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FACULTY OF ENGINEERING & TECHNOLOGY

BCS-503: Object Oriented Techniques

Lecture-03

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OBJECTIVES

In this PPT, you will learn to:

- ❖ **Explain Object-Oriented Concepts**
- ❖ **Role of Object-Oriented Analysis and Design (OOAD) in SDLC**

What is Object-Oriented Concepts

In the design phase, there are two approaches to software development:

1. Function-oriented approach

- Is module-centric and concentrates on functions of the software.

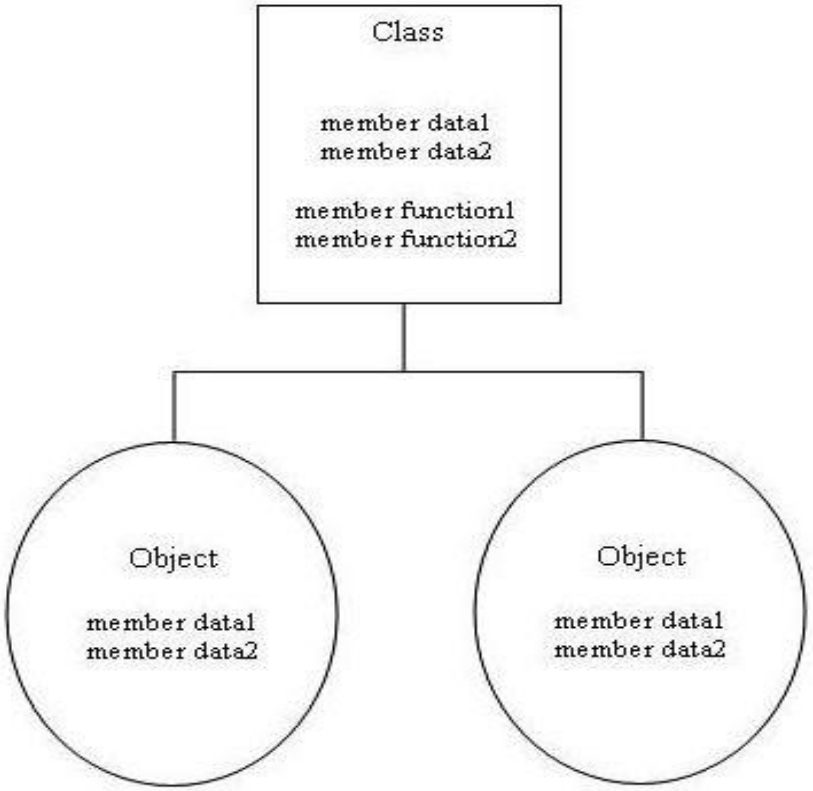
2. Object-oriented approach

- Portrays things as they exist in the real world.
- Introduces the concept of inheritance which allows reuse of existing code components.
- Supports inheritance, reusability and encapsulation of data, abstraction, and polymorphism.

OVERVIEW OF OBJECT-ORIENTED CONCEPTS

Classes and Objects

- A class is an abstract data type that contains a set of attributes and functions.
- An object is an instance of a class.

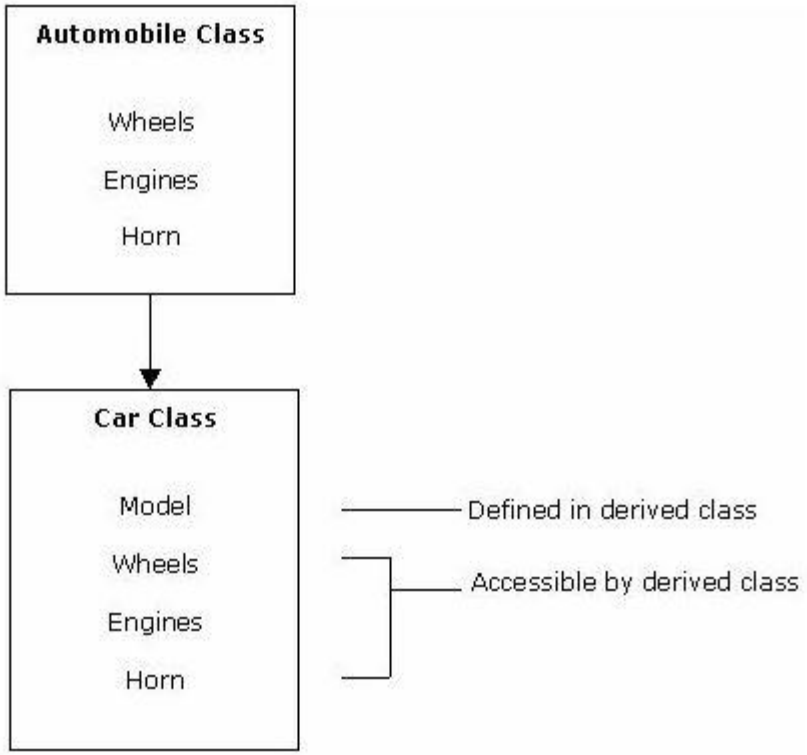


A Class and its Objects

OVERVIEW OF OBJECT-ORIENTED CONCEPTS (Contd.)

