中山大学软件工程学院

SCHOOL OF SOFTWARE ENGINEERING

第7讲 软件设计文档(SDD)

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- IEEE SDD 标准
- 一份 SDD 模板简介

实验内容

- **撰写软件设计文档(SDD)**
  - 1. 整理设计建模的结果
  - 2. 撰写SDD

IEEE SDD 标准

IEEE Std 1016™-2009

- The required information content and organization for software design descriptions (SDDs) are described. An SDD is a representation of a software design to be used for communicating design information to its stakeholders.

IEEE Standard for Information Technology—Systems Design—Software Design Descriptions

IEEE Computer Society

Sponsored by the
Software & Systems Engineering Standards Committee

IEEE
3 Park Avenue
New York, NY 10016-5997, USA

20 July 2009

IEEE Std 1016™-2009
(Revision of
IEEE Std 1016-1998)

IEEE SDD 标准

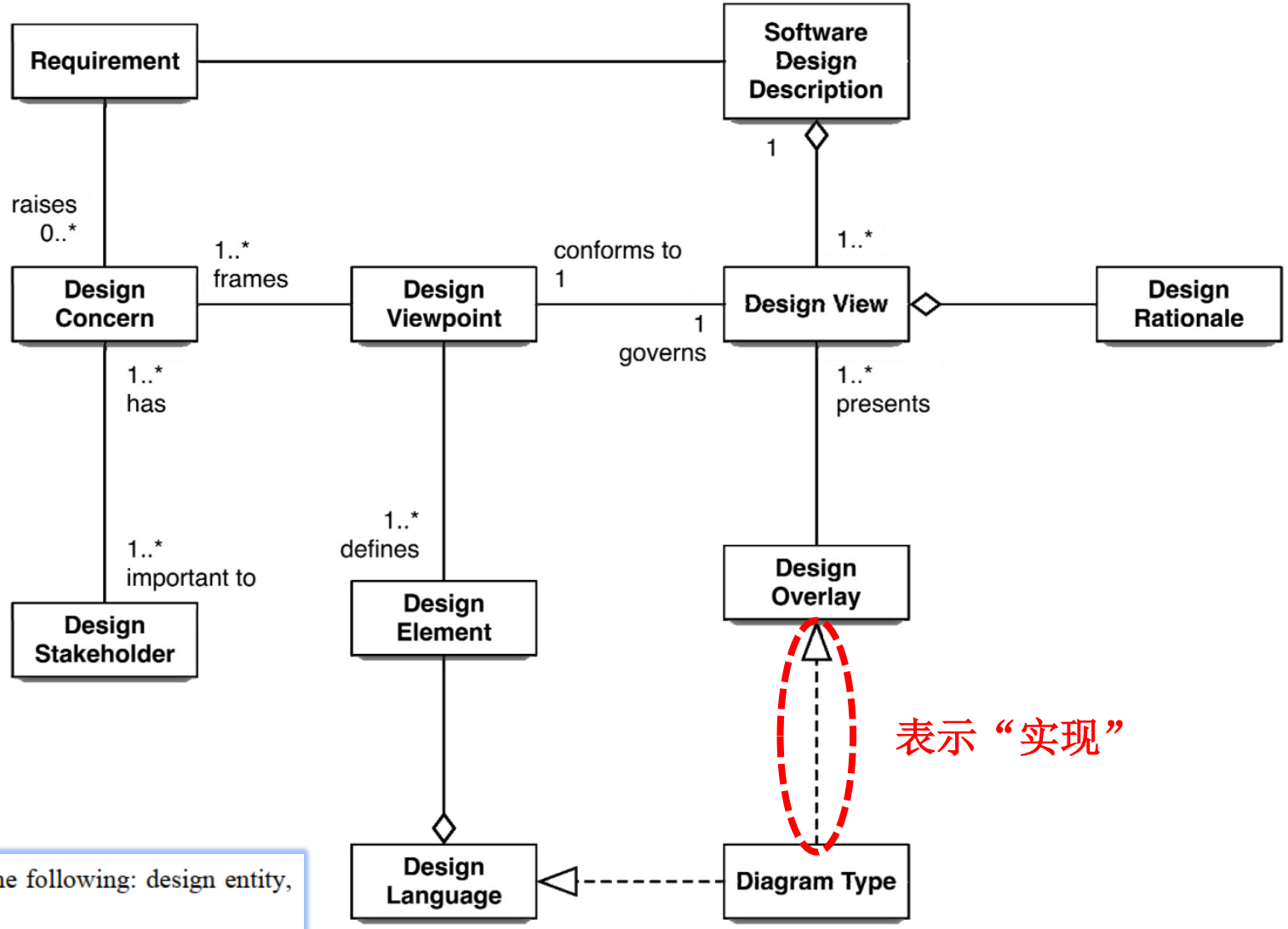
- An SDD is organized using design views. Each design view is governed by a **design viewpoint**. Each design viewpoint focuses on a set of **design concerns** and introduces a set of descriptive resources called **design elements** that are used to construct and interpret the design view.

