Summary & Concluding Remarks

Software Analysis and Design

CSE 460

Fall 2022

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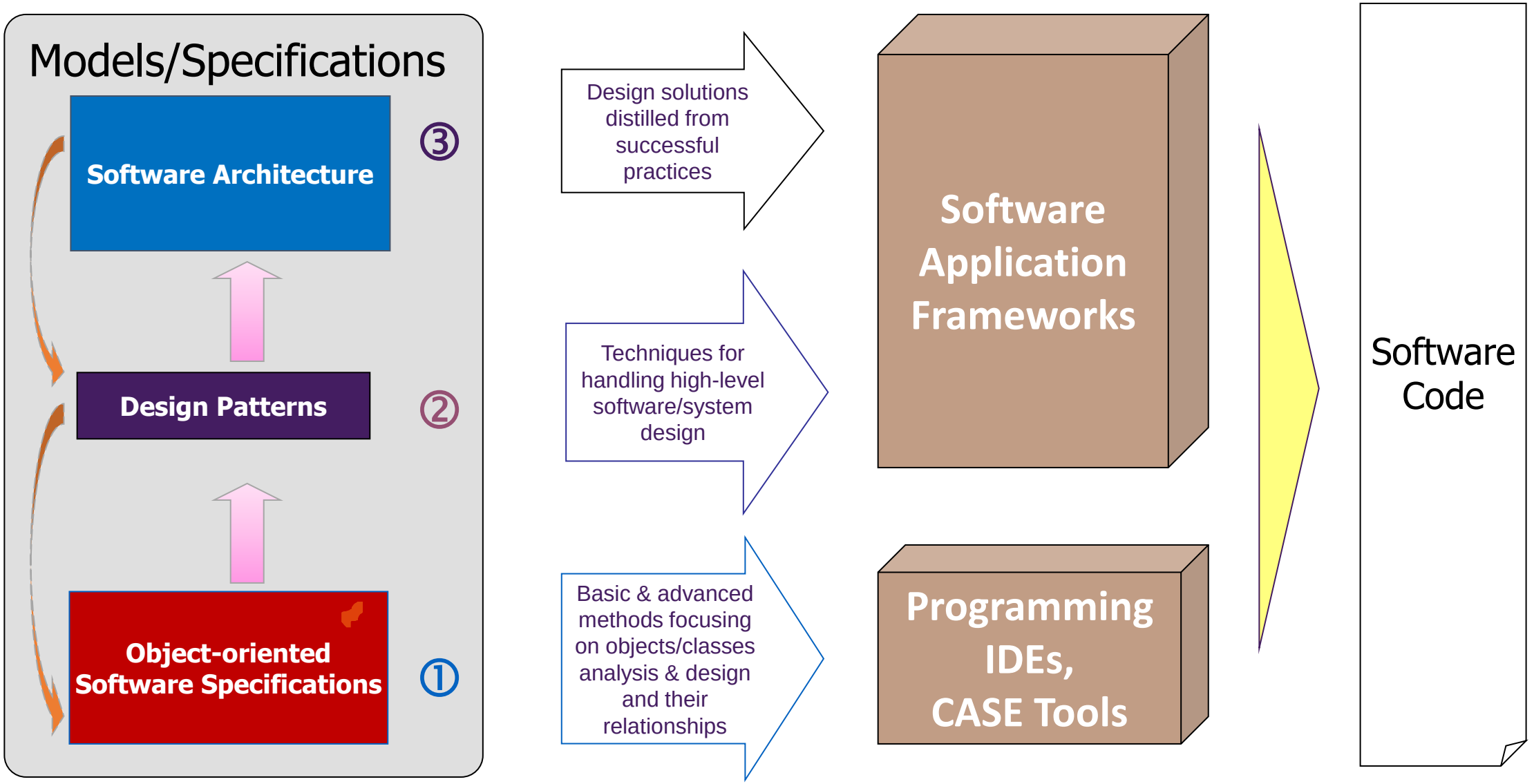
Component-based Software Engineering



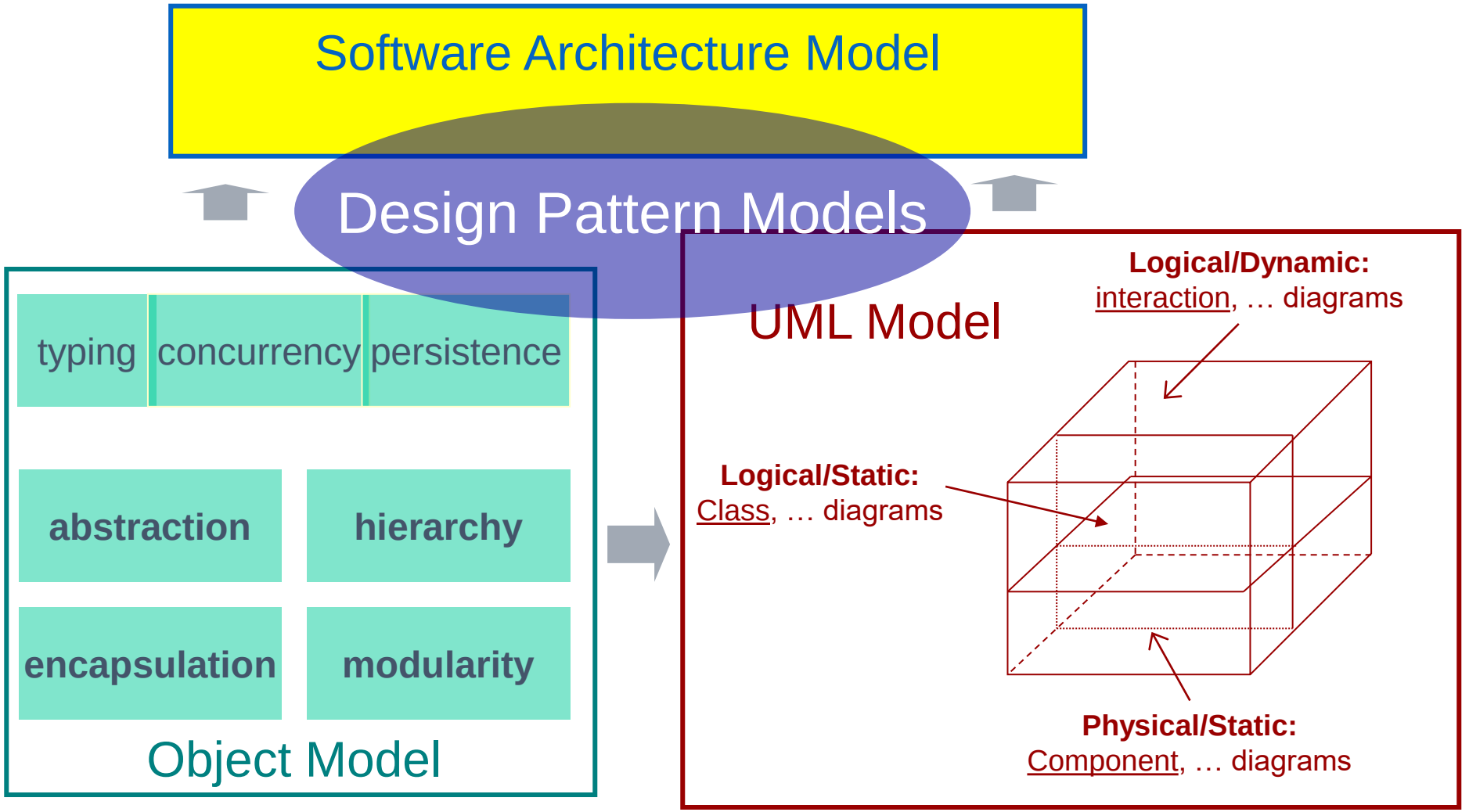
Taming Software Complexity

Article: Revealing the complexity of automotive software

Describes software complexity in view of the code, architecture, variants, and requirements aspects.

