Supplier<String> rollNumberSupplier = () -> {
```

```
            String roll = String.format("%s-%d-%04d", dept, year, current[0]);
            current[0] = (current[0] + 1) % 10000;
            return roll;
        };

        for (int i = 0; i < n; i++) {
            System.out.println(rollNumberSupplier.get());
        }

        sc.close();
    }
}
```

Status : Correct **Marks : 10/10**

2. Problem Statement

Nethra is a researcher working on a project that involves analyzing experimental data. As part of her analysis, she needs to determine whether a given word is a palindrome or not.

Create a Java program that allows Nethra to input a word, and then check and display whether the entered word is a palindrome. Use lambda expressions to perform the palindrome check.

Input Format

The first line of input consists of a word.

Output Format

The output prints whether the given word is a palindrome or not in the following format:

"<input> is palindrome" or "<input> is not palindrome".

Refer to the sample output for formatting specifications.

Sample Test Case

Input: malayalam

Output: malayalam is palindrome

Answer

```
import java.util.Scanner;
import java.util.function.Predicate;

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

        String inputString = scanner.nextLine();

        Predicate<String> isPalindrome = str -> {
            String reversed = new StringBuilder(str).reverse().toString();
            return str.equalsIgnoreCase(reversed);
        };

        if (isPalindrome.test(inputString)) {
            System.out.println(inputString + " is palindrome");
        } else {
            System.out.println(inputString + " is not palindrome");
        }

        scanner.close();
    }
}
```

Status : Correct ***Marks : 10/10***

3. Problem Statement

Problem Statement

Sophia, a data analyst, is studying experimental results collected from various lab sensors. Each sensor provides a list of numeric readings, and Sophia wants to calculate the average of these readings to analyze consistency.

She decides to use lambda expressions and the Function functional interface to compute the average of all the recorded values efficiently.

Your Task

Write a Java program that:

Reads the total number of measurements.Reads all the measurement values as doubles.Uses a Function<double[], Double> lambda expression to calculate the average value.Displays the final average, formatted to two decimal places.

Input Format

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

The second line contains N space-separated double values.

Output Format

Print the average of the entered values, rounded to two decimal places.

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 6
2.2 1.2 5.4 4.6 2.9 55.7
Output: 12.00

Answer

```
import java.util.*;
import java.util.function.Function;

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

      int n = sc.nextInt();
      double[] values = new double[n];

      for (int i = 0; i < n; i++) {
         values[i] = sc.nextDouble();
      }
```

```
        Function<double[], Double> calculateAverage = arr -> {
            double sum = 0;
            for (double val : arr) {
                sum += val;
            }
            return sum / arr.length;
        };

        double average = calculateAverage.apply(values);
        System.out.printf("%.2f", average);

        sc.close();
    }
}
```

Status : Correct **Marks : 10/10**

4. Problem Statement

A company named TechNova is collecting feedback from its customers. Each customer gives a feedback score (an integer between 1 and 10) along with their name.

The company wants to:

Display each customer's name along with their feedback in a formatted way using a lambda expression and a Consumer functional interface.After displaying all feedbacks, calculate and display the average feedback score.You need to implement this functionality using Java lambda expressions and streams, emphasizing the Consumer interface for displaying formatted output.

Input Format

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

The next n lines each contain a String (customer name) followed by an int (feedback score).

Output Format

- Each line prints a customer's name and feedback in the format:
- Customer: <name>, Feedback Score: <score>

- After all customers are displayed, print the average feedback as:
- Average Feedback: <average_value>

(Average should be displayed up to two decimal places.)

Sample Test Case

Input: 3
Ravi 7
Ananya 9
Kiran 8

Output: Customer: Ravi, Feedback Score: 7
Customer: Ananya, Feedback Score: 9
Customer: Kiran, Feedback Score: 8
Average Feedback: 8.00

Answer

```
import java.util.*;
import java.util.function.Consumer;

class Customer {
    String name;
    int feedback;

    Customer(String name, int feedback) {
        this.name = name;
        this.feedback = feedback;
    }
}

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

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

        int n = sc.nextInt();
        List<Customer> customers = new ArrayList<>();

        for (int i = 0; i < n; i++) {
            String name = sc.next();
            int feedback = sc.nextInt();
            customers.add(new Customer(name, feedback));
        }

        Consumer<Customer> displayFeedback = c ->
                System.out.println("Customer: " + c.name + ", Feedback Score: " +
c.feedback);

        customers.forEach(displayFeedback);

        double avgFeedback = customers.stream()
                .mapToInt(c -> c.feedback)
                .average()
                .orElse(0.0);

        System.out.printf("Average Feedback: %.2f", avgFeedback);
        sc.close();
    }
}
```

Status : Correct **Marks : 10/10**

Rajalakshmi Engineering College

Name: T.Siva Sankari
Email: 241901108@rajalakshmi.edu.in
Roll no: 241901108
Phone: 7397332706
Branch: REC
Department: CSE (CS) - Section 1
Batch: 2028
Degree: B.E - CSE (CS)

Scan to verify results

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

Aditya is developing a reading app that recommends books to users based on a predefined list.

Each time a user opens the app, it should supply the next book title in the list, one at a time, using a lambda expression and the Supplier functional interface.

When all books have been recommended, the list should start again from the beginning.

Input Format

The first line contains an integer n — the total number of available book titles.

The next n lines each contain a book title (a string).

The next line contains an integer m — the number of times users open the app (i.e., the number of recommendations to be made).

Output Format

Print the supplied book title for each recommendation, one per line.

If m > n, repeat the list from the start.

Sample Test Case

Input: 3
The Alchemist
Atomic Habits
Ikigai
5
Output: The Alchemist
Atomic Habits
Ikigai
The Alchemist
Atomic Habits

Answer