Inheritance

- Inheritance refers to sharing of attributes and behaviors among classes based upon hierarchical relationship.
- The inheritance feature allows you to define a new class by extending an existing class.
- The original class is called a base class and the new class obtained through inheritance is called a derived class or sub calss.

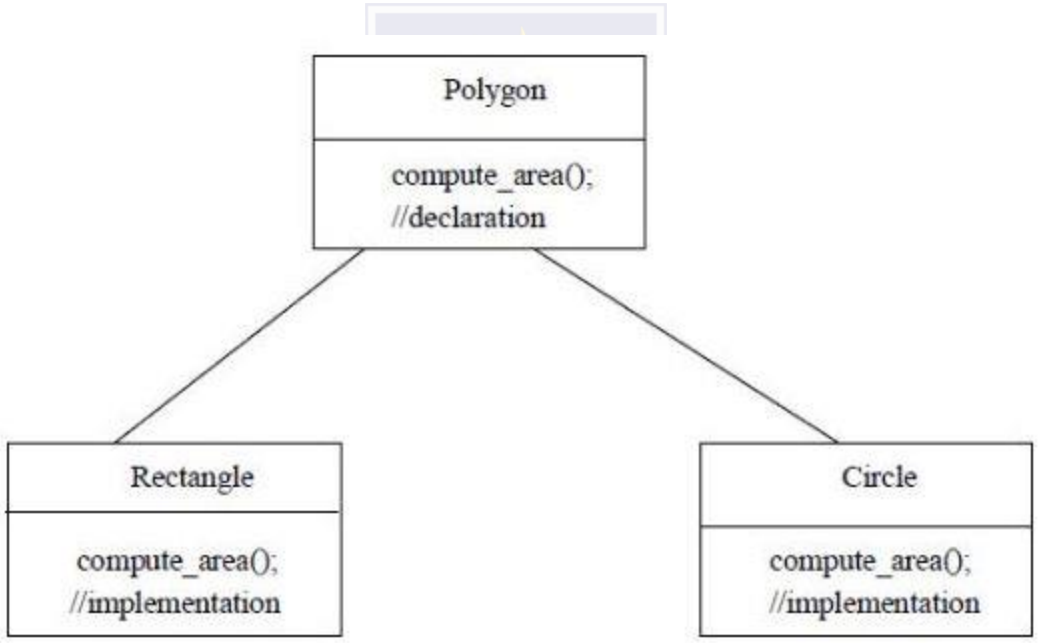


Inheritance of a Derived Class from a Base Class

OVERVIEW OF OBJECT-ORIENTED CONCEPTS (Contd.)

Abstraction

- Abstraction focuses on essential, inherent aspects of an entity ignoring its implementation details.
- An abstract class specifies the abstract operation but does not include its implementation.
- The implementation is provided in the derived classes of the abstract class.



Abstraction Among Classes

OVERVIEW OF OBJECT-ORIENTED CONCEPTS (Contd.)

Encapsulation

- Encapsulation means preventing access to non-essential details.
- Encapsulation is also called information hiding because it involves hiding attributes and operations of a class from other classes

OVERVIEW OF OBJECT-ORIENTED CONCEPTS (Contd.)