Examination of such software shows it is complex – all **six complexity attributes** of systems make it abundantly evident developing good software needs a great deal more than coding skill

Concepts and Models Essential for Building Resilient High-Quality Software



Design Patterns + Software Architecture

Object-Oriented Analysis & Design

- Chapter 1: ***Complexity***
- Chapter 2: ***The Object Model***
- Chapter 3: ***Classes and Objects***
- Chapter 4: ***Classification***
- Chapter 5: ***Structural and Behavioral Specifications (UML)***

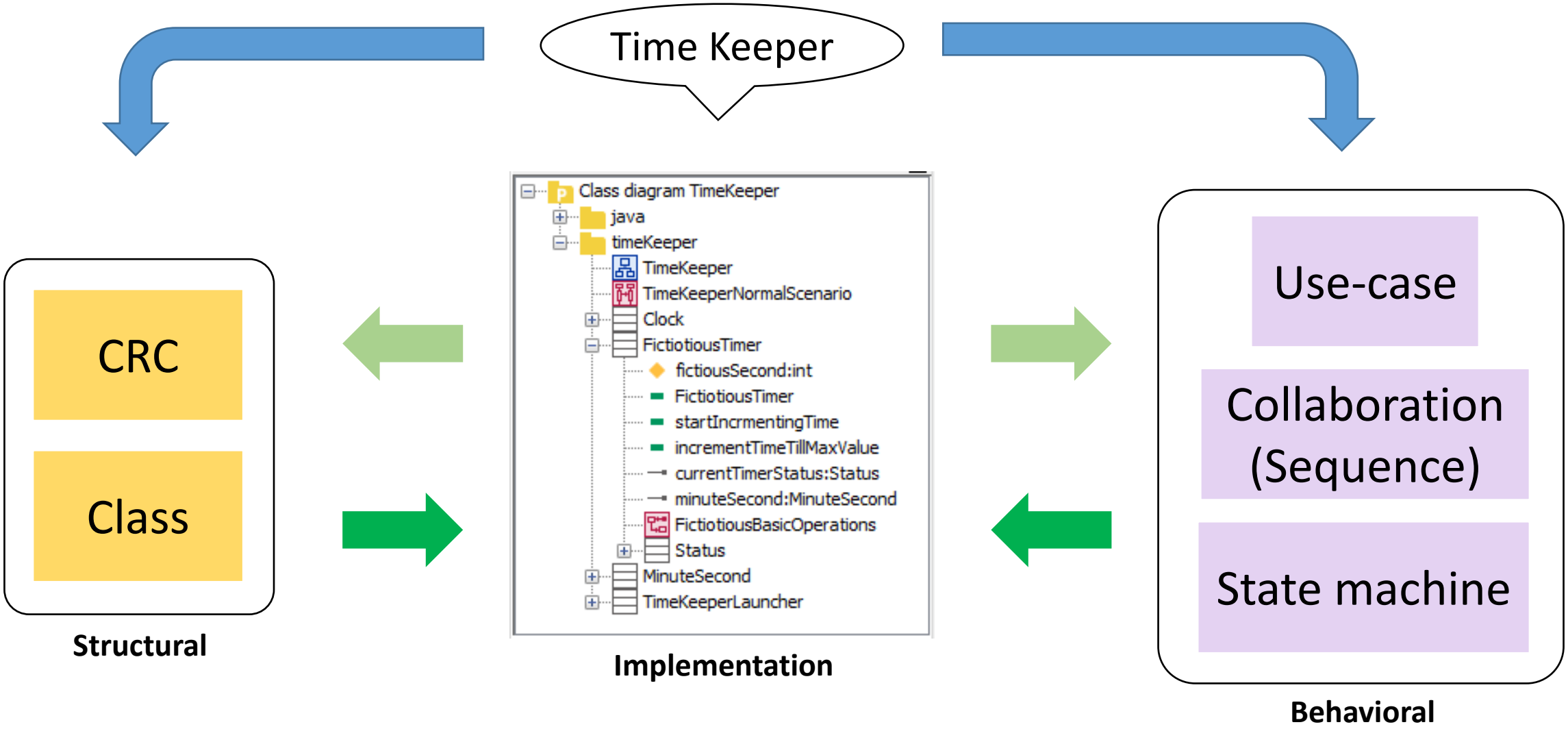
Design Patterns

- Chapter 1: ***Concepts and Techniques + Singleton Pattern***
- Chapter 2: ***Observer***
- Chapter 3: ***Façade***

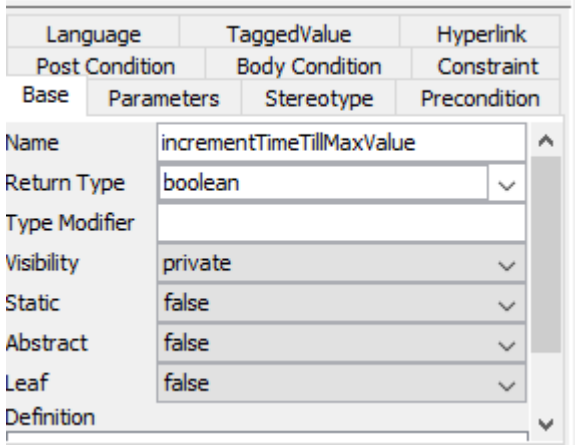
Software Architecture

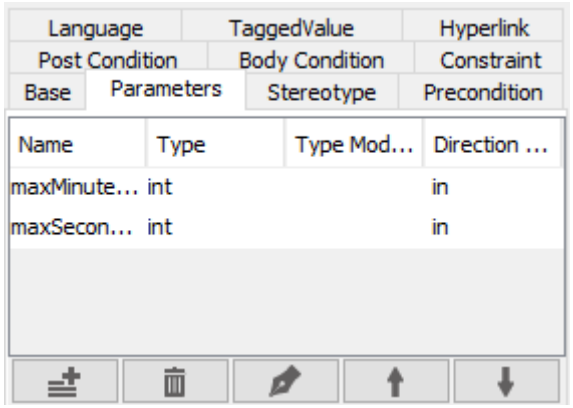
- Chapter 1: ***Architecture Business Cycle***
- Chapter 2: ***Concepts and Artifacts***
- Chapter 3: ***Artifacts and Quality Attributes***

