ಭಾರತೀಯ ಮಾಹಿತಿ ತಂತ್ರಜ್ಞಾನ ಸಂಸ್ಥೆ ರಾಯಚೂರು
भारतीय सूचना प्रौद्योगिकी संस्थान रायचूर
Indian Institute of Information Technology Raichur

Lab - 7
Introduction to Programming (ID110)
Date: December 11, 2024
Topics: Strings

Time: 1.5 Hr | CSE'24, Semester - I | Max marks: 10

Instructions:

- The lab session consists of **two programming questions**, and both of them are **mandatory**.
- External materials (e.g., notes, books) and electronic devices (e.g., mobile phones, smartwatch, Bluetooth) are **strictly prohibited**. Only a **blank sheet of paper** and a **pen** may be used for rough work.
- Internet usage is **not allowed** under any circumstances. Any violations will lead to **serious academic consequences**, including potential disqualification from the lab.
- Any form of **plagiarism or academic dishonesty** will be treated with the utmost seriousness and may result in severe penalties, including a zero for the lab or further disciplinary actions.
- Code must be written from scratch during the session. Pre-written code snippets or solutions will not be accepted. Use meaningful variable names and add appropriate comments where necessary.
- Upon completion, **two code files** named after **roll no.** (e.g., `"CS24B1001-Lab7-p1.c"` and `"CS24B1001-Lab7-p2.c"`) must be submitted on **Google Classroom**. Not following the naming convention will lead to **minus marking**. The submission will only be accepted if done in the presence of TA.

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1. Suppose you have been elected for the Sports Secretary position of IIITR. Your upcoming duty is to ensure a smooth inter IIIT sports meet conduction. You have appointed particular students as the coordinators of some particular sports. To keep track of this data, you must do a lot of paperwork. Being a CSE student, you decide to make a database management system to simply track the student details and the sport they're coordinating. The system stores two types of data tables:

   - **Table 1 (Student Information Table):**
     This table contains information about students, including their roll no., name, age, department, and sportID. Each user is uniquely identified by their roll no.
   - **Table 2 (Sports Information Table):**
     This table holds details about different sports, where each sport is uniquely identified by a sportID. The table includes the sportsID, sportName, and equipments.

Table 1: Student Information Table

RollNo.	Name	Age	Department	SportID
CS21B1014	Naman Kumar	22	CSE	S01
AD23B1078	Ishani Gora	19	AI-DS	S03
MC22B1035	Rajat Sharma	20	M&C	S02

Table 2: Sports Information Table

ID	Name	Equipment
S01	Cricket	Bat, Ball, Stumps
S02	Chess	Chessboard, Score-sheet
S03	Volleyball	Net, Volleyball

The relationship between these tables is such that the `SportID` in Table 1 matches the `ID` in Table 2, providing a mapping of players to their respective sports.

To-do:

1. **Data Input:** Prompt the user to input data for each cell in both tables, including the column names, **except the department**. The department of the student should automatically be determined using the rest of the information about the student.(How?)
2. **3-Dimensional Array:** Create a structure for both tables based on user-defined rows and columns.
3. **Formatted Display:** Display the tables in a neatly formatted manner for better readability.
4. **Establish Relationships:** Create relationships between the two tables based on the `SportID` and display each player along with the sport they are associated with.

Notes

- One student can only be the coordinator of one sport.
- Each sport has only one coordinator.
- Do not use space-separated column names. For eg. instead of "Roll No.", use "RollNo.".
- Equipment names for a sport should be taken as input one by one, but in the end, should be stored as a single string. (Check test cases for example.)
- Handle the missing data cases. (Check test cases for example.)

Test Cases:

1.

Input

```
Enter the number of rows and columns for Table-1: 2 5
Columns Names: RollNo. Name Age Department SportID
Enter data for Table 1:
Enter Roll No. of student 1: CS24B1031
Enter Name of student 1: MAYANK SONI
Enter Age of student 1: 18
Enter SportID of student 1: S02
Enter Roll No. of student 2: AD24B1054
Enter Name of student 2: SHREYAS CHANDRAKANT INGLE
Enter Age of student 2: 19
Enter SportID of student 2: S01
Enter the number of rows and columns for Table-2: 2 3
Columns Names: ID Name Equipment
Enter data for Table 2:
Enter ID of sport 1: S01
Enter Name of sport: Cricket
Enter the total no. of equipment of sport 1: 3
Equipment 1: Bat
Equipment 2: Ball
Equipment 3: Stumps
Enter ID of sport 2: S02
Enter Name of sport 2: Basketball
Enter the total no. of equipment of sport 2: 2
Equipment 1: Basketball
Equipment 2: Ring
```

Output

```
Table 1:
RollNo. - Name - Age - Department - SportID
CS24B1031 - MAYANK SONI - 18 - CSE - S02
AD24B1054 - SHREYAS CHANDRAKANT INGLE - 19 - AI-DS - S01
#####################################################
Table 2:
ID - Name - Equipment
S01 - Cricket - Bat, Ball, Stumps
S02 - Basketball - Basketball, Ring
#####################################################
Relationships (Table 1 -> Table 2):
MAYANK SONI (S02) -> Basketball
SHREYAS CHANDRAKANT INGLE (S01) -> Cricket
```

2.