Polymorphism

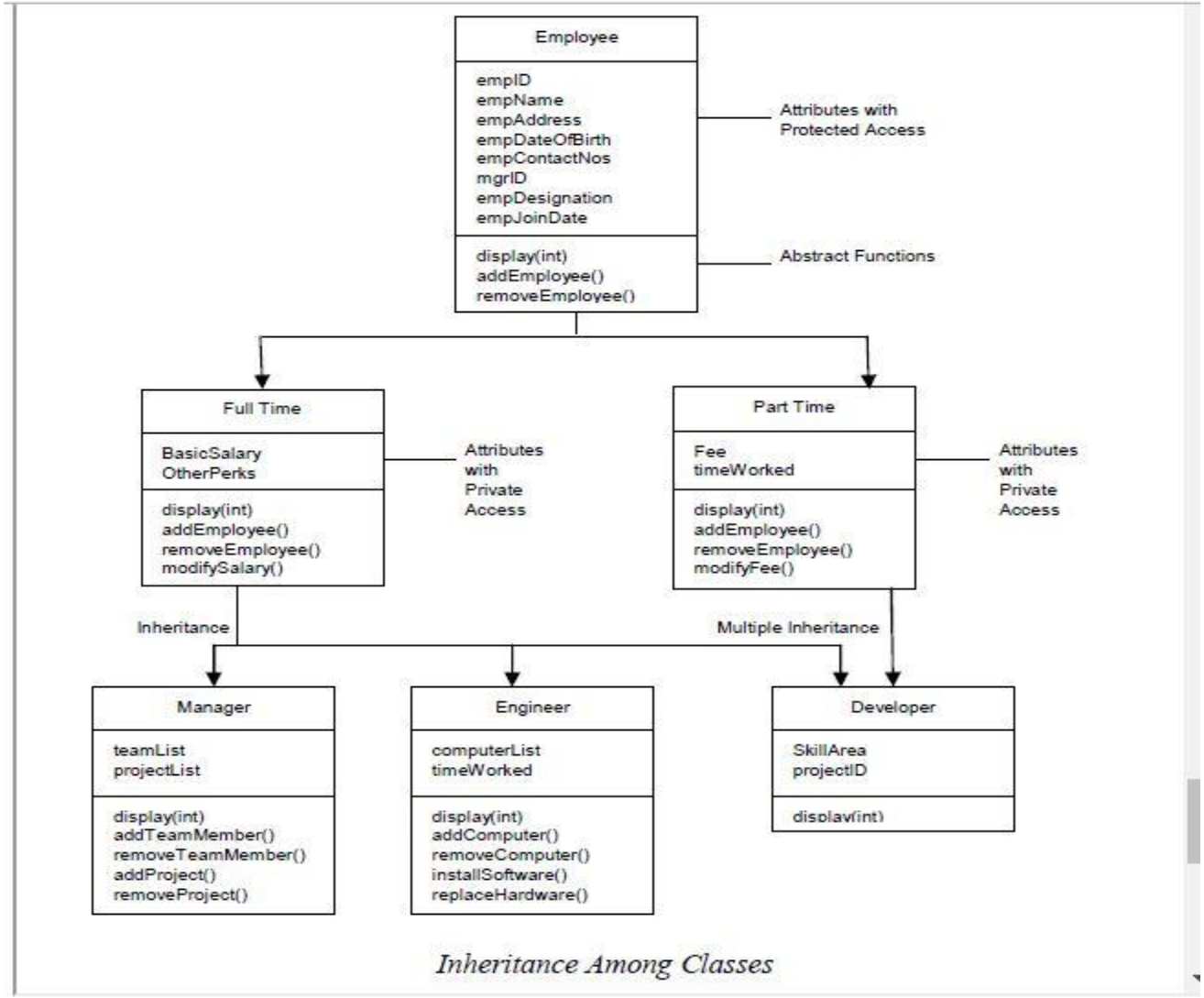
- Polymorphism is the concept of using operators or functions in different ways depending on what they are operating on.
- Using operators in different ways depending on what they are operating on is called operator overloading.
- Using functions in different ways is called function overloading.

Example of Object-Oriented Concept

Countryside Markets has no formal system to store its employees information. The organization now wants to store detailed information about its employees, such as name, age, date of birth, e-mail id, department, employee code, salary drawn, and date of joining.

OVERVIEW OF OBJECT-ORIENTED CONCEPTS (Contd.)

Countryside Markets class hierarchy



Inheritance Among Classes

Role of Object-Oriented Analysis and Design (OOAD) in SDLC

- Object-Oriented approach does not replace the standard approaches, such as Data Flow Diagrams (DFD) or Entity Relationship (ER) diagrams. It is only an addition to the existing toolkit.
- OOAD uses the Object-Oriented approach to solve the real world problems. It uses Object-Oriented approach to analyze the system requirements and break a large and complex system into smaller and simpler components.
- OOAD is analysis of requirements and design of software system in terms of the objects, classes, encapsulation, inheritance, polymorphism, abstraction, and dynamic binding.
- OOAD is a methodology that can be applied to linear, iterative, or incremental approach.

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Multiple Choice Question:

Q1. If the objects focus on the problem domain, then we are concerned with _____.

a) Object Oriented Analysis

b) Object Oriented Design

c) Object Oriented Analysis and Design

d) None of the above

Multiple Choice Question:

Q2. The feature of the object oriented paradigm which helps code reuse is _____ .

a) Object

b) Class

c) Inheritance

d) Aggregation.

Multiple Choice Question:

Q3. In OOD, the attributes(data variables) and methods(operation on the data) are bundled together is called _____ .

a) Classes

b) Objects

c) Encapsulation

d) Inheritance

Multiple Choice Question:

Q4. OOD languages provide a mechanism where methods performing similar tasks but vary in arguments, and that can be assigned to the same name is called _____ .

a) Classes

b) Object

c) Polymorphism

d) Encapsulation

Multiple Choice Question:

Q5. Which of the following is a technique for hiding the internal implementation details of an object?

a) Abstraction

b) Encapsulation

c) Inheritance

d) Polymorphism

Summary

In this PPT, you learned that:

- The function-oriented approach is module-centric and concentrates on the functions of the software.
- The object-oriented (OO) approach supports reusability and encapsulation of data and concepts such as inheritance, abstraction, and polymorphism.
- OOAD is analysis of requirements and design of software system in terms of objects, classes, encapsulation, inheritance, polymorphism, abstraction, and dynamic binding.