```
import java.util.*;
import java.util.function.Supplier;

class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        sc.nextLine();
        List<String> books = new ArrayList<>();
        for (int i = 0; i < n; i++) {
            books.add(sc.nextLine());
        }
        int m = sc.nextInt();
        final int[] index = {0};
        Supplier<String> bookSupplier = () -> {
            String book = books.get(index[0]);
            index[0] = (index[0] + 1) % books.size();
            return book;
        };
```

```
        for (int i = 0; i < m; i++) {
            System.out.println(bookSupplier.get());
        }

        sc.close();
    }
}
```

Status : Correct **Marks : 10/10**

2. Problem Statement

Sneha is developing a feature for an e-commerce application that helps display product details after applying a seasonal discount.

She decides to use lambda expressions with the Consumer functional interface to print each product's name, original price, and discounted price neatly.

The program should:

Accept a list of product names and their prices.Apply a 15% discount on all products.Use a Consumer lambda expression to display the details in a formatted manner.

Input Format

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

The next n lines each contain a String (product name) and a double (price) separated by a space.

Output Format

For each product, print the details in the format:

Product: <name>, Original Price: <price>, Discounted Price: <discounted price>

If there are no products, print:

No products available

Sample Test Case

Input: 1
Phone 60000
Output: Product: Phone, Original Price: 60000.0, Discounted Price: 51000.0

Answer

```
import java.util.*;
import java.util.function.Consumer;

class Product {
   String name;
   double price;

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

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

      int n = sc.nextInt();
      sc.nextLine();

      if (n == 0) {
         System.out.println("No products available");
         return;
      }

      List<Product> products = new ArrayList<>();

      for (int i = 0; i < n; i++) {
         String[] input = sc.nextLine().split(" ");
         String name = input[0];
         double price = Double.parseDouble(input[1]);
         products.add(new Product(name, price));
      }

      Consumer<Product> displayProduct = product -> {
```

```
        double discountedPrice = product.price * 0.85;
            System.out.printf("Product: %s, Original Price: %.1f, Discounted Price: %.1f
%n",product.name, product.price, discountedPrice);
        };

        products.forEach(displayProduct);

        sc.close();
    }
}
```

Status : Correct **Marks : 10/10**

3. Problem Statement

Emily, an analyst at a data processing firm, is tasked with cleaning up datasets to remove duplicate values from lists of integers.

Create a Java program that allows Emily to input a series of integers, with the program then utilizing a lambda expression to efficiently remove any duplicates.

Input Format

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

The second line consists of N space-separated integers, each denoting an array element.

Output Format

The output prints the array elements after removing the duplicates inside the square bracket separated by a comma and space.

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 15
1 2 3 4 3 2 1 2 3 4 4 4 5 5 6

Output: [1, 2, 3, 4, 5, 6]

Answer

```
import java.util.*;
import java.util.function.Function;
import java.util.stream.Collectors;

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

        int n = sc.nextInt();
        List<Integer> numbers = new ArrayList<>();
        for (int i = 0; i < n; i++) {
            numbers.add(sc.nextInt());
        }

        Function<List<Integer>, List<Integer>> removeDuplicates =
            list -> list.stream().distinct().collect(Collectors.toList());

        List<Integer> uniqueNumbers = removeDuplicates.apply(numbers);

        System.out.println(uniqueNumbers);

        sc.close();
    }
}
```

Status : Correct ***Marks : 10/10***

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.*;
import java.util.function.Predicate;
import java.util.stream.Collectors;

class Employee {
    String name;
    int salary;

    Employee(String name, int salary) {
        this.name = name;
        this.salary = salary;
    }
}
```

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

        for (int i = 0; i < n; i++) {
            String name = sc.next();
            int salary = sc.nextInt();
            employees.add(new Employee(name, salary));
        }

        Predicate<Employee> highSalary = e -> e.salary >= 50000;

        List<String> result = employees.stream()
                .filter(highSalary)
                .map(e -> e.name)
                .collect(Collectors.toList());

        if (result.isEmpty()) {
            System.out.println("No employee found with salary >= 50000");
        } else {
            result.forEach(System.out::println);
        }
    }
}
```

Status : Correct ***Marks : 10/10***

Rajalakshmi Engineering College

Name: T.Siva Sankari
Email: 241901108@rajalakshmi.edu.in
Roll no: 241901108
Phone: 7397332706
Branch: REC
Department: CSE (CS) - Section 1
Batch: 2028
Degree: B.E - CSE (CS)

Scan to verify results

2024_28_III_OOPS Using Java Lab

2028_REC_OOPS using Java_Week 12_Q4

Attempt : 1
Total Mark : 10
Marks Obtained : 10

Section 1 : Coding

1. Problem Statement

Abi is working on a text analysis project where she needs to categorize words based on their length.

Words that have three or fewer characters are considered “Short”, while

words with more than three characters are classified as “Long.”

Write a Java program that takes a sentence as input, analyzes each word, and prints a list showing whether each word is “Short” or “Long.”

Use the predefined functional interface Function<String, String> along with a lambda expression for categorization.

Input Format

A single line containing a sentence (words separated by spaces).

Output Format

- A single line with each word categorized as "Short" or "Long", separated by spaces.

Refer to the sample output for formatting specifications.

Sample Test Case

Input: I love my cat
Output: Short Long Short Short

Answer

```
import java.util.*;
import java.util.function.Function;

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        String sentence = sc.nextLine();
        String[] words = sentence.split(" ");
        Function<String, String> categorize = word ->
            (word.length() <= 3) ? "Short" : "Long";
        for (String word : words) {
            System.out.print(categorize.apply(word) + " ");
        }
    }
}
```

Status : Correct ***Marks : 10/10***

Rajalakshmi Engineering College

Name: T.Siva Sankari
Email: 241901108@rajalakshmi.edu.in
Roll no: 241901108
Phone: 7397332706
Branch: REC
Department: CSE (CS) - Section 1
Batch: 2028
Degree: B.E - CSE (CS)

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.Scanner;

public class Main {

    interface ReverseStringFunction {
        String reverse(String input);
    }

    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        String input = scanner.nextLine();
        String reversed = ((ReverseStringFunction) s -> new
StringBuilder(s).reverse().toString()).reverse(input);
        System.out.println(reversed);
        scanner.close();
    }
}
```

