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FACULTY OF ENGINEERING & TECHNOLOGY

BCS-503: Object Oriented Techniques

Lecturer-15

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Computer Science & Engineering

OBJECTIVES

In this PPT, you will learn to:

- ❖ **Identify various types of classes and the relationships between them**
- ❖ **Types of Classes**

IDENTIFY VARIOUS TYPES OF CLASSES AND THE RELATIONSHIPS BETWEEN THEM

- After you identify the classes from the problem statement or use cases.
- You can classify the identified classes into various types.
- This enables you to make the software system reusable and manageable.

TYPES OF CLASSES

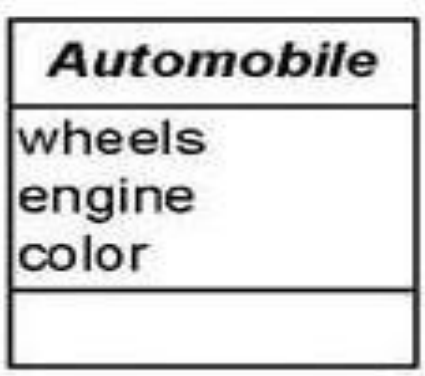
UML classifies classes into the following categories:

1. Abstract class
2. Parameterized class
3. Factory class
4. Self-linked class

TYPES OF CLASSES (Contd.)

Abstract class:

- An abstract class is a class that does not have any direct instances.
- The classes inherited from an abstract class can have direct instances.
- An abstract class is used to define the common features and common behavior of a set of subclasses.
- The UML notation for an abstract class is same as that of a simple class. However, the name of the class is italicized to indicate that the class is an abstract class.



Abstract Class

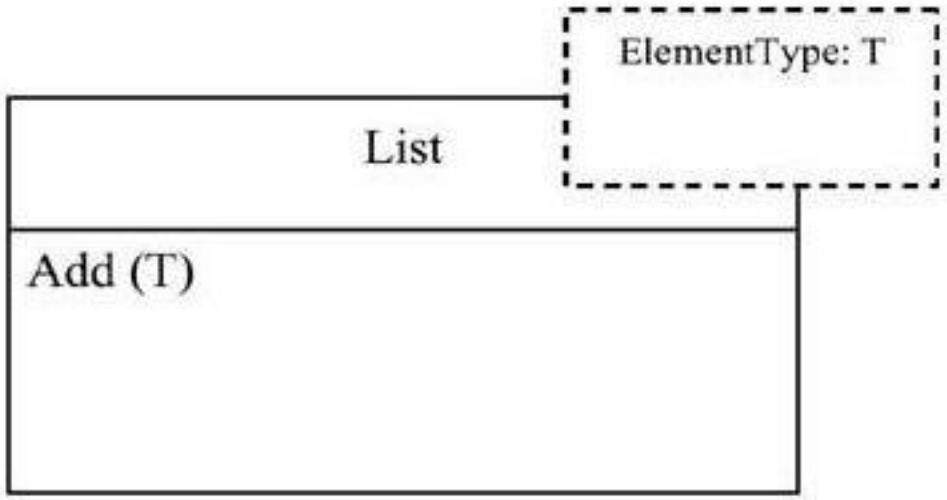
TYPES OF CLASSES (Contd.)

Parameterized Class:

- A parameterized class provides a mechanism that enables you to use operations and classes to work with different data types.
- A parameterized class consists of type parameters that are unbounded.
- The data types of the parameters are not defined in the parameterized class.
- You cannot create the objects of a parameterized class.
- To use the functions defined in the parameterized class, you need to realize the parameterized class by using classes.
- The data types of the type parameters are defined in the classes that realize the parameterized class.

TYPES OF CLASSES (Contd.)

The following is the representation of a parameterized class.



Parameterized Class

TYPES OF CLASSES (Contd.)

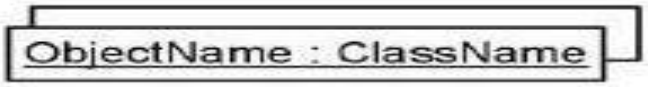
Factory Class:

- A class whose multiple objects have same attribute values is known as a factory class.

- An example of a factory class is an EJB factory class that creates multiple instances of EJB in an instance pool of the J2EE middle tier server.

- You can represent the multiple objects of a factory class by single symbol of overlapping rectangles.

- The following is the representation of a factory class.



Object Diagram for Factory Class

TYPES OF CLASSES (Contd.)

Self-Linked Class:

- A class whose objects fulfill more than one role is called a self- linked class.

- The following is the representation of a self-linked class.

Object Diagram for a Self-Linked Class

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Multiple Choice Question:

Q1. Which among the following are not the valid notations for package and component diagram?

a) Notes

b) Box

c) Extension Mechanisms

d) Packages

Multiple Choice Question:

Q2. Which of the following statement is false?

a) A note is a dog-eared box connected to any model element by a dashed line

b) The main way to extend UML is by constraints, properties, etc

c) A dependency relation holds between two entities D and I where change in I does not affect D

d) All of the mentioned

Multiple Choice Question:

Q3. Which of these depicts the true definition for the UML extensions?

a) A constraint is a statement that must be true of the entities designated by one or more model elements

b) A property is a characteristic of the entity designated by a model element

c) A stereotype is a UML model element given more specific meaning

d) All of the mentioned

Multiple Choice Question:

Q4. Which of the following is incorrect in reference to dependency?

a) Module D uses module I when a correct version of I must be present for D to work correctly

b) Module D depends for compilation on module I

c) Class I imports elements from package D

d) None of the mentioned

Multiple Choice Question:

Q5. What is a collection of model elements called?

a) Box

b) Dependency

c) UML packages

d) Package members

Summary

In this PPT, you learned that:

- An abstract class is a class that does not have any direct instances.
- An abstract class is used to define the common features and common behavior of a set of subclasses.
- A parameterized class, also called template class, provides a mechanism that enables you to use operations and classes to work with different data types.
- The objects of a parameterized class cannot be created.
- A class that has multiple objects having the same attribute values is known as a factory class.
- A class that has objects, which fulfill more than one role, is called a self-linked class.