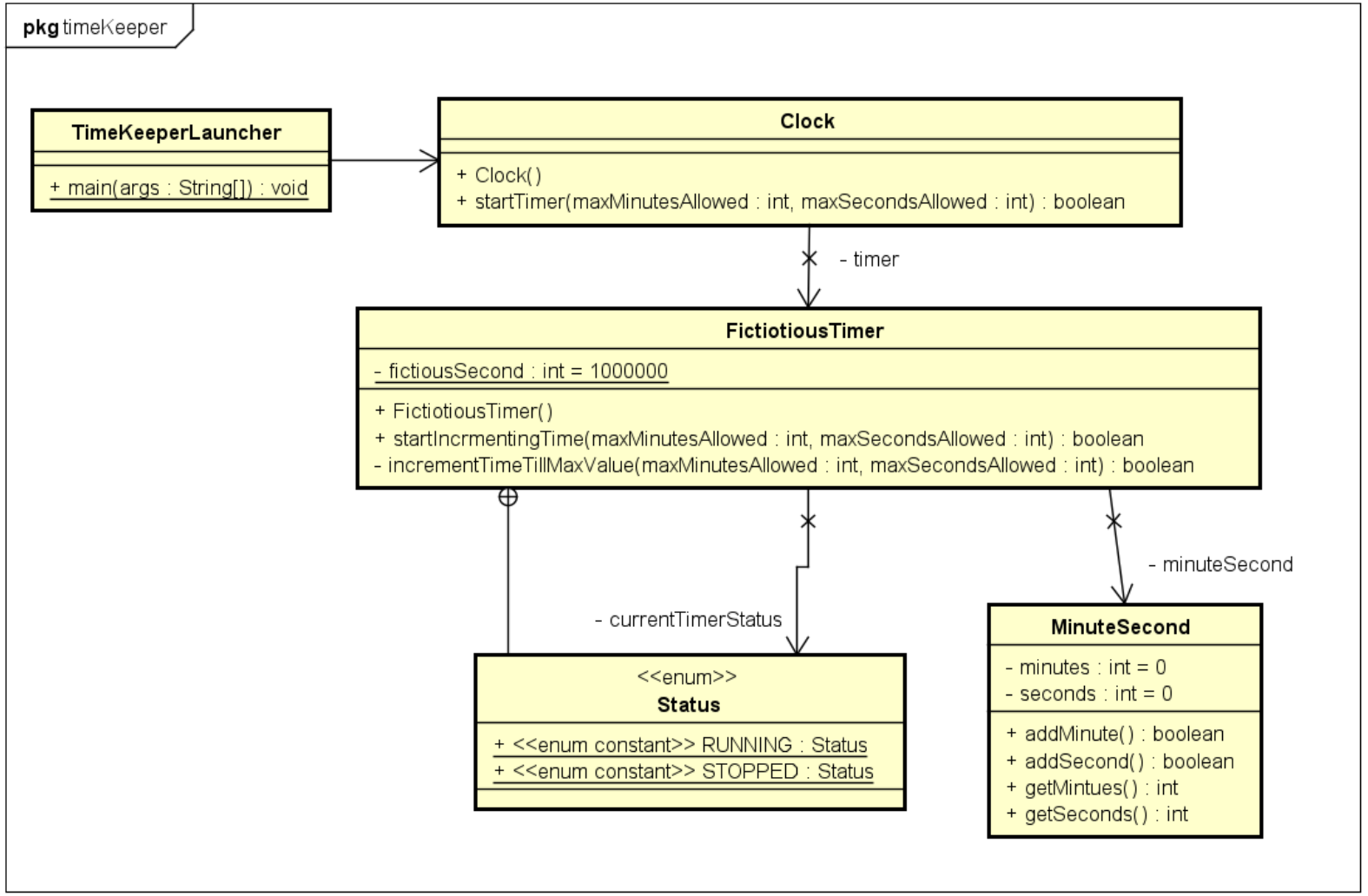
Analysis & Design Specifications → Implementation