Status : Correct ***Marks : 10/10***

Rajalakshmi Engineering College

Name: T.Siva Sankari
Email: 241901108@rajalakshmi.edu.in
Roll no: 241901108
Phone: 7397332706
Branch: REC
Department: CSE (CS) - Section 1
Batch: 2028
Degree: B.E - CSE (CS)

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.*;
import java.util.function.Consumer;

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

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

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

        Consumer<Integer> printSquare = x -> System.out.print((x * x) + " ");

        for (int num : arr) {
            printSquare.accept(num);
        }
    }
}
```

Status : Correct ***Marks : 10/10***

Rajalakshmi Engineering College

Name: T.Siva Sankari
Email: 241901108@rajalakshmi.edu.in
Roll no: 241901108
Phone: 7397332706
Branch: REC
Department: CSE (CS) - Section 1
Batch: 2028
Degree: B.E - CSE (CS)

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;
class EvenSumCalculator {
    public static int calculateEvenSum(int[] numbers) {
        return java.util.Arrays.stream(numbers)
                .filter(n -> n % 2 == 0)
                .sum();
    }
}
class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        int count = scanner.nextInt();
        int[] numbers = new int[count];

        for (int i = 0; i < count; i++) {
            numbers[i] = scanner.nextInt();
        }
        int sum = EvenSumCalculator.calculateEvenSum(numbers);
        System.out.println(sum);

        scanner.close();
    }
}
```

Status : Correct ***Marks : 10/10***

Rajalakshmi Engineering College

Name: T.Siva Sankari
Email: 241901108@rajalakshmi.edu.in
Roll no: 241901108
Phone: 7397332706
Branch: REC
Department: CSE (CS) - Section 1
Batch: 2028
Degree: B.E - CSE (CS)

Scan to verify results

2024_28_III_OOPS Using Java Lab

REC_2028_OOPS using Java_Week 11

Attempt : 1
Total Mark : 20
Marks Obtained : 20

Section 1 : Project

1. Problem Statement

In Café Central, the menu is cataloged and stored in a database.

To efficiently manage the restaurant's menu using Java and JDBC, you must build a Restaurant Management System that supports:

Adding new menu items

Updating menu item prices

Viewing details of a menu item

Displaying all menu items in sorted order

You are given two files:

File 1: MenuItem.java (POJO Class)

This class represents the MenuItem entity.
A MenuItem contains the following details:

Field Description
itemId Unique Menu Item ID (Integer)
name Item Name (String)
category Item Category (String)
price Item Price (Double)

Students must write code in the marked area:

```
class MenuItem {
    private int itemId;
    private String name;
    private String category;
    private double price;

    public MenuItem() {}

    public MenuItem(int itemId, String name, String category, double price) {
        // write your code here
    }

    // Include getters and setters
}
```

Expected in this part:
Assign parameter values to instance variables inside the constructor.
Add getters and setters for all attributes.

File 2: MenuItemDAO.java (Data Access Layer)

This class handles all database operations using JDBC.

Students must complete the missing JDBC logic in the following methods:

```
class MenuItemDAO {

    public void addMenuItem(Connection conn, MenuItem menuItem)
throws SQLException {
        // write your code here
    }

    public void updateItemPrice(Connection conn, int itemId, double
newPrice) throws SQLException {
        // write your code here
    }

    public void deleteMenuItem(Connection conn, int itemId) throws
SQLException {
        // write your code here
    }

    public MenuItem viewItemDetails(Connection conn, int itemId) throws
SQLException {
        // write your code here
    }

    public List<MenuItem> displayAllMenuItems(Connection conn) throws
SQLException {
        // write your code here
    }

    private MenuItem mapToMenuItem(ResultSet rs) throws SQLException {
        return new MenuItem(
```

```
        // write your code here
    );
  }
}
```

Expected in this part:

Write SQL queries for INSERT, UPDATE, DELETE, SELECT.

Execute queries using PreparedStatement or Statement.

Map ResultSet rows to MenuItem objects using mapToMenuItem().

Return a List<MenuItem> where required.

The system should connect to a MySQL database using the following default credentials:

DB URL: jdbc:mysql://localhost/ri_db

USER: test

PWD: test123

The menu table has already been created with the following structure:

Table Name: menu

Input Format

The first line of input consists of an integer choice, representing the operation to be performed (1 for Add Item, 2 for Restock item, 3 for reduce item, 4 for Display, 5 for Exit).

For choice 1 (Add Menu Item):

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

For choice 2 (Update Item Price):

- The second line consists of an integer item_id.
- The third line consists of a double new_price.

For choice 3 (View Item Details):

- The second line consists of an integer item_id.

For choice 4 (Display All Menu Items):

- No additional inputs are required.

For choice 5 (Exit):

- No additional inputs are required.

Output Format

For choice 1 (Add Menu Item):

- Print "Menu item added successfully" if the item was added.
- Print "Failed to add item." if the insertion failed.

For choice 2 (Update Item Price):

- Print "Item price updated successfully" if the price update was successful.
- Print "Item not found." if the specified item ID does not exist.

For choice 3 (View Item Details):

- Display the item details in the format:
- ID: [item_id] | Name: [name] | Category: [category] | Price: [price]
- Print "Item not found." if the specified item ID does not exist.

For choice 4 (Display All Menu Items):

- Display each item on a new line in the format:
- ID | Name | Category | Price
- If no items are available, print nothing (or handle with an appropriate message if desired).

For choice 5 (Exit):

- Print "Exiting Restaurant Management System."

For invalid input:

- Print "Invalid choice. Please try again."

Sample Test Case

Input: 1
11
Margherita Pizza
Main Course
12.99
4
5
Output: Menu item added successfully
ID | Name | Category | Price
11 | Margherita Pizza | Main Course | 12.99
Exiting Restaurant Management System.

