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FACULTY OF ENGINEERING & TECHNOLOGY

BCS-503: Object Oriented Techniques

Lecture-12

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OBJECTIVES

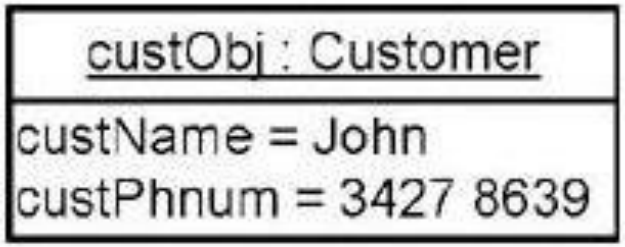
In this PPT, you will learn to:

- ❖ **Introducing Object Diagrams**
- ❖ **Relationships in Class and Object Diagrams**

INTRODUCING OBJECT DIAGRAMS

- Object diagrams represent the instances of static elements, that is, classes.

- Object diagram is represented as a rectangular box with two compartments



Object Diagram

RELATIONSHIPS IN CLASS AND OBJECT DIAGRAMS

Relationships indicate the way in which the elements of a software system connect to each other logically and physically.

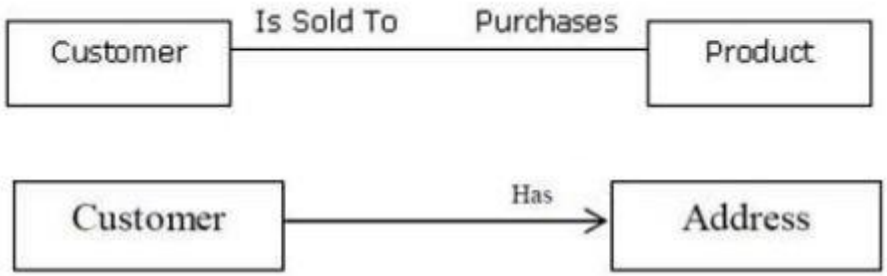
The various relationships between classes and objects are:

1) Association
2) Dependency
3) Generalization
4) Realization

RELATIONSHIPS IN CLASS AND OBJECT DIAGRAMS (Contd.)

Association relationship:

Represents the static relationship shared among objects of two classes.



- An attribute of the association relationship is multiplicity.
- Multiplicity represents the number of objects of a class that are connected to an object of another class.

Multiplicity Relationship

RELATIONSHIPS IN CLASS AND OBJECT DIAGRAMS (Contd.)

- The four types of multiplicity relationships are: –

Exactly one (1): Specifies that only one object of a class is related to object/s of another class.

One or zero (0..1): Specifies that zero or one object of a class is related to object/s of another class.

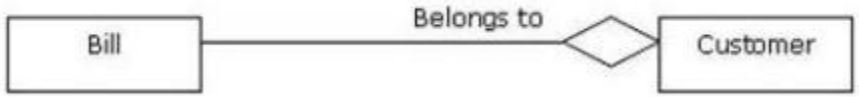
Many (0..*): Specifies that zero or many objects of a class are related to object/s of another class.

One or more (1..*): Specifies that one or many objects of a class are related to object/s of another class.

RELATIONSHIPS IN CLASS AND OBJECT DIAGRAMS (Contd.)

Association relationship is of two types:

1.Aggregation: Represents an association between two classes such that class A is a part of class B and class A can exist independently.



Aggregation Relationship

2.Composition: Represents an association between two classes such that class A contains class B and also controls the lifetime of class B.

Composition Relationship

RELATIONSHIPS IN CLASS AND OBJECT DIAGRAMS (Contd.)

Dependency relationship:

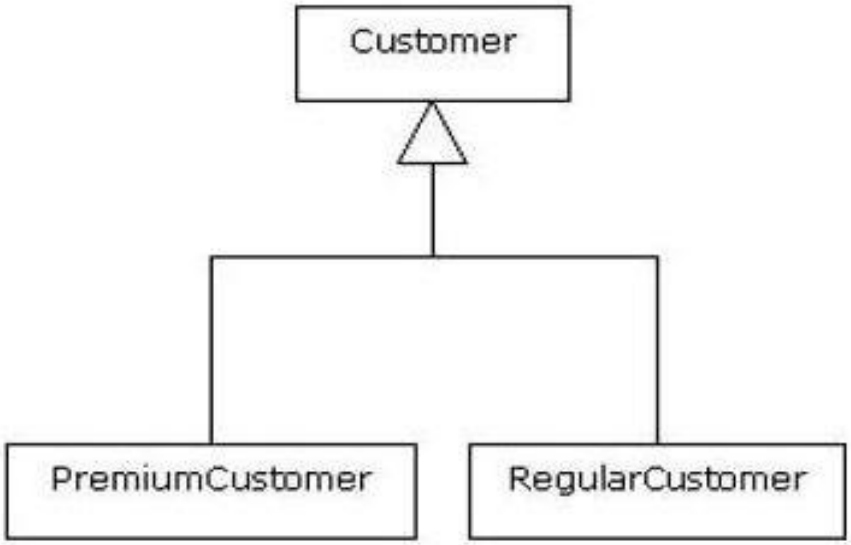
Represents the semantic relationship between two classes such that a change in the attributes and operations of one class affects the attributes and operations of the other class.

Dependency Relationship

RELATIONSHIPS IN CLASS AND OBJECT DIAGRAMS (Contd.)

Generalization relationship:

- Represents how super classes are related to the sub classes.
- Super classes are called base classes and sub classes are known as derived classes



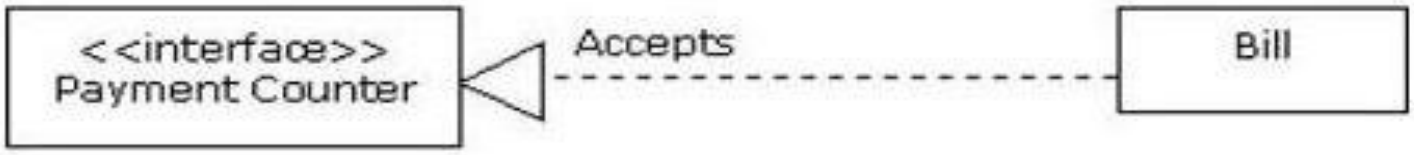
Generalization Relationship

RELATIONSHIPS IN CLASS AND OBJECT DIAGRAMS (Contd.)

Realization relationship:

- Represents the semantic relationship among the components of a class diagram, where one component specifies a contract and the other component implements the contract.

- You define a contract as a set of functions



Realization Relationship

REFERENCES

1. James Rumbaughet. al, "Object Oriented Modeling and Design", PHI

2. Grady Booch, James Rumbaugh, Ivar Jacobson, "The Unified Modeling Language User Guide", Pearson Education

3. Naughton, Schildt, "The Complete Reference JAVA2", TMH

4. Mark Priestley "Practical Object-Oriented Design with UML", TMH

5. Booch, Maksimchuk, Engle, Young, Conallen and Houstan, "Object Oriented Analysis and Design with Applications", Pearson Education

6. Pandey, Tiwari, " Object Oriented Programming with JAVA" , Acme Learning

7. https://www.javatpoint.com/java-tutorial

8. https://www.tutorialspoint.com/java/index.htm

9. https://www.tutorialspoint.com/object_oriented_analysis_design/index.htm

10. https://www.slideshare.net/niitstudentcare/

MULTIPLE CHOICE QUESTION

Multiple Choice Question:

Q1. Which of the following represents the semantic relationship between two classes such that a change in the attributes and operations of one class affects the attributes and operations of the other class?

a) Generalization

b) Dependency

c) Realization

d) Aggregation

Multiple Choice Question:

Q2. What is the class relationship?

a) A relationship between classes that tells how they are related

b) A relationship between classes that tells how much power one class has over other class

c) A relationship between classes that tells which parts of a class is visible to other classes

d) All of the mentioned

Multiple Choice Question:

Q3. Composition is also a type of _____ relationship.

a) Aggregation

b) Association

c) Inheritance

d) Both Aggregation an Association

Multiple Choice Question:

Q4. Which type of relationship is modelled by Composition?

a) Is-A relationship

b) Has-A relationship

c) Part-Of relationship

d) Have-A relationship

Multiple Choice Question:

Q5. Which of the following relationships is uni-directional?

a) Aggregation

b) Association

c) Composition

d) Both Aggregation and Composition

Summary

In this PPT, you learned that:

- The object diagram notation represents the name and attributes of the object. It also includes the name of the class and the values of the attributes for a specific instance.

- The various types of relationships shared by objects and classes are:
  1) Association
  2) Dependency
  3) Generalization
  4) Realization