Fictitious Timer Specification







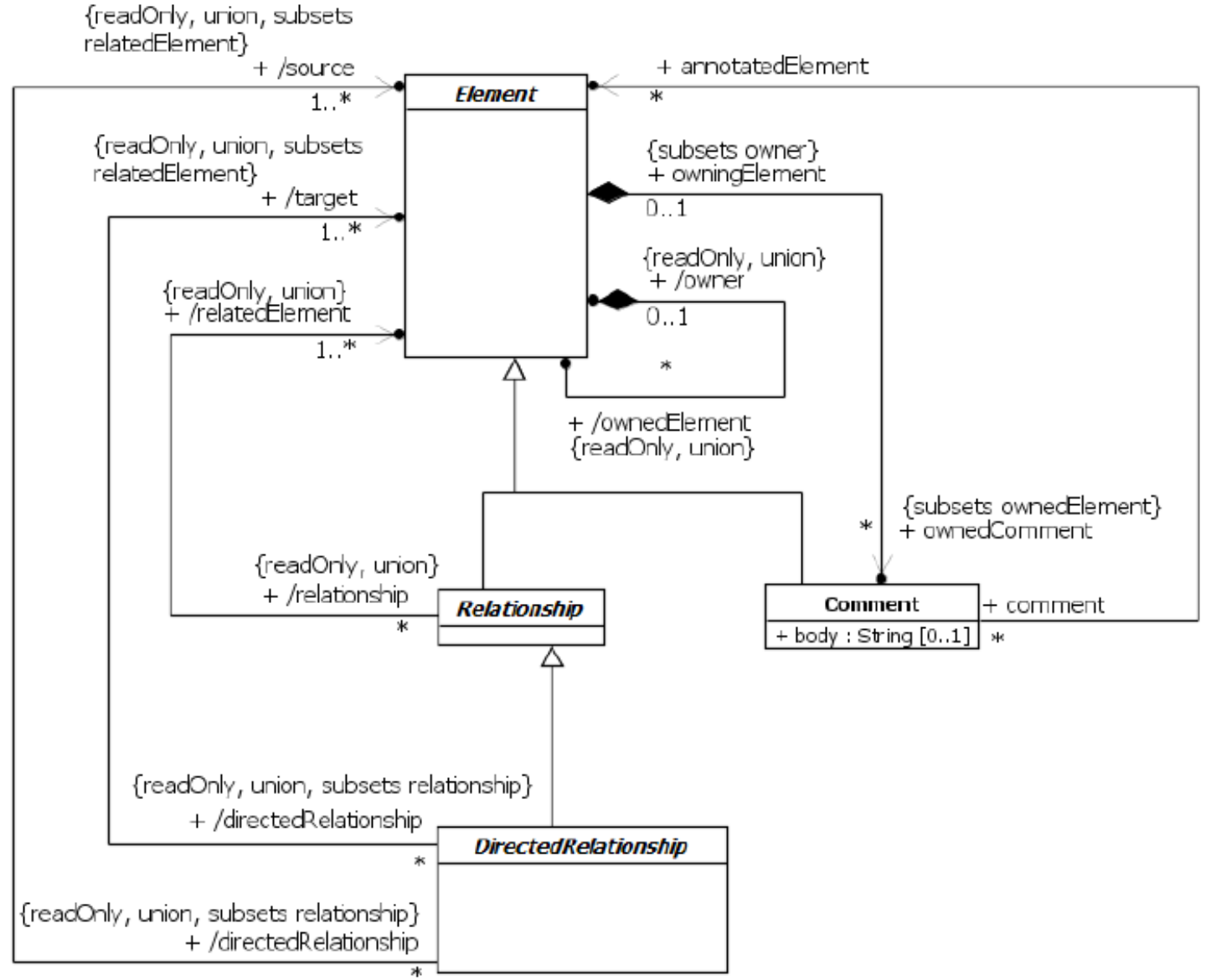


Figure 7.1 Root

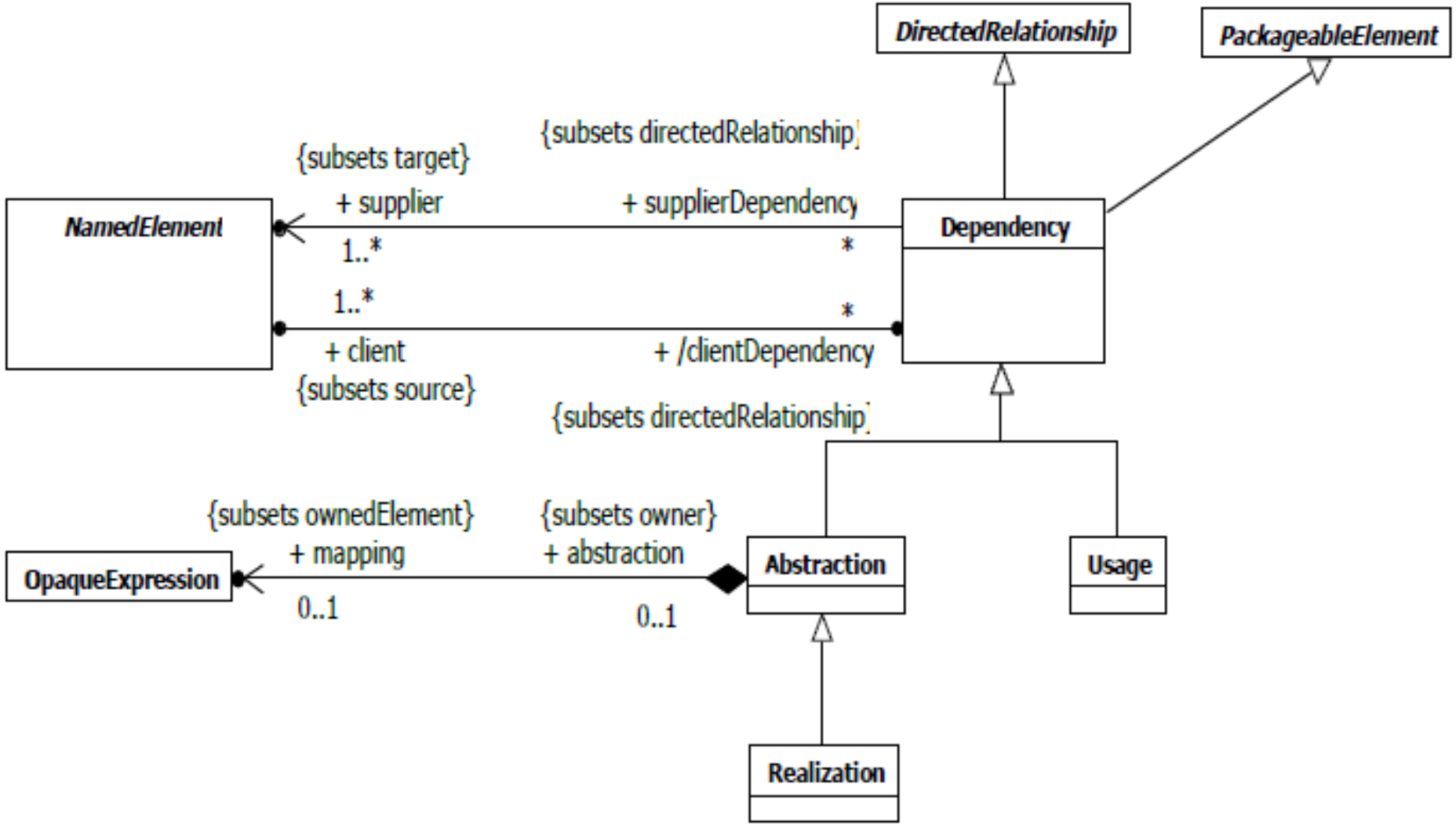