Input

```
Enter the number of rows and columns for Table-1: 3 5
Columns Names: RollNo. Name Age Department SportID
Enter data for Table 1:
Enter Roll No. of student 1: CS24B1021
Enter Name of student 1: ELENA GILBERT
Enter Age of student 1: 20
Enter SportID of student 1: S01
Enter Roll No. of student 2: AD24B1052
Enter Name of student 2: DAMON SALVATORE
Enter Age of student 2: 21
Enter SportID of student 2: S02
Enter Roll No. of student 3: MC24B1033
Enter Name of student 3: STEFAN SALVATORE
Enter Age of student 3: 22
Enter SportID of student 3: S03
Enter the number of rows and columns for Table-2: 2 3
Columns Names: ID Name Equipment
Enter data for Table 2:
Enter ID of sport 1: S01
Enter Name of sport: Football
Enter the total no. of equipment of sport 1: 1
Equipment 1: Ball
Enter ID of sport 2: S02
Enter Name of sport 2: Tennis
Enter the total no. of equipment of sport 2: 2
Equipment 1: Racket
Equipment 2: Tennis Ball
```

Output

```
Table 1:
RollNo. - Name - Age - Department - SportID
CS24B1021 - ELENA GILBERT - 20 - CSE - S01
AD24B1052 - DAMON SALVATORE - 21 - AI-DS - S02
MC24B1033 - STEFAN SALVATORE - 22 - M&C - S03
########################################################
Table 2:
ID - Name - Equipment
S01 - Football - Ball
S02 - Tennis - Racket, Tennis Ball
########################################################
Relationships (Table 1 -> Table 2):
ELENA GILBERT (S01) -> Football
DAMON SALVATORE (S02) -> Tennis
STEFFAN SALVATORE (S03) -> Sport Not Found
```

(6 marks)

2. You find yourself standing in the dimly lit corridors of Hogwarts School of Witchcraft and Wizardry. The air is thick with magic, and you feel a strange sense of urgency as you look at the diary you're holding. Yes! It's the Horcrux you've been stumbled upon - Tom Riddle's diary. Your task, young wizard, is to uncover the mystery behind the **anagrams** written in the diary, a truly mesmerizing phenomenon of English literature. An anagram is when you rearrange the letters of one word or phrase to create a new word or phrase using the same letters, without adding or removing any. For example, the words "listen" and "silent" have the same letters: L, I, S, T, E, and N, but they are arranged differently to form new words. You must create a spell, a simple program, that checks if two names are anagrams of each other. You will be given a set of strings, and you need to determine the anagrams present. An anagram, in this case, is when one string can be rearranged to form the other, ignoring spaces and letter case.

   Identifying each set of anagrams will award your house 10 points but that's not it! Discovering 3 pairs will open the doors to the Chamber of Secrets and will unleash the devil within. You need a minimum of 60 points to conquer the Basilisk, or else...

Input

- Your Hogwarts house (Gryffindor, Hufflepuff, Ravenclaw, or Slytherin)
- A single string containing comma-separated words or phrases which may or may not be anagrams.

Output

- Detected pair of anagram
- Announcement of 10 points awarded to your house after discovery of each pair of anagram
- Announcement when the Chamber of Secrets is opened
- Total points after all the anagrams detected
- Declaration of survival

Testcase 1

Input

Your Hogwarts house (Gryffindor, Hufflepuff, Ravenclaw, Slytherin): Slytherin

Enter the words that appeared in the diary: Ginny Weasley, A Mad Frosty Coal, Dormitory, A Wily Genius, Draco Malfoy, The Eyes Below, Ron Weasley, School Master, Tom Marvolo Riddle, Elegant Man, I Am Lord Voldemort, Dirty Room, The Classroom, One Sly War, Washer, The Eyes, They See Below, Listen, Silent

Output

Anagram Pair Found: "Dormitory" and "Dirty Room"

10 points to Slytherin!

Anagram Pair Found: "The Elbow Eyes" and "They See Below"

10 points to Slytherin!
Anagram Pair Found: "Elon Flow" and "Lone Wolf"
10 points to Slytherin!

The Chamber of Secrets has been opened! Enemies of the heir...beware!

Anagram Pair Found: "Ron Weasley" and "One Sly Wear"
10 points to Slytherin!
Anagram Pair Found: "School Master" and "The Classroom"
10 points to Slytherin!
Anagram Pair Found: "Tom Marvolo Riddle" and "I Am Lord Voldemort"
10 points to Slytherin!
Anagram Pair Found: "Listen" and "Silent"
10 points to Slytherin!
Total Points: 70
Congratulations! You've killed the Basilisk!

Testcase 2

Input

Your Hogwarts house (Gryffindor, Hufflepuff, Ravenclaw, Slytherin): Hufflepuff
Enter the words that appeared in the diary: listen, silent, evil, vile, hello, world

Output

Anagram Pair Found: "listen" and "silent"
10 points to Hufflepuff!
Anagram Pair Found: "evil" and "vile"
10 points to Hufflepuff!
Total Points: 20

Testcase 3

Input

Your Hogwarts house (Gryffindor, Hufflepuff, Ravenclaw, Slytherin): Gryffindor
Enter the words that appeared in the diary: foul creature, evil god, I am lord voldemort, vile dog, act, night, basilisk, tom marvolo riddle, dirty room,sinister, thing, cat, dormitory

Output

Anagram Pair Found: "evil god" and "vile dog"
10 points to Gryffindor!
Anagram Pair Found: "I am lord voldemort" and "tom marvolo riddle"
10 points to Gryffindor!
Anagram Pair Found: "act" and "cat"
10 points to Gryffindor!

The Chamber of Secrets has been opened! Enemies of the heir...beware!

Anagram Pair Found: "night" and "thing"
10 points to Gryffindor!
Anagram Pair Found: "dirty room" and "dormitory"
10 points to Gryffindor!
Total Points: 50
You have failed to kill the Basilisk... Death awaits.

(4 marks)

All the Best!