

# Rajalakshmi Engineering College

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

### **REC\_2028\_OOPS using Java\_Week 10\_PAH**

Attempt : 1  
Total Mark : 30  
Marks Obtained : 30

#### **Section 1 : Coding**

##### **1. Problem Statement**

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

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

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

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

- StudentID (Integer) - A unique identifier.
- Name (String) - The student's name (can contain spaces).

- GPA (Double) - The Grade Point Average.

### **Output Format**

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

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

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

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 5

101 John 8.5

102 Alice 9.1

103 Bob 8.5

104 Zoe 7.3

105 Charlie 9.1

Output: 104 Zoe 7.30

103 Bob 8.50

101 John 8.50

102 Alice 9.10

105 Charlie 9.10

### **Answer**

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

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

    public int compareTo(Student other) {
```

```

        if (this.gpa != other.gpa) {
            return Double.compare(this.gpa, other.gpa);
        }
        return this.name.compareTo(other.name);
    }

    public String toString() {
        return studentID + " " + name + " " + String.format("%.2f", gpa);
    }
}

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

```

**Status :** Correct

**Marks :** 10/10

## 2. Problem Statement

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

She wants the system to:

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

order.

Implement this logic using a class named EventManager.

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

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

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

(Example: 09:00 TeamMeeting).

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

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

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

Refer to the sample output for formatting specifications.

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

Input: 5

09:00 TeamMeeting

13:30 LunchBreak

11:00 ProjectUpdate

09:00 Standup

15:00 ClientCall

Output: Scheduled Events:

09:00 - TeamMeeting

11:00 - ProjectUpdate

13:30 - LunchBreak

15:00 - ClientCall

#### ***Answer***

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

```

        schedule = new TreeMap<>();
    }

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

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

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

        EventManager manager = new EventManager();

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

        manager.printSchedule();
    }
}

```

**Status :** Correct

**Marks :** 10/10

### 3. Problem Statement

Sarah is working on a spam detection system that analyzes incoming messages for unique patterns. Spammers often use repetitive character

sequences, making it important to identify the first non-repeating character in a message.

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

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

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

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

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

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

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

Refer to the sample output for formatting specifications.

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

Input: 10  
abacabadac

Output: d

#### ***Answer***

```
import java.util.*;  
class NonRepeatingCharacterFinder {  
  
    public char findFirstNonRepeatingCharacter(String str) {  
        HashMap<Character, Integer> charCount = new HashMap<>();  
  
        for (char ch : str.toCharArray()) {  
            charCount.put(ch, charCount.getOrDefault(ch, 0) + 1);  
        }  
  
        for (char ch : str.toCharArray()) {
```

```
if (charCount.get(ch) == 1) {
    return ch;
}
return '\0';
}
class FirstNonRepeatingCharacter {
public static void main(String[] args) {
    Scanner sc = new Scanner(System.in);

    int N = sc.nextInt();
    String str = sc.next()

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

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

    sc.close();
}
}
```

**Status : Correct**

**Marks : 10/10**