Figure 7.17 Abstract syntax of dependencies

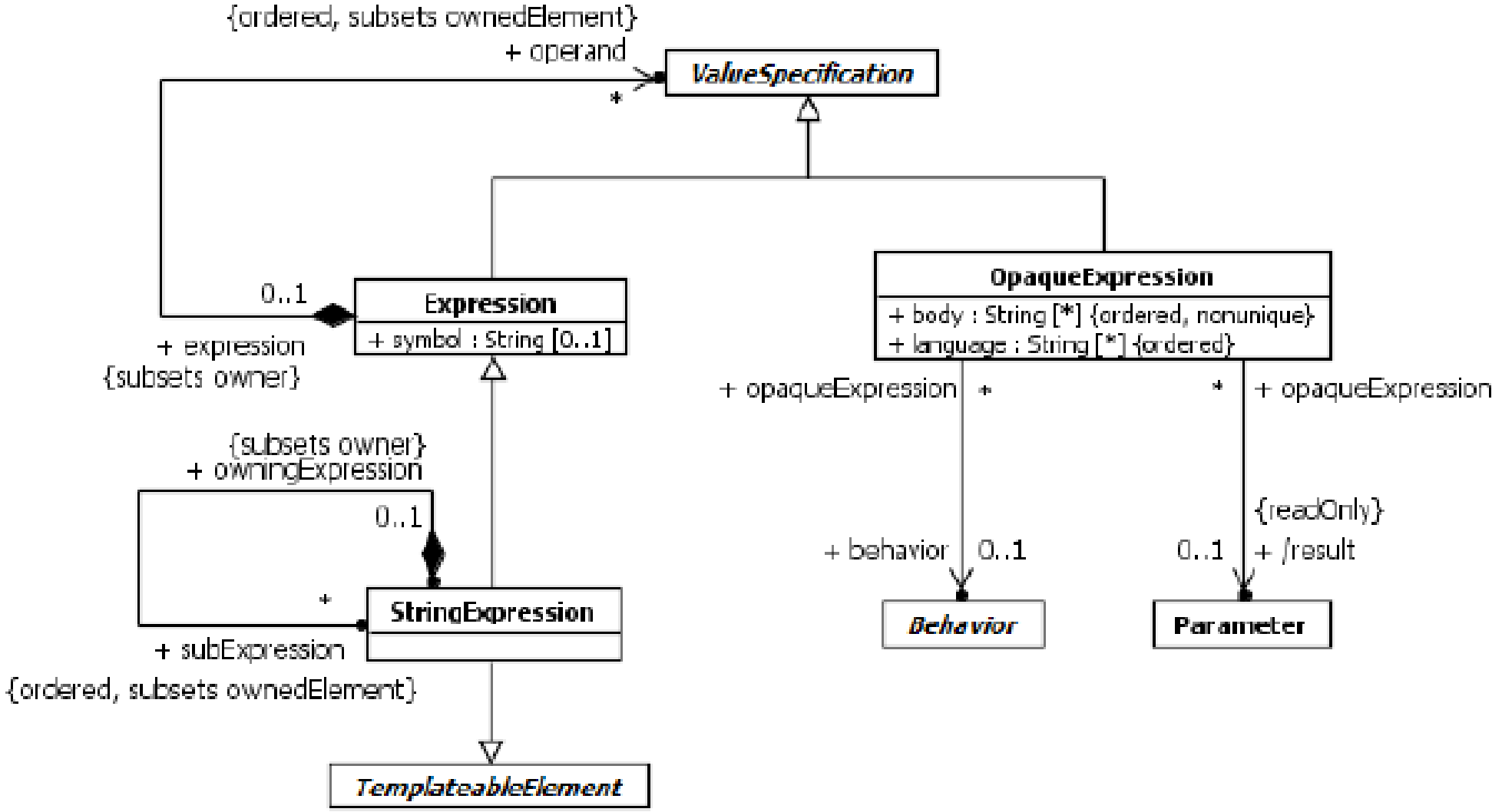


Figure 8.2 Expressions

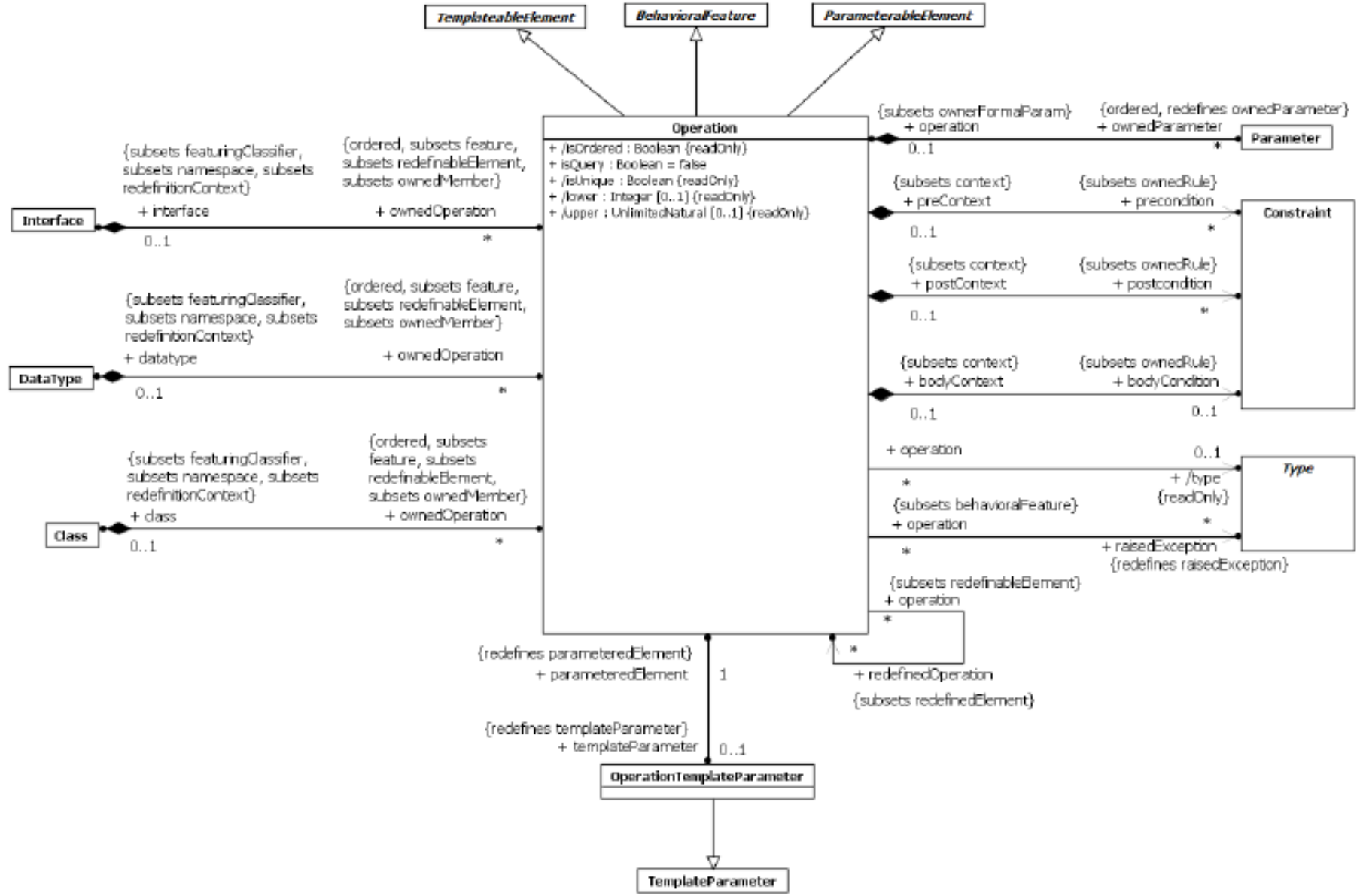


