

Design Defects and Restructuring

LECTURE 01

SAT, SEP 05, 2020

Course Outline

Introduction

Programming
Practices

Design Issues

Data
Modeling

Design
Patterns

Refactoring

Course Organization

2 Lectures – Morning & Afternoon

- Class Timings for Morning Lecture

- 9:30 AM – 12:30 PM
- 1st Session: 9:30 AM – 11:00 AM
- Break: 11:00 AM – 11:15 AM
- 2nd Session: 11:15 AM – 12:30 PM

- Class Timings for Afternoon Lecture

- 2:00 PM – 5:00 PM
- 1st Session: 2:00 PM – 3:30 PM
- Break: 3:30 PM – 3:45 PM
- 2nd Session: 3:45 PM – 5:00 PM

Course Evaluations

Quiz – 10%

Assignment – 15%

Class Participation – 5%

Midterm – 20%

Final – 50%

Reference Books

Object-Oriented Methods: A Foundation

- UML Edition (2nd Edition)
- By: James Martin, James J. Odell

Agile Software Development

- Principles, Patterns, and Practices
- By: Robert C. Martin

Design Patterns

- Elements of Reusable Object-Oriented Software
- By: Erich Gamma, John Vlissides, Richard Helm, Ralph Johnson (Gang of Four – GoF)

Reference Books – Contd.

Patterns of Enterprise Application Architecture

- By: Martin Fowler

Refactoring

- Improving the Design of Existing Code
- By: Martin Fowler

Web References and Articles

Software Development

Why do we develop Software?

What is the purpose of Software Development?

Technical aspects of Software Development

- Program Constructs (Computation)
 - Assignment (Sequence) – Expressions (Numeric, Logical, String, Temporal)
 - Loop (Iteration)
 - Condition (Selection)
- Program Organization
 - Functions
 - Procedures
 - Classes
 - Files
 - Folders

Concept

An idea or notion that we apply to the things, or objects, in our awareness

Concepts are the recognition device

Concepts (Examples)

Tangible

- Person
- Pencil
- Car

Intangible

- Time
- Quality
- Company

Roles

- Doctor
- Patient
- Owner

Judgments

- Productive Job
- High Pay

Concepts (Examples)

Relational

- Marriage
- Partnership
- Ownership

Events

- Sale
- Purchase
- Market Crash

Others

- String
- Number
- Icon
- Image
- Signal

Concept Triad

The Term Concept

The Intension

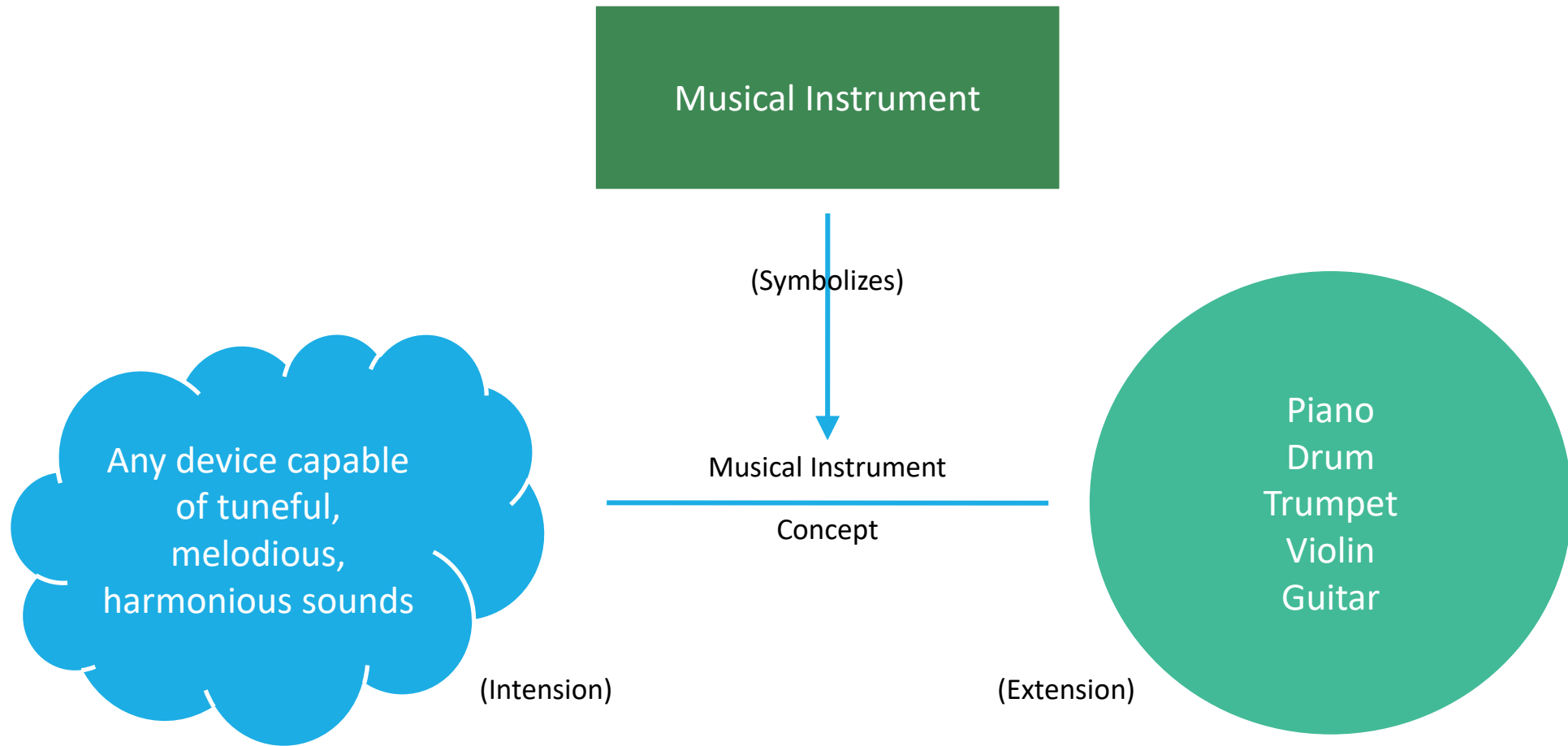
The complete definition of the concept

The test that determines whether or not the concept applies to an object

The Extension

The set of all objects to which the concept applies

Concept Triad – Example



Concept Triad – Incomplete

Concepts without name

- slow down the communication
- Example
 - Intension: A commission to purchase, sell or supply goods or services
 - Extension: Order # AA-01834, Order # DX-99286
- Name: Order

Concept Triad – Incomplete

Concepts without instance

- have no value
- Example
 - Name: Company Saboteur
 - Intension: A person who engages in damaging property with the intention of injuring a corporation
- Extension: None

Concept Triad – Incomplete

Concepts without definition

- are not concepts
- they are just meaningless
- Example
 - Name: P-CD-X99
 - Extension: “X17”, “Z42”
- Intension: None, no documentation, meaningless names or values

Concept Triad

Synonyms

- concepts with two names
- Example
 - Name: Customer, Client
 - Intension: A person or organization that purchases goods or services
 - Extension: “IBM”, “Sayed Yousuf”

Concept Triad

Homonyms

- concept with two meanings
- Example
 - Name: Finalized Sale
 - Intension: A sale sealed with a handshake, A sale sealed with a signed sales contract
 - Extension: Sale Contract Documents

Type

A shared notion or idea that applies to objects in our awareness

A type is a concept

It is a kind of object

Synonym of concept

A recommended term for concept in object-oriented analysis standard community