University of Central Punjab

**Faculty of Information Technology**

# Object Oriented Programming

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| **Lab 12** | |  |
| **Topic** | **Composition** |
| **Objective** | The basic purpose of this lab is to implement the concept of composition. |
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**Instructions:**

* Indent your code.
* Comment your code.
* Use meaningful variable names.
* Plan your code carefully on a piece of paper before you implement it.
* Name of the program should be same as the task name. i.e. the first program should be Task\_1.cpp

**Students are required to work in multiple files i.e .h and .cpp**

Task 1

Create UML diagram for the following and identify weather the following classes hold association relation or composition relation

1. Student and Teacher
2. Heart and Body
3. Car and wheel
4. Class and Chair
5. Food and plate
6. Car and Engine
7. Book and Pages

Task 2

Write a program that has two classes company and Employee. You can see company class is using employee type object(hence composition). Write down all setter and getter functions for both classes. You are required to create a main function in order to check Employee class and Company class and call Print Info function of both using respective objects

Class Employee

Private:

char\* name;

int id;

int age;

int salary;

Class Company

Private:

char \* name;

char\*address;

Char\* PhNo;

Employee Edetail;

**Create UML diagram for the above classes.**

Task 3

Write a program that has two classes Car and engine. You can see Car class is using engine type object(hence composition). Write down all setter and getter functions for both classes. You are required to create a Car class and Engine class and call Print Info function of both using respective objects

Class Car

Private:

char\* model;

int door;

Engine engineDetails;

Class Engine

Private:

Double fuelaverage;

char \* type;

char \*fueltype;

**Create UML diagram for the above classes.**

Task 4

**Write program by using Composition object.**

Class Person has a birthdate

**Create UML diagram for the above classes.**

Task 5

In UCP, we have thousands of students who are currently enrolled in any Course. One Course has exactly one *Instructor* associated with it. We need to implement this scenario to store information of *Students*, *Instructors*, and *Courses*.

1. Define a class **Student** having following private data members:

i.) name (pointer to character array) ii.) registrationNo (pointer to character array)

iii.) city(pointer to character array)

1. Write parameterized constructor with default parameters for student class.
2. Write copy constructor and assignment operator.
3. Write setter and getter for each data member of student class.
4. Write a display function.

1. Define a class **Instructor** having following private data members:

1. name (pointer to character array)
2. education (pointer to character array)

1. Write parameterized constructor with default parameters for Instructor class.
2. Write copy constructor and assignment operator.
3. Write a display function.
4. Write setter and getter for each data member of instructor class.

1. Define a class **Course** having following private data members:

1. courseName (pointer to character array)
2. instructor ( a course offered has exact one Instructor)
3. student ( a Course offered has many Students enrolled)

1. Write default and parameterized constructor for Course class.
2. Write setter and getter for each data member of Course class.
3. Write copy constructor and assignment operator.
4. Write a display function.
5. Write a function that return total student count enrolled in course.
6. Write a display() function in Course class that displays complete Course information like following

Course Name: OOP LAB

Instructor Name: XYZ

Total Students Enrolled: 2

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No. Registration No Student Name

* 1. L1F1YBSCSWXYZ Ali
  2. L1F1YBSCSWXYZ Ammar

1. A Course cannot have more than 30 students. Write logic to implement this.