Figure 9.13 Operations

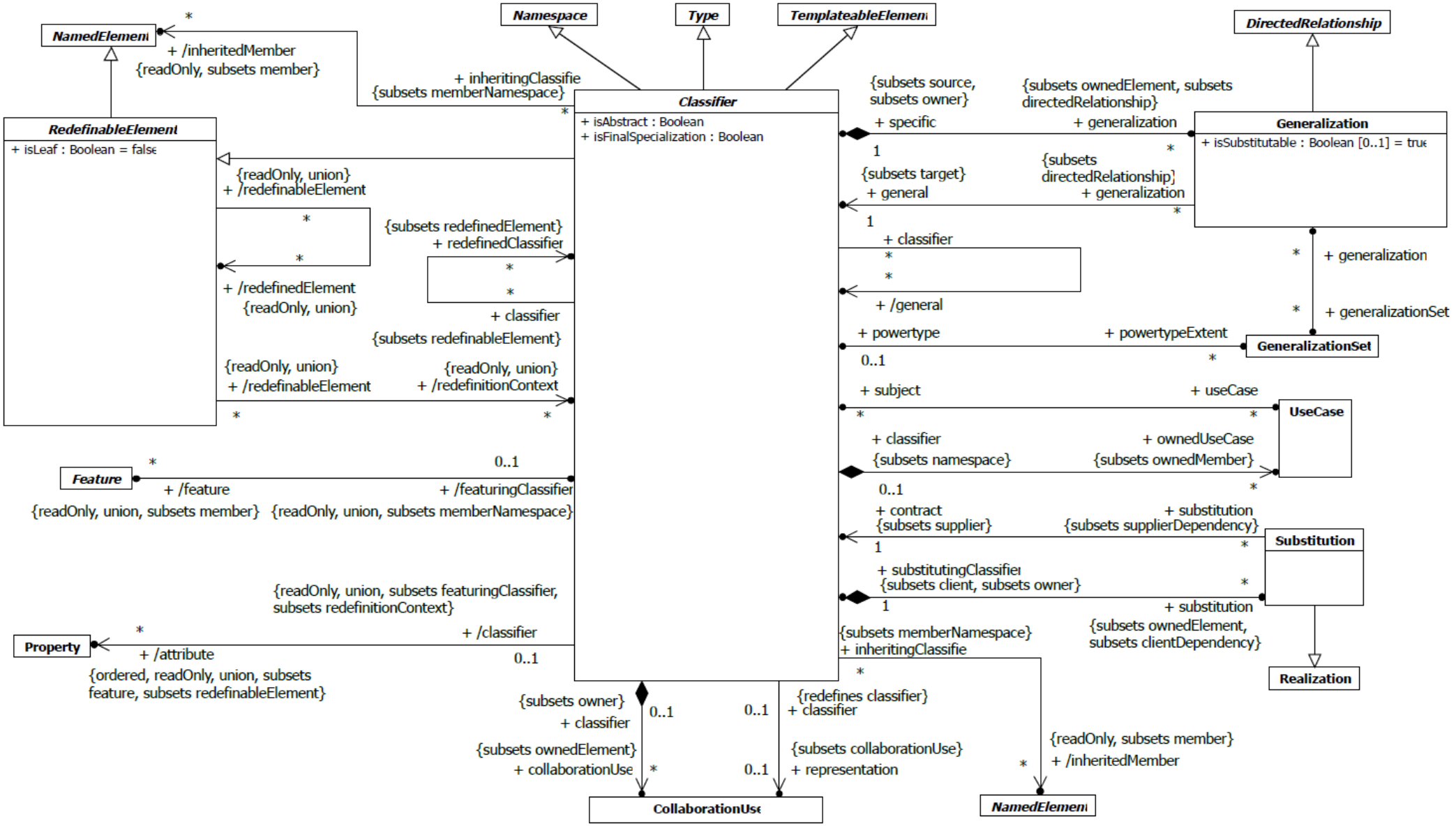


Figure 9.1 Classifiers

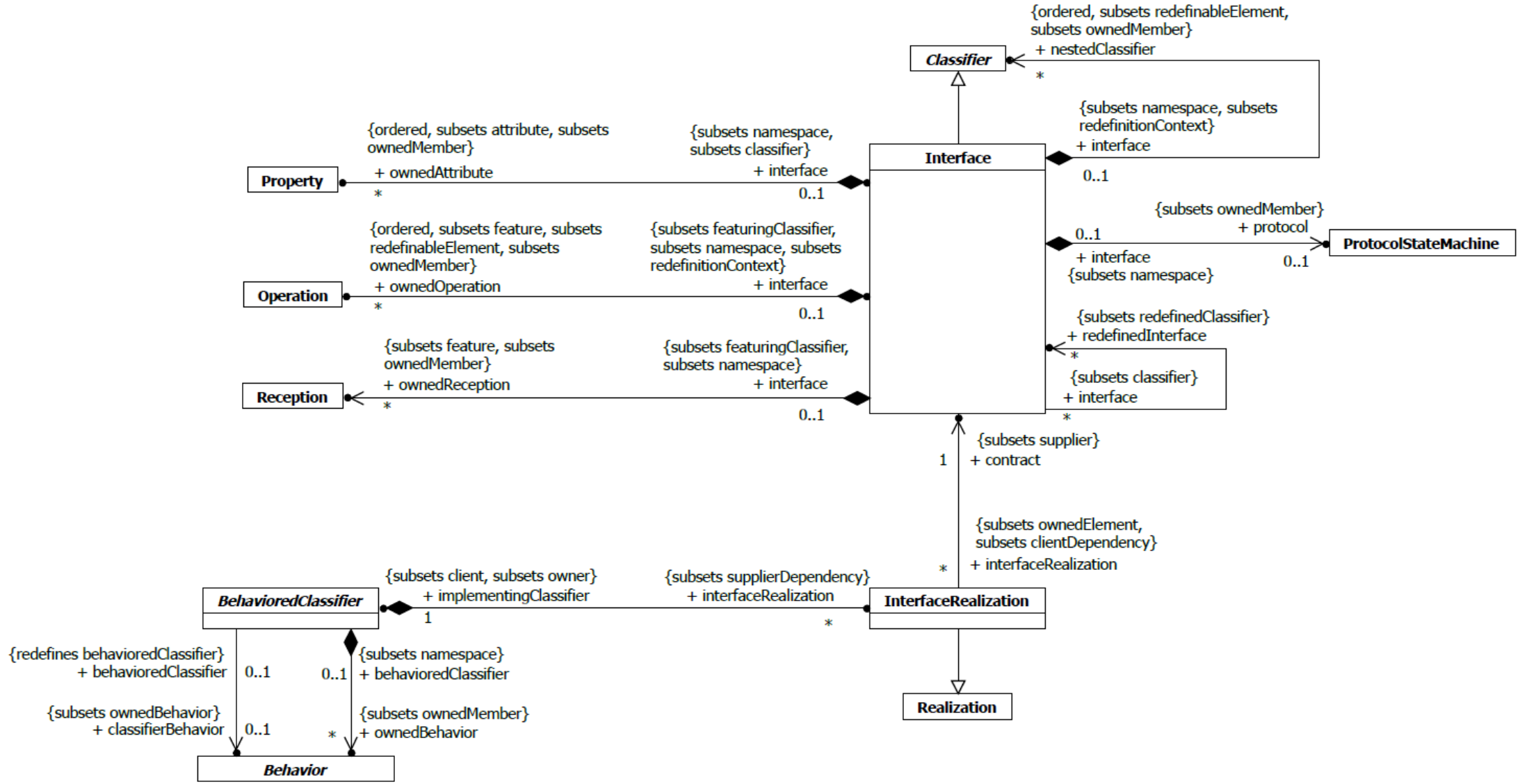


Figure 10.7 Interfaces