Answer

```
import java.sql.*;
import java.util.Scanner;

class RestaurantManagementSystem {
   public static void main(String[] args) {
     try (Connection conn = DriverManager.getConnection("jdbc:mysql://
localhost/ri_db", "test", "test123");
          Scanner scanner = new Scanner(System.in)) {

         boolean running = true;

         while (running) {
            int choice = scanner.nextInt();

            switch (choice) {
               case 1:
                  addMenuItem(conn, scanner);
                  break;
               case 2:
                  updateItemPrice(conn, scanner);
                  break;
```

```
                case 3:
                    viewItemDetails(conn, scanner);
                    break;
                case 4:
                    displayAllMenuItems(conn);
                    break;
                case 5:
                    System.out.println("Exiting Restaurant Management System.");
                    running = false;
                    break;
                default:
                    System.out.println("Invalid choice. Please try again.");
            }
        }
    } catch (SQLException e) {
        e.printStackTrace();
    }
}

public static void addMenuItem(Connection conn, Scanner scanner) {
    int itemId = scanner.nextInt();
    scanner.nextLine();

    String name = scanner.nextLine();
    String category = scanner.nextLine();
    double price = scanner.nextDouble();

    MenuItem menuItem = new MenuItem(itemId, name, category, price);

    String insertQuery = "INSERT INTO menu (item_id, name, category, price)
VALUES (?, ?, ?, ?)";
    try (PreparedStatement stmt = conn.prepareStatement(insertQuery)) {
        stmt.setInt(1, menuItem.getItemId());
        stmt.setString(2, menuItem.getName());
        stmt.setString(3, menuItem.getCategory());
        stmt.setDouble(4, menuItem.getPrice());

        int rowsInserted = stmt.executeUpdate();
        System.out.println(rowsInserted > 0 ? "Menu item added successfully" :
"Failed to add item.");
    } catch (SQLException e) {
        System.out.println("Error adding item: " + e.getMessage());
    }
```

```
    }

    public static void updateItemPrice(Connection conn, Scanner scanner) {
        int itemId = scanner.nextInt();
        double newPrice = scanner.nextDouble();

        String updateQuery = "UPDATE menu SET price = ? WHERE item_id = ?";
        try (PreparedStatement stmt = conn.prepareStatement(updateQuery)) {
            stmt.setDouble(1, newPrice);
            stmt.setInt(2, itemId);

            int rowsUpdated = stmt.executeUpdate();
            System.out.println(rowsUpdated > 0 ? "Item price updated successfully" :
"Item not found.");
        } catch (SQLException e) {
            System.out.println("Error updating price: " + e.getMessage());
        }
    }

    public static void viewItemDetails(Connection conn, Scanner scanner) {
        int itemId = scanner.nextInt();

        String selectQuery = "SELECT * FROM menu WHERE item_id = ?";
        try (PreparedStatement stmt = conn.prepareStatement(selectQuery)) {
            stmt.setInt(1, itemId);

            ResultSet rs = stmt.executeQuery();
            if (rs.next()) {
                MenuItem menuItem = new MenuItem(
                        rs.getInt("item_id"),
                        rs.getString("name"),
                        rs.getString("category"),
                        rs.getDouble("price")
                );

                System.out.printf("ID: %d | Name: %s | Category: %s | Price: %.2f%n",
                        menuItem.getItemId(),
                        menuItem.getName(),
                        menuItem.getCategory(),
                        menuItem.getPrice());
            } else {
                System.out.println("Item not found.");
```

```
        }
        } catch (SQLException e) {
            System.out.println("Error retrieving item details: " + e.getMessage());
        }
    }

    public static void displayAllMenuItems(Connection conn) {
        String displayQuery = "SELECT * FROM menu ORDER BY item_id";
        try (Statement stmt = conn.createStatement();
             ResultSet rs = stmt.executeQuery(displayQuery)) {

            System.out.println("ID | Name | Category       | Price");
            while (rs.next()) {
                MenuItem menuItem = new MenuItem(
                        rs.getInt("item_id"),
                        rs.getString("name"),
                        rs.getString("category"),
                        rs.getDouble("price")
                );

                System.out.printf("%d | %s | %s | %.2f%n",
                        menuItem.getItemId(),
                        menuItem.getName(),
                        menuItem.getCategory(),
                        menuItem.getPrice());
            }
        } catch (SQLException e) {
            System.out.println("Error displaying menu items: " + e.getMessage());
        }
    }
}

 class MenuItem {
    private int itemId;
    private String name;
    private String category;
    private double price;

    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**

2. Problem Statement

Create a JDBC-based Hospital Management System that handles runtime input to manage patient records. The system should allow users to:

Add a new patient (patient ID, name, age, status).

Update a patient's status.

View a specific patient's record by patient ID.

Display all patient records in the database.

Exit the application.

The system should connect to a MySQL database using the following default credentials:

DB URL: jdbc:mysql://localhost/ri_db

USER: test

PWD: test123

The patients table has already been created with the following structure:

Table Name: patients

Input Format

The first line of input consists of an integer choice, representing the operation to be performed:

(1 for Add Patient, 2 for Update Patient Status, 3 for View Patient Record, 4 for Display All Patients, 5 for Exit)

For choice 1 (Add Patient):

- The second line consists of an integer patient_id.
- The third line consists of a string name.
- The fourth line consists of an integer age.
- The fifth line consists of a string status.

For choice 2 (Update Patient Status):

- The second line consists of an integer patient_id.
- The third line consists of a string new_status.

For choice 3 (View Patient Record):

- The second line consists of an integer patient_id.

For choice 4 (Display All Patients):

- No additional inputs are required.

For choice 5 (Exit):

- No additional inputs are required.

Output Format

For choice 1 (Add Patient):

- Print "Patient added successfully" if the patient was added.
- Print "Failed to add patient." if the insertion failed.

For choice 2 (Update Patient Status):

- Print "Patient status updated successfully" if the update was successful.
- Print "Patient not found." if the specified patient ID does not exist.

For choice 3 (View Patient Record):

- Display the patient details in the format:
- ID: [patient_id] | Name: [name] | Age: [age] | Status: [status]
- Print "Patient not found." if the specified patient ID does not exist.

For choice 4 (Display All Patients):

- Display each patient on a new line in the format:
- ID | Name | Age | Status
- If no records are available, print nothing (or handle it with an appropriate message if desired).

For choice 5 (Exit):

- Print "Exiting Hospital Management System."

For invalid input:

- Print "Invalid choice. Please try again."

Sample Test Case

Input: 1
101
John Doe
45
Admitted
4
5
Output: Patient added successfully
ID | Name | Age | Status
101 | John Doe | 45 | Admitted

Exiting Hospital Management System.

Answer

