

Design Defects and Restructuring

LECTURE 02

SAT, SEP 12, 2020

Object Oriented Concepts

Concepts

- Abstraction
- Class
- Object
- Encapsulation
- Information Hiding (Scope)
- Inheritance
- Interface
- Messaging
- Polymorphism (Ad hoc – Overload, Subtype – Override, Parametric – Templates or Generics)
- Delegate (Function Pointer)
- Relationship

Object Oriented Analysis

Object Types

- Person (Role)
- Organization – Group
- Product
- Event – Result of Happening, Action or Association (Time?)
- Spatial – Location
- Temporal – Time

Relationships

Association

Classification

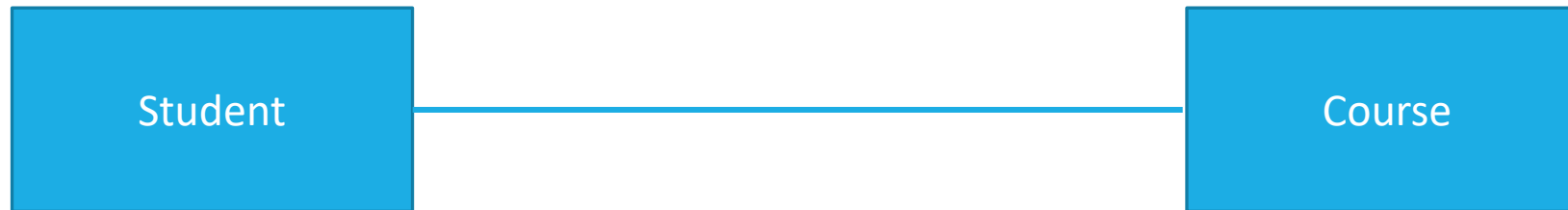
Generalization

Aggregation

Composition

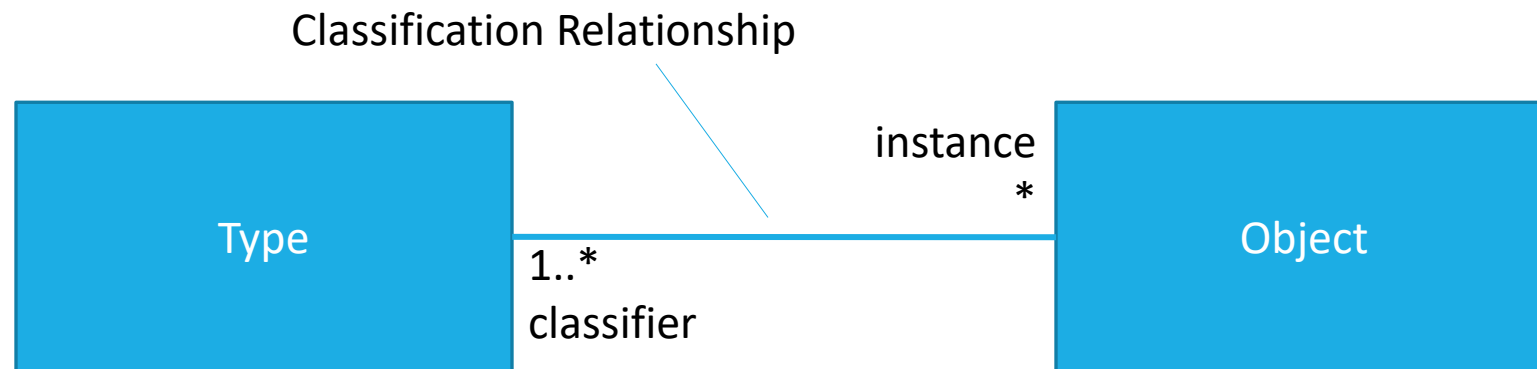
Association

An association is a user defined relationship



Classification

It is the act or result of applying a concept (type) to an object

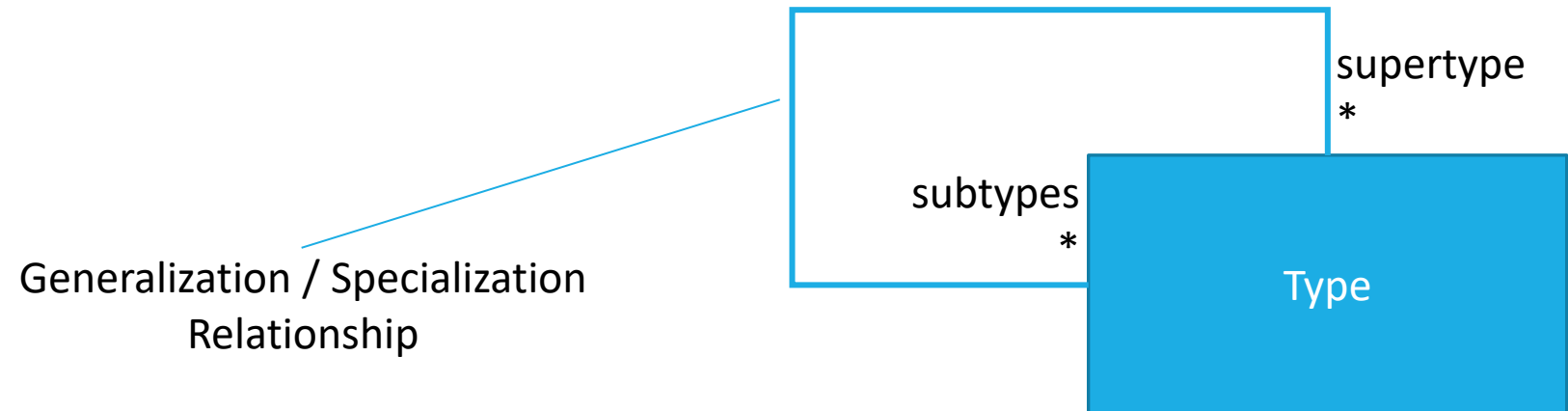


Generalization / Specialization

It is the act or result of distinguishing a concept (type) that completely includes or encompasses another

Generalization enables us to define our types in more general terms by using super-types

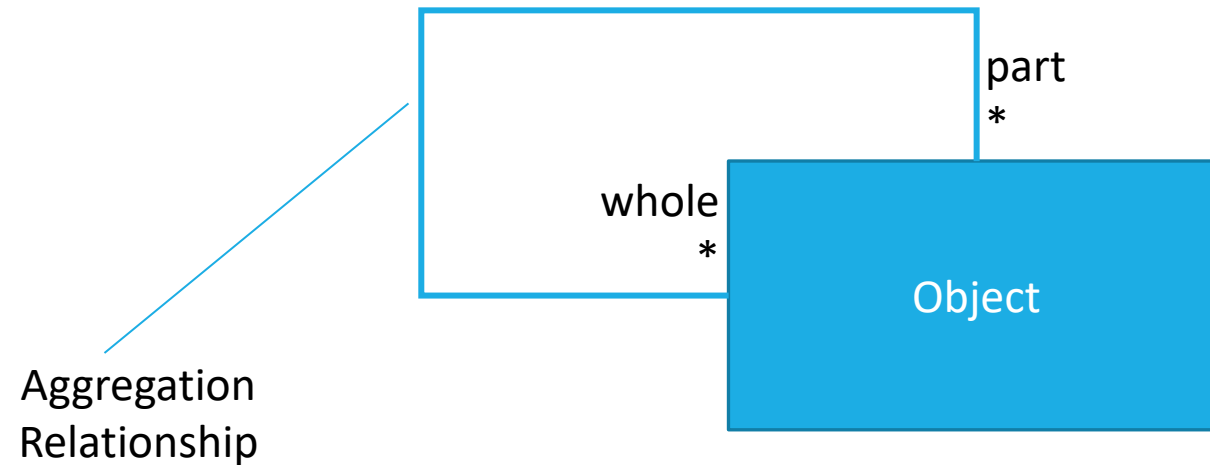
Specialization allows us to be more specific about our types by using subtypes



Aggregation / Composition

It is the act or result of forming an object whole using other objects as its parts

Aggregation is a mechanism for forming a whole from component parts



Generalization / Classification

Objects are instances because they have been classified

Type of objects are subtypes because they have been specialized

Classification and Generalization / Specialization are two different phenomenon and have different hierarchies

Classification is the relationship between object and type

Generalization / Specialization is the relationship between types only

Example

Consider the following phrases

1. Fido is an Alsatian
2. An Alsatian is a Dog
3. Dogs are Animals
4. An Alsatian is a Breed
5. Dog is a Species

1 & 2

• Fido is a Dog ✓

2 & 3

• Alsations are Animals ✓

1 & 2 & 3

• Fido is an Animal ✓

1 & 4

• Fido is a Breed ✗

2 & 5

• An Alsatian is a Species ✗

Example – Contd.

Fido is an Alsatian

• Classification

An Alsatian is a Dog

• Generalization

Dogs are Animals

• Generalization

An Alsatian is a Breed

• Classification

Dog is a Species

• Classification

Generalization / Classification



Links – Relationships (UML Notations)