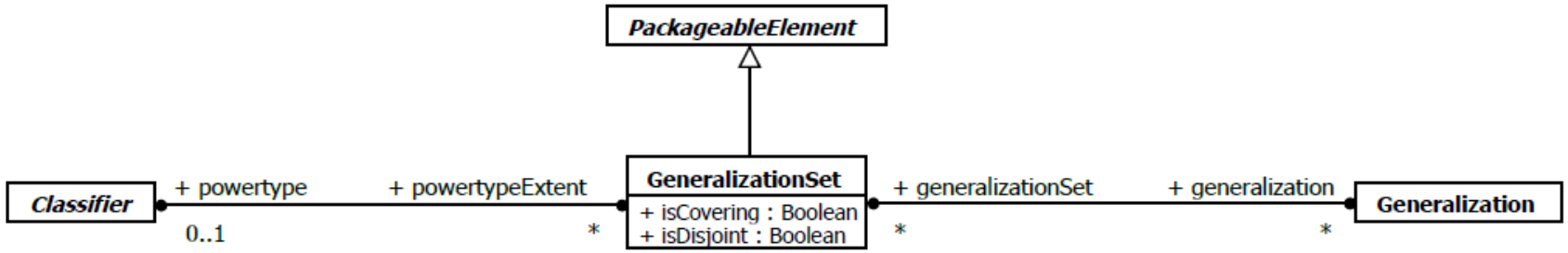


Figure 9.14 Generalization Sets

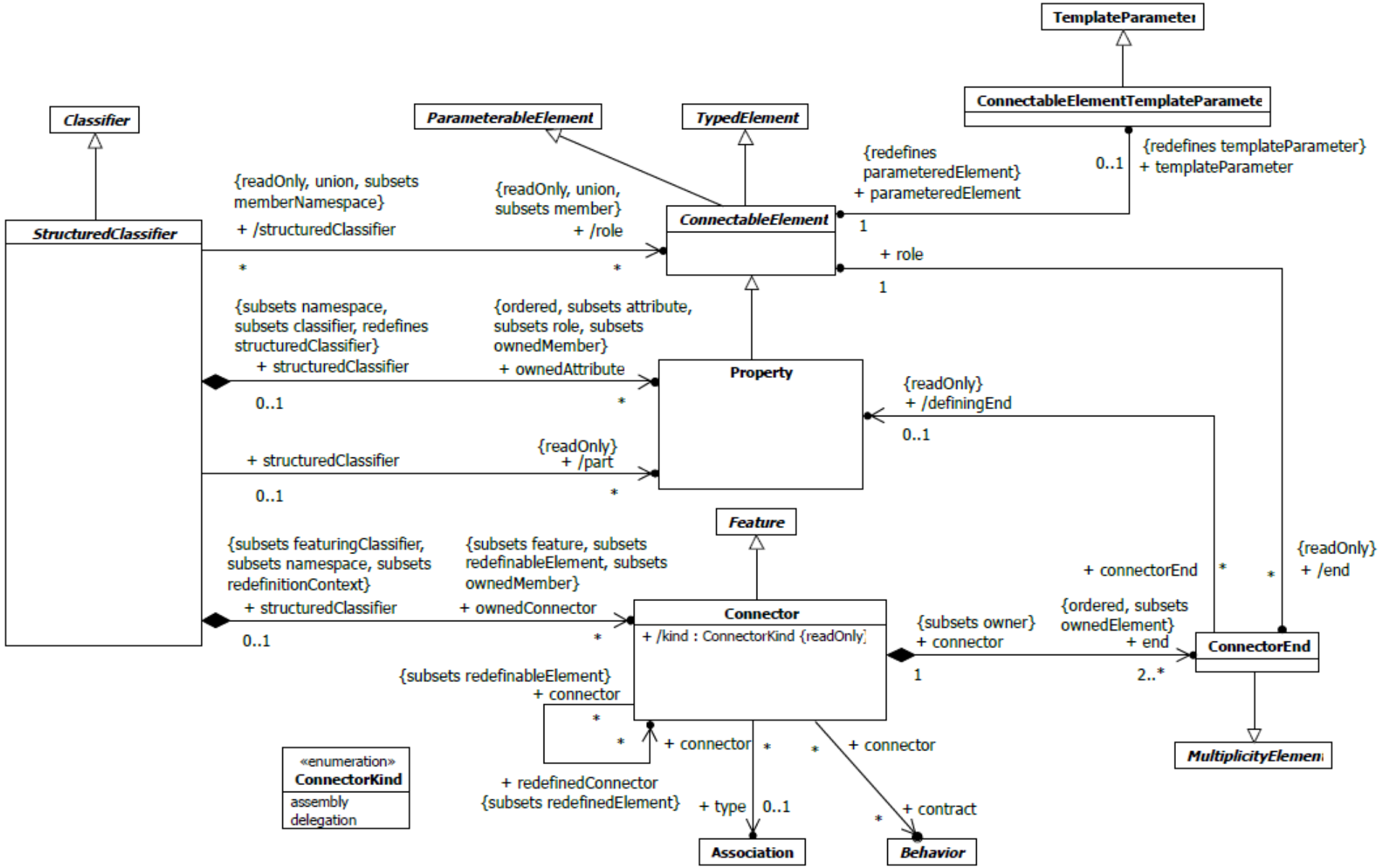
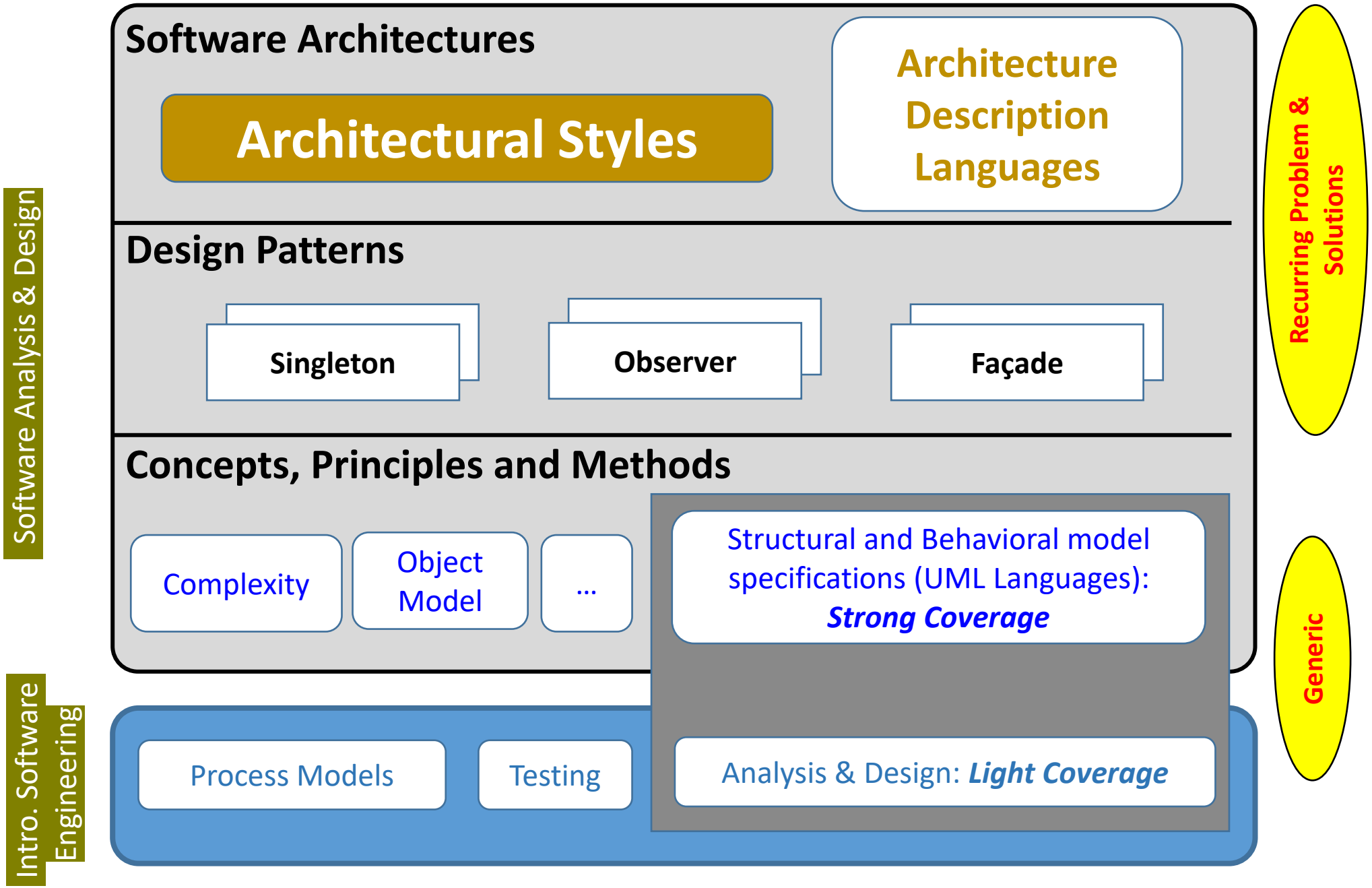


