FACULTY OF COMPUTER SCIENCE AND ENGINEERING
Ghulam Ishaq Khan Institute of Engineering Sciences and Technology, Topi

Lab Duration: 3 hrs.	**CS112 Object Oriented Programming Lab**	**Marks: 10**
Lab No: 01	**Instructor: Mr. Usman Haider**	**Dated: 14/02/2022**

Before performing tasks, keep in mind the following rules:

1. **CHEATING IS NOT ALLOWED. Looking at someone's else screen is also cheating.**
2. **Mobile phone and internet usage are not allowed.**
3. **If you have any queries related to the task, you can ask instructors only. Never talk to each other until you are allowed.**
4. **Do not answer any query until you are asked.**
5. **Perform all the tasks.**
6. **Avoiding any of the above rules will lead to marks deduction.**

Task 1: SGPA Calculator using struct (4)

Write a C++ program to calculate the semester G.P.A. of the students enrolled at GIKI. The program should calculate and store the SGPA of at least three students and student details. The students' detail should include their name, reg. no., and degree program. The program should take the marks from the user for the courses enrolled in the semester and calculate the grade points (G.P.); this will be used to calculate the SGPA.

Note: For simplicity, consider that all courses are 3 credit hours (C.H.). Formula to calculate SGPA is:

$$SGPA = \frac{GP_1 * CH_1 + GP_2 * CH_2 + \ldots + GP_n * CH_n}{Total\_CH}$$

Sample Input:

Enter the record of 1st student:

Enter the name: Usa
Enter the reg. no.: CS2101
Enter the degree program: Ph.D._CS
Enter the number of courses: 5
Enter the marks of 1st course: 87
Enter the marks of 2nd course: 78
Enter the marks of 3rd course: 85
Enter the marks of 4th course: 90
Enter the marks of 5th course: 80

Enter the record of 2nd student:

Enter the name: Jalees
Enter the reg. no.: CS2034
Enter the degree program: Ph.D._CE
Enter the number of courses: 4
Enter the marks of 1st course: 80
Enter the marks of 2nd course: 70
Enter the marks of 3rd course: 82
Enter the marks of 4th course: 75

Enter the record of 3rd student:

Enter the name: Maaz
Enter the reg. no.: CS1234
Enter the degree program: MS_EE
Enter the number of courses: 4
Enter the marks of 1st course: 82
Enter the marks of 2nd course: 75
Enter the marks of 3rd course: 88
Enter the marks of 4th course: 69

Sample Output:

S.No.	Name	Reg. No.	Degree Program	SGPA
1	USA	CS2101	Ph.D._CS	3.67
2	Jalees	CS2034	Ph.D._CE	3.16
3	Maaz	CS1234	MS_EE	3.25

Task 2: Best student extractor using struct (3)

Write a C++ program to sort the student's record in descending order you just created in task 1. Display the sorted records and the record of the student at the top.

Sample Input:

Same as in Question 1

Sample Output:

S.No.	Name	Reg. No.	Degree Program	SGPA
1	Usman	CS2101	Ph.D. CS	3.67
3	Maaz	CS1234	MS EE	3.25
2	Jalees	CS2034	Ph.D. CE	3.16

The best student is:

Usman	CS2101	Ph.D. CS	3.67

Task 3: Birthday Wisher using struct (3)

Write a C++ program to wish birthdays. The program should store the details of a minimum of 3 users, including their name, age, city, and date of birth. The program should take a birthday from the user, check if it is the birthday of any existing user, and display a Happy Birthday message.

Note: You cannot use string for data of birth.

Sample Input:

Enter the record of 1st user:
Enter the name: Usman
Enter the age: 26
Enter the city: Islamabad
Enter the D.O.B:
Enter day: 26
Enter month: Jan
Enter Year: 1996
Enter the record of 2nd user:
Enter the name: Jalees
Enter the age: 28
Enter the city: Peshawar
Enter the D.O.B:
Enter day: 24
Enter month: Jun
Enter Year: 1994
Enter the record of 3rd user:
Enter the name: Maaz
Enter the age: 25
Enter the city: Nowshera
Enter the D.O.B:
Enter day: 02
Enter month: Mar
Enter Year: 1997
Enter a D.O.B to check:
Enter day: 24
Enter month: Jun
Enter Year: 1994

Sample Output:

It is Jalees's Birthday. Happy Birthday, Jalees.