```
import java.sql.*;
import java.util.Scanner;

class HospitalManagementSystem {
   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:
                  addPatient(conn, scanner);
                  break;
               case 2:
                  updatePatientStatus(conn, scanner);
                  break;
               case 3:
                  viewPatientRecord(conn, scanner);
                  break;
               case 4:
                  displayAllPatients(conn);
                  break;
               case 5:
                  System.out.println("Exiting Hospital Management System.");
                  running = false;
                  break;
               default:
                  System.out.println("Invalid choice. Please try again.");
            }
         }
      } catch (SQLException e) {
         e.printStackTrace();
      }
```

```
    }

    public static void addPatient(Connection conn, Scanner scanner) {
        int patientId = scanner.nextInt();
        scanner.nextLine();

        String name = scanner.nextLine();

        int age = scanner.nextInt();

        scanner.nextLine();
        String status = scanner.nextLine();

        String insertQuery = "INSERT INTO patients (patient_id, name, age, status)
VALUES (?, ?, ?, ?)";
        try (PreparedStatement stmt = conn.prepareStatement(insertQuery)) {
            stmt.setInt(1, patientId);
            stmt.setString(2, name);
            stmt.setInt(3, age);
            stmt.setString(4, status);

            int rowsInserted = stmt.executeUpdate();
            System.out.println(rowsInserted > 0 ? "Patient added successfully" :
"Failed to add patient.");
        } catch (SQLException e) {
            System.out.println("Error adding patient: " + e.getMessage());
        }
    }

    public static void updatePatientStatus(Connection conn, Scanner scanner) {
        int patientId = scanner.nextInt();
        scanner.nextLine();

        String newStatus = scanner.nextLine();

        String updateQuery = "UPDATE patients SET status = ? WHERE patient_id
= ?";
        try (PreparedStatement stmt = conn.prepareStatement(updateQuery)) {
            stmt.setString(1, newStatus);
            stmt.setInt(2, patientId);
```

```
            int rowsUpdated = stmt.executeUpdate();
            System.out.println(rowsUpdated > 0 ? "Patient status updated
successfully" : "Patient not found.");
        } catch (SQLException e) {
            System.out.println("Error updating patient status: " + e.getMessage());
        }
    }

    public static void viewPatientRecord(Connection conn, Scanner scanner) {
        int patientId = scanner.nextInt();

        String selectQuery = "SELECT * FROM patients WHERE patient_id = ?";
        try (PreparedStatement stmt = conn.prepareStatement(selectQuery)) {
            stmt.setInt(1, patientId);

            ResultSet rs = stmt.executeQuery();
            if (rs.next()) {
                System.out.printf("ID: %d | Name: %s | Age: %d | Status: %s%n",
                        rs.getInt("patient_id"),
                        rs.getString("name"),
                        rs.getInt("age"),
                        rs.getString("status"));
            } else {
                System.out.println("Patient not found.");
            }
        } catch (SQLException e) {
            System.out.println("Error retrieving patient record: " + e.getMessage());
        }
    }

    public static void displayAllPatients(Connection conn) {
        String displayQuery = "SELECT * FROM patients ORDER BY patient_id";
        try (Statement stmt = conn.createStatement();
             ResultSet rs = stmt.executeQuery(displayQuery)) {

            System.out.println("ID | Name | Age | Status");
            while (rs.next()) {
                System.out.printf("%d | %s | %d | %s%n",
                        rs.getInt("patient_id"),
                        rs.getString("name"),
                        rs.getInt("age"),
                        rs.getString("status"));
```

```
            }
        } catch (SQLException e) {
            System.out.println("Error displaying patients: " + e.getMessage());
        }
    }

}
```

Status : Correct ***Marks : 10/10***

Rajalakshmi Engineering College

Name: T.Siva Sankari
Email: 241901108@rajalakshmi.edu.in
Roll no: 241901108
Phone: 7397332706
Branch: REC
Department: CSE (CS) - Section 1
Batch: 2028
Degree: B.E - CSE (CS)

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

Tony is an e-learning platform administrator, he oversees the user ratings for various online courses offered in the platform.

To enhance user experience, you should assist him in utilizing a HashMap to store course ratings given by learners. Regularly, he analyzes this data to identify the highest and lowest-rated courses, enabling targeted improvements and ensuring the quality of the educational content. This process assists in maintaining a competitive and engaging online learning environment for the users.

Input Format

The input consists of a string representing the course name followed by a double value representing the course's rating, in separate lines.

The input is terminated by entering "done".

Output Format

The first line of output prints the string "Highest Rated Course: " followed by the highest-rated course.

The second line prints the string "Lowest Rated Course: " followed by the lowest-rated courses.

Refer to the sample output for formatting specifications.

Sample Test Case

Input: DSA
4.0
OOPS
4.2
C
3.2
done

Output: Highest Rated Course: OOPS
Lowest Rated Course: C

Answer