Figure 11.1 Structured Classifiers

Course Activities

	Assigned	Due	First batch	Grades Released	Trends Documents released	Reviews
Hw 1	08/26/22	09/04/22	09/06/22	09/11/22	09/11/22	09/12/22
Hw 2	09/06/22	09/14/22	09/16/22	09/20/22	09/20/22	09/21/22
Exam 1 Review	Sept. 26, Slides + Zoom Recording					
Exam 1	09/28/22	09/28/22	10/01/22	10/05/22	10/05/22	10/05/22
Hw 3	10/05/22	10/15/22	10/17/22	10/23/22	10/23/22	10/26/22
Hw 4	10/16/22	10/28/22	10/29/22	11/02/22	11/02/22	11/2/2022 11/4/2022
Exam 1 Review	Nov. 4, Slides + Zoom Recording					
Exam 2	11/02/22	11/07/22	11/09/22	11/13/22	11/13/22	11/14/22
Hw 5	11/09/22	11/19/22	11/22/22	11/27/22	11/27/22	11/28/2022
SW Anal/Des Project	11/04/22	11/28/22	12/02/22	12/06/22	12/06/22	
Final Exam Review	Dec. 2, Slides + Zoom Recording					
Final Exam	12/07/22	12/07/22	12/09/22	12/10/22	12/10/22	12/11/22
Final grades						12/12/22

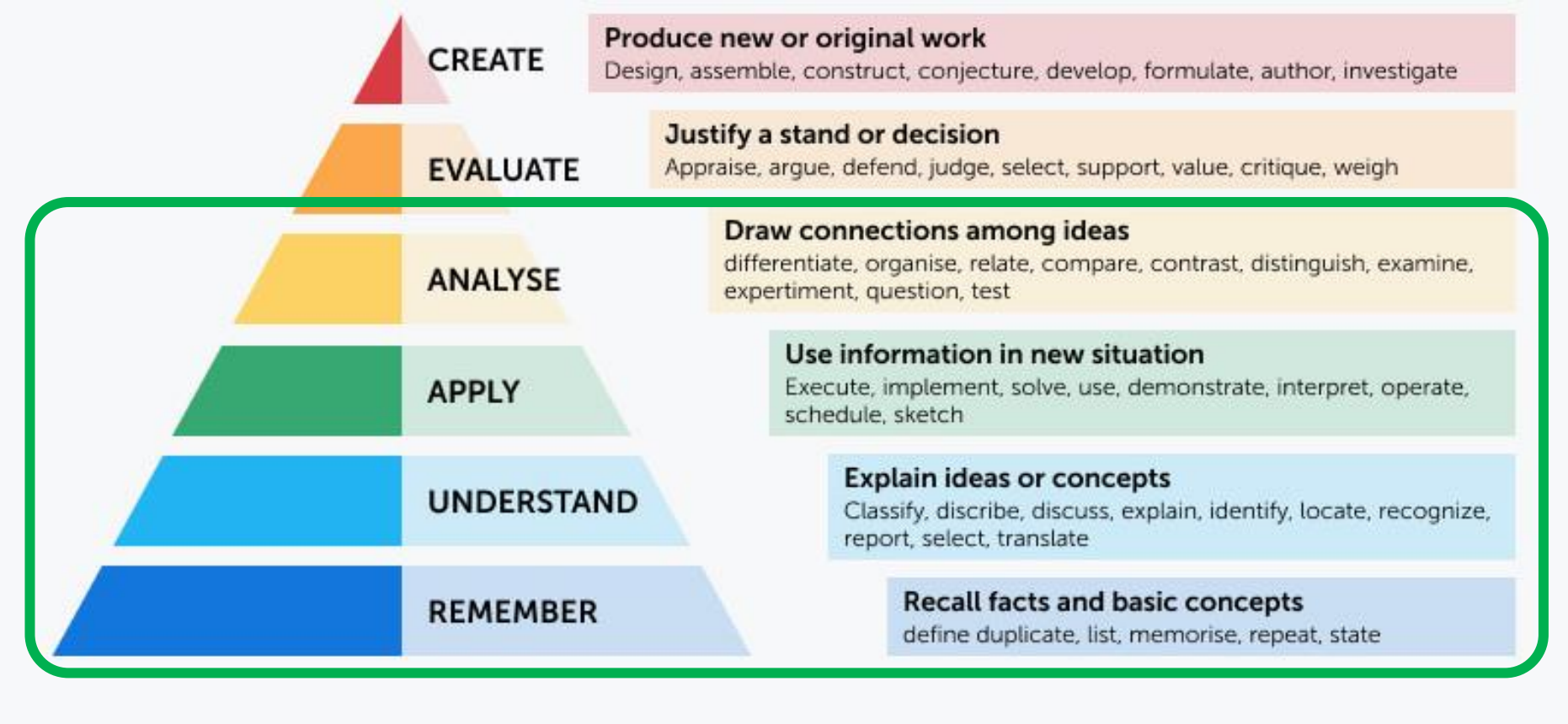

Software Architectures
Architectural Styles
Architecture Description Languages
Design Patterns
Singleton
Observer
Façade
Concepts, Principles and Methods
Complexity
Object Model
…
Structural and Behavioral model specifications (UML Languages): Strong Coverage
Process Models
Testing
Analysis & Design: Light Coverage
Software Analysis & Design
Intro. Software Engineering
Recurring Problem & Solutions
Generic

Challenges in Software Analysis & Design

- Software development increasingly depends on using and developing models – …, *statecharts, design patterns, software architecture*
- Having multiple perspectives and applying complementary concepts/methods/frameworks toward developing models is *computer scientist and software engineer most distinguishing skills*
- Models provide a basis for developing frameworks, tools, and code – *essential to science of computing*

… creating the next generation of high-quality software …

Bloom's Taxonomy Thinking Skills



Source is available here.

Final exam

- The exam questions focus on the **Understand**, **Apply**, and **Analyze** skills in Bloom's taxonomy. This taxonomy was described in class. It is available in the "Course Objectives" slides.
- Exam questions can be of different types (e.g., true/false, multiple choice, fill-in-the-blanks, short answers, and problem-solving).
- Format and other information are provided in CSE 460 Final-F22 Coverpage.pdf (Canvas)