```
import java.util.HashMap;
import java.util.Map;
import java.util.Scanner;

class CourseAnalyzer {
   public Map<String, String>
identifyHighestAndLowestRatedCourses(Map<String, Double> courseRatings) {
      double highestRating = Double.MIN_VALUE;
      double lowestRating = Double.MAX_VALUE;
      String highestRatedCourse = "";
      String lowestRatedCourse = "";

      for (Map.Entry<String, Double> entry : courseRatings.entrySet()) {
         String course = entry.getKey();
         double rating = entry.getValue();
```

```
            if (rating > highestRating) {
                highestRating = rating;
                highestRatedCourse = course;
            }
            if (rating < lowestRating) {
                lowestRating = rating;
                lowestRatedCourse = course;
            }
        }

        Map<String, String> result = new HashMap<>();
        result.put("highest", highestRatedCourse);
        result.put("lowest", lowestRatedCourse);
        return result;
    }
}

public class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        Map<String, Double> courseRatings = new HashMap<>();

        while (true) {
            String courseName = scanner.nextLine();
            if (courseName.equalsIgnoreCase("done")) {
                break;
            }
            double rating = Double.parseDouble(scanner.nextLine().trim());
            courseRatings.put(courseName, rating);
        }

        CourseAnalyzer analyzer = new CourseAnalyzer();
        Map<String, String> result =
analyzer.identifyHighestAndLowestRatedCourses(courseRatings);

        System.out.printf("Highest Rated Course: %s\n", result.get("highest"));
        System.out.printf("Lowest Rated Course: %s", result.get("lowest"));

        scanner.close();
    }
}
```

Status : Correct ***Marks : 10/10***

2. 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.*;



class Book {
    int isbn;
    String title, author;

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

    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;
    }

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

```
    }
}

class Library {
    HashSet<Book> books = new HashSet<>();

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

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

    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**

3. Problem Statement

David is managing an employee database where each employee has a unique ID, name, and department. He wants to ensure that duplicate employee IDs are not added to the system. Implement a Java program that allows adding employees to the system, displaying all employees, and checking if an employee exists based on the given ID.

Implement a class EmployeeDatabase that contains a HashSet to store employee records. The Employee class should be a user-defined object containing employee details. The main class should handle user operations and interact with the EmployeeDatabase class.

Input Format

The first line contains an integer n representing the number of employees to be added.

The next n lines follow, each containing:

1. An integer employee_id
2. A string name
3. A string department

The next line contains an integer m representing the number of queries.

The next m lines follow, each containing an employee ID to check for existence.

Output Format

The output prints a list of all employees added in the format:

"ID: <employee_id>, Name: <name>, Department: <department>"

For each query, output "Employee exists" if the ID is found, otherwise "Employee

not found".

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 3
101 John IT
102 Alice HR
103 Bob Finance
2
101
104
Output: ID: 101, Name: John, Department: IT
ID: 102, Name: Alice, Department: HR
ID: 103, Name: Bob, Department: Finance
Employee exists
Employee not found

Answer

```
import java.util.*;

class Employee {
    int employeeId;
    String name, department;

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

    public int hashCode() {
        return Objects.hash(employeeId);
    }

    public boolean equals(Object obj) {
        if (this == obj) return true;
        if (obj == null || getClass() != obj.getClass()) return false;
        Employee e = (Employee) obj;
```

```
        return this.employeeId == e.employeeId;
    }

    public String toString() {
        return "ID: " + employeeId + ", Name: " + name + ", Department: " +
department;
    }
}

class EmployeeDatabase {
    HashSet<Employee> employees = new HashSet<>();

    public void addEmployee(int id, String name, String department) {
        employees.add(new Employee(id, name, department));
    }

    public void displayEmployees() {
        for (Employee e : employees) {
            System.out.println(e);
        }
    }

    public boolean checkEmployee(int id) {
        return employees.contains(new Employee(id, "", ""));
    }
}
class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        EmployeeDatabase db = new EmployeeDatabase();
        int n = sc.nextInt();
        for (int i = 0; i < n; i++) {
            int id = sc.nextInt();
            String name = sc.next();
            String department = sc.next();
            db.addEmployee(id, name, department);
        }
        db.displayEmployees();
        int m = sc.nextInt();
        for (int i = 0; i < m; i++) {
            int id = sc.nextInt();
            if (db.checkEmployee(id))
```

```
            System.out.println("Employee exists");
        else
            System.out.println("Employee not found");
    }
    sc.close();
  }
}
```

Status : Correct **Marks : 10/10**

4. Problem Statement

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 times1 appears once3 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;

class MajorityElementFinder {
    public static int findMajorityElement(int[] arr) {
        HashMap<Integer, Integer> countMap = new HashMap<>();
        int n = arr.length;

        for (int num : arr) {
            countMap.put(num, countMap.getOrDefault(num, 0) + 1);
        }
        for (int key : countMap.keySet()) {
            if (countMap.get(key) > n / 2) {
                return key;
            }
        }
```

```
        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***

Rajalakshmi Engineering College

Name: T.Siva Sankari
Email: 241901108@rajalakshmi.edu.in
Roll no: 241901108
Phone: 7397332706
Branch: REC
Department: CSE (CS) - Section 1
Batch: 2028
Degree: B.E - CSE (CS)

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

Sarah is working on a spam detection system that analyzes incoming messages for unique patterns. Spammers often use repetitive character sequences, making it important to identify the first non-repeating character in a message.

Given a string, Sarah needs to determine the first character that appears only once. If all characters repeat, the system should return -1.

She decides to use a HashMap to efficiently track character frequencies and find the solution.

Input Format

The first line contains an integer N representing , the length of the string.

The second line contains a string of N lowercase English letters (a-z).

Output Format

The output prints a character representing the first non-repeating character. If none exist, print -1.

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 10
abacabadac
Output: d

Answer

```
import java.util.*;
class NonRepeatingCharacterFinder {

  public char findFirstNonRepeatingCharacter(String str) {
    HashMap<Character, Integer> charCount = new HashMap<>();

    for (char ch : str.toCharArray()) {
      charCount.put(ch, charCount.getOrDefault(ch, 0) + 1);
    }

    for (char ch : str.toCharArray()) {
      if (charCount.get(ch) == 1) {
        return ch;
      }
    }

    return '\0';
  }
}
class FirstNonRepeatingCharacter {
  public static void main(String[] args) {
    Scanner sc = new Scanner(System.in);

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

```
        String str = sc.next();

        NonRepeatingCharacterFinder finder = new NonRepeatingCharacterFinder();
        char result = finder.findFirstNonRepeatingCharacter(str);

        if (result == '\0') {
            System.out.println(-1);
        } else {
            System.out.println(result);
        }

        sc.close();
    }
}
```

Status : Correct **Marks : 10/10**

2. Problem Statement

Riya is building a calendar event scheduler where each event is stored in chronological order using a TreeMap. The key represents the event time in 24-hour format (HH:MM), and the value is the event description.

She wants the system to:

Automatically sort events by time.Avoid duplicate time entries — if a duplicate time is entered, ignore the new entry.Print all scheduled events in order.

Implement this logic using a class named EventManager.

Input Format

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

The next n lines each contain a string in the format: "HH:MM Description"

(Example: 09:00 TeamMeeting).

Output Format

The first line of the output prints "Scheduled Events:"

The next k lines print each event in the format: "HH:MM - Description"

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 5
09:00 TeamMeeting
13:30 LunchBreak
11:00 ProjectUpdate
09:00 Standup
15:00 ClientCall
Output: Scheduled Events:
09:00 - TeamMeeting
11:00 - ProjectUpdate
13:30 - LunchBreak
15:00 - ClientCall

Answer

```
import java.util.*;
class EventManager {
    TreeMap<String, String> schedule;

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

    public void addEvent(String time, String description) {
        if (!schedule.containsKey(time)) {
            schedule.put(time, description);
        }
    }

    public void printSchedule() {
        System.out.println("Scheduled Events:");
        for (Map.Entry<String, String> entry : schedule.entrySet()) {
            System.out.println(entry.getKey() + " - " + entry.getValue());
        }
```

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

        EventManager manager = new EventManager();

        for (int i = 0; i < n; i++) {
            String line = sc.nextLine();
            int spaceIndex = line.indexOf(' ');
            String time = line.substring(0, spaceIndex);
            String desc = line.substring(spaceIndex + 1);
            manager.addEvent(time, desc);
        }

        manager.printSchedule();
    }
}
```

Status : Correct **Marks : 10/10**

3. Problem Statement

A university maintains a list of student records and wants to store them in a sorted manner based on their GPA. If two students have the same GPA, they should be further sorted by their name in lexicographical order. Implement a program that uses a TreeSet to store student records and ensures unique student IDs.

Input Format

The first line contains an integer N - the number of students.

The next N lines contain details of each student in the format: "StudentID Name GPA"

- StudentID (Integer) - A unique identifier.
- Name (String) - The student's name (can contain spaces).
- GPA (Double) - The Grade Point Average.

Output Format

The output prints the list of students in ascending order of GPA.

If two students have the same GPA, sort them by name.

Print details in the format: "StudentID Name GPA" in the output, GPA is rounded to two decimal places.

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 5
101 John 8.5
102 Alice 9.1
103 Bob 8.5
104 Zoe 7.3
105 Charlie 9.1

Output: 104 Zoe 7.30
103 Bob 8.50
101 John 8.50
102 Alice 9.10
105 Charlie 9.10

Answer

```
import java.util.*;
class Student implements Comparable<Student> {
    int studentID;
    String name;
    double gpa;

    public Student(int studentID, String name, double gpa) {
        this.studentID = studentID;
        this.name = name;
        this.gpa = gpa;
    }

    public int compareTo(Student other) {
        if (this.gpa != other.gpa) {
```

```
            return Double.compare(this.gpa, other.gpa);
        }
        return this.name.compareTo(other.name);
    }

    public String toString() {
        return studentID + " " + name + " " + String.format("%.2f", gpa);
    }
}
class UniversityRecords {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        sc.nextLine();
        TreeSet<Student> studentSet = new TreeSet<>();
        for (int i = 0; i < n; i++) {
            int id = sc.nextInt();
            String name = sc.next();
            double gpa = sc.nextDouble();
            studentSet.add(new Student(id, name, gpa));
        }
        for (Student s : studentSet) {
            System.out.println(s);
        }
        sc.close();
    }
}
```

Status : Correct **Marks : 10/10**

Rajalakshmi Engineering College

Name: T.Siva Sankari
Email: 241901108@rajalakshmi.edu.in
Roll no: 241901108
Phone: 7397332706
Branch: REC
Department: CSE (CS) - Section 1
Batch: 2028
Degree: B.E - CSE (CS)

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.Set;
import java.util.TreeSet;
import java.util.Scanner;
class NumberChecker {
    private Set<Integer> numberSet;

    public NumberChecker(Set<Integer> numberSet) {
        this.numberSet = numberSet;
    }

    public void addNumbers(int[] numbers) {
        for (int number : numbers) {
            numberSet.add(number);
        }
    }

    public String checkNumber(int number) {
        return numberSet.contains(number) ? number + " is present!" : number + " is
not present!";
    }
}
class Main {
    public static void main(String[] args) {
```

```
        Scanner scanner = new Scanner(System.in);
        int numberOfElements = scanner.nextInt();
        int[] numbers = new int[numberOfElements];

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

        int elementToCheck = scanner.nextInt();
        scanner.close();

        Set<Integer> numberSet = new TreeSet<>();
        NumberChecker numberChecker = new NumberChecker(numberSet);
        numberChecker.addNumbers(numbers);

        System.out.println(numberChecker.checkNumber(elementToCheck));
    }
}
```

Status : Correct **Marks : 10/10**

Rajalakshmi Engineering College

Name: T.Siva Sankari
Email: 241901108@rajalakshmi.edu.in
Roll no: 241901108
Phone: 7397332706
Branch: REC
Department: CSE (CS) - Section 1
Batch: 2028
Degree: B.E - CSE (CS)

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.*;
class MessageAnalyzer {
   public void analyzeMessageFrequency(List<String> lines) {
      TreeMap<Character, Integer> frequencyMap = new TreeMap<>();

      for (String line : lines) {
         for (char ch : line.toCharArray()) {
            if (Character.isLetter(ch)) {
               frequencyMap.put(ch, frequencyMap.getOrDefault(ch, 0) + 1);
            }
         }
```

```
        }

        System.out.println("Character Frequency:");
        for (Map.Entry<Character, Integer> entry : frequencyMap.entrySet()) {
            System.out.println(entry.getKey() + ": " + entry.getValue());
        }
    }
}
public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int n = Integer.parseInt(sc.nextLine());
        List<String> lines = new ArrayList<>();
        for (int i = 0; i < n; i++) {
            lines.add(sc.nextLine());
        }

        MessageAnalyzer analyzer = new MessageAnalyzer();
        analyzer.analyzeMessageFrequency(lines);
    }
}
```

Status : Correct **Marks : 10/10**

Rajalakshmi Engineering College

Name: T.Siva Sankari
Email: 241901108@rajalakshmi.edu.in
Roll no: 241901108
Phone: 7397332706
Branch: REC
Department: CSE (CS) - Section 1
Batch: 2028
Degree: B.E - CSE (CS)

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.Scanner;
import java.util.Map;
import java.util.HashMap;
class ValueProcessor {
   public static Map<String, Double> readValues(Scanner scanner) {
      Map<String, Double> valueMap = new HashMap<>();
      while (true) {
         String input = scanner.nextLine();
         if (input.toLowerCase().equals("done")) {
            break;
         }
         String[] pair = input.split(":");
         if (pair.length == 2) {
            String key = pair[0].trim();
            try {
               double value = Double.parseDouble(pair[1].trim());
               valueMap.put(key, value);
            } catch (NumberFormatException e) {
               System.out.println("Invalid input");
               return null;
            }
         } else {
```

```
                System.out.println("Invalid format");
                return null;
            }
        }
        return valueMap;
    }

    public static double calculateSum(Map<String, Double> valueMap) {
        double sum = 0;
        for (double value : valueMap.values()) {
            sum += value;
        }
        return sum;
    }
}
class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        Map<String, Double> valueMap = ValueProcessor.readValues(scanner);
        if (valueMap != null) {
            double sum = ValueProcessor.calculateSum(valueMap);
            System.out.printf("%.2f\n", sum);
        }
        scanner.close();
    }
}
```

Status : Correct **Marks : 10/10**

Rajalakshmi Engineering College

Name: T.Siva Sankari
Email: 241901108@rajalakshmi.edu.in
Roll no: 241901108
Phone: 7397332706
Branch: REC
Department: CSE (CS) - Section 1
Batch: 2028
Degree: B.E - CSE (CS)

Scan to verify results

2024_28_III_OOPS Using Java Lab

2028_REC_OOPS using Java_Week 10_Q1

Attempt : 1
Total Mark : 10
Marks Obtained : 10

Section 1 : COD

1. Problem Statement

A city traffic management system needs to track vehicles entering a toll booth. Each vehicle is uniquely identified by its registration number. The system should allow adding vehicles to a record, ensuring that no duplicate registration numbers exist. The vehicles should be stored in a HashSet, which does not guarantee any specific order.

Your task is to implement a program using a HashSet that allows adding vehicle details and displaying the records.

Input Format

The first line of input contains an integer N - the number of vehicles.

The next N lines contain details of each vehicle in the format: "RegNumber

OwnerName VehicleType"

1. RegNumber (String) - A unique registration number (Alphanumeric).
2. OwnerName (String) - The name of the vehicle owner.
3. VehicleType (String, Car, Bike, or Truck) - The type of vehicle.

If a vehicle with the same registration number is already present, ignore the duplicate entry.

Output Format

The output prints the unique vehicle records in any order (since HashSet does not maintain order).

Output format: "RegNumber OwnerName VehicleType"

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 5
KA01AB1234 John Car
MH02CD5678 Alice Bike
DL03EF9012 Bob Truck
TN04GH3456 Mike Car
KA01AB1234 John Car

Output: TN04GH3456 Mike Car
KA01AB1234 John Car
MH02CD5678 Alice Bike
DL03EF9012 Bob Truck

Answer

```
import java.util.*;
class Vehicle {
   String regNumber;
   String ownerName;
   String vehicleType;
   private static HashSet<Vehicle> vehicleSet = new HashSet<>();
   public Vehicle(String regNumber, String ownerName, String vehicleType) {
      this.regNumber = regNumber;
      this.ownerName = ownerName;
```

```
        this.vehicleType = vehicleType;
    }
    public static void addVehicle(String regNumber, String ownerName, String
vehicleType) {
        vehicleSet.add(new Vehicle(regNumber, ownerName, vehicleType));
    }
    public static void displayVehicles() {
        for (Vehicle v : vehicleSet) {
            System.out.println(v);
        }
    }
    public boolean equals(Object obj) {
        if (this == obj) return true;
        if (obj == null || getClass() != obj.getClass()) return false;
        Vehicle vehicle = (Vehicle) obj;
        return regNumber.equals(vehicle.regNumber);
    }
    public int hashCode() {
        return Objects.hash(regNumber);
    }
    public String toString() {
        return regNumber + " " + ownerName + " " + vehicleType;
    }
}class TollBoothSystem {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        sc.nextLine();
        for (int i = 0; i < n; i++) {
            String regNumber = sc.next();
            String ownerName = sc.next();
            String vehicleType = sc.next();
            Vehicle.addVehicle(regNumber, ownerName, vehicleType);
        }
        Vehicle.displayVehicles();
        sc.close();
    }
}
```

Status : Correct **Marks : 10/10**