Example:

A viewpoint can introduce familiar design elements such as functions, input, and outputs; these elements are used to construct a functional view.

IEEE SDD 标准

- The key concepts of SDD



UML v2.5.1

⇢▷	UMLEdge (Realization)	7.7.4, B.2.3 Fig 7.21, 10.11

3.2 design concern: An area of interest with respect to a software design.

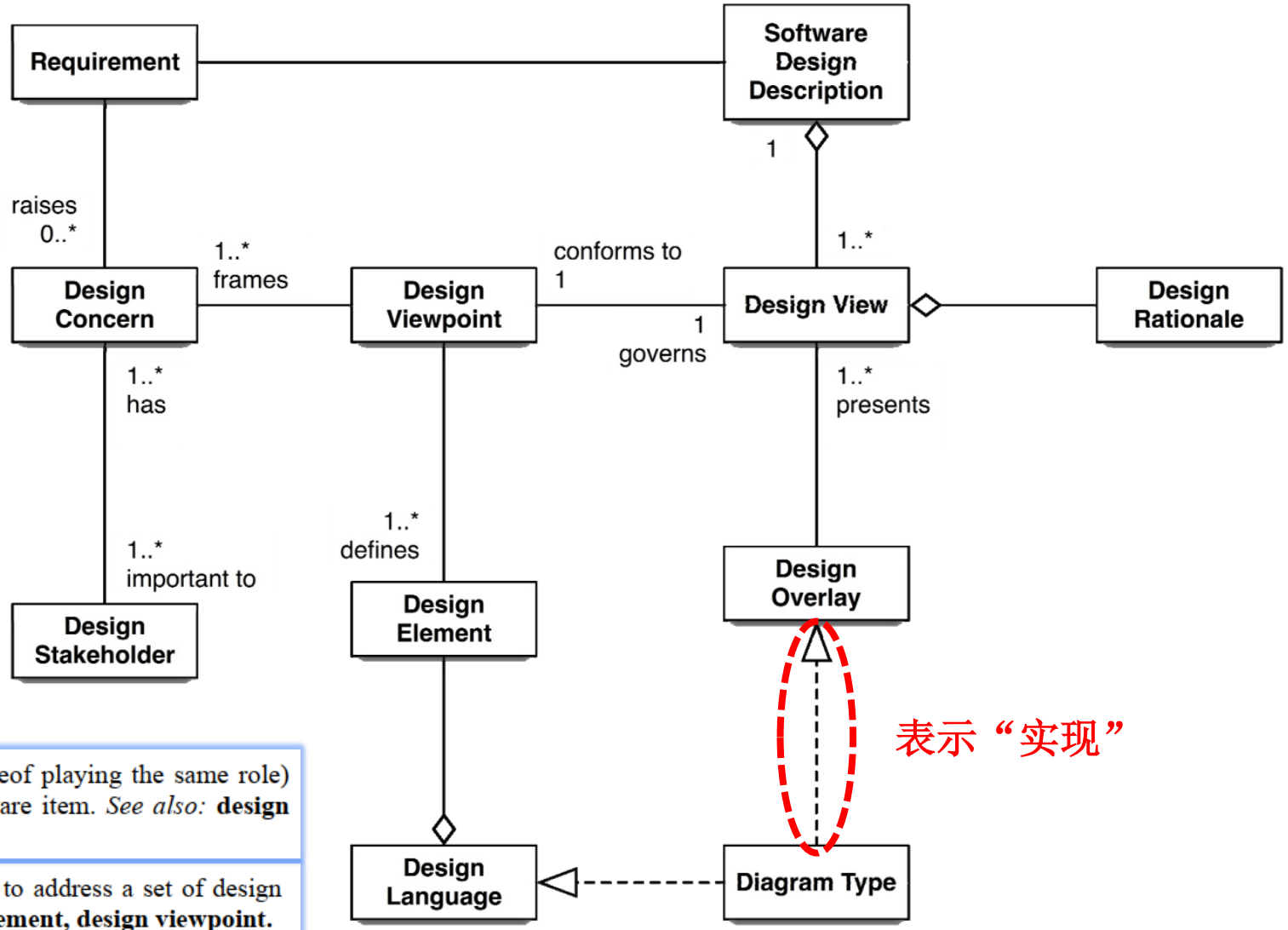
3.4 design element: An item occurring in a design view that may be any of the following: design entity, design relationship, design attribute, or design constraint.

3.6 design overlay: A representation of additional, detailed, or derived design information organized with reference to an existing design view.

3.7 design rationale: Information capturing the reasoning of the designer that led to the system as designed, including design options, trade-offs considered, decisions made, and the justifications of those decisions.

IEEE SDD 标准

- The key concepts of SDD



UML v2.5.1

⇢▷	UMLEdge (Realization)	7.7.4, B.2.3 Fig 7.21, 10.11

3.9 design stakeholder: An individual, organization, or group (or classes thereof playing the same role) having an interest in, or design concerns relative to, the design of some software item. *See also:* **design concern**.

3.12 design view: A representation comprised of one or more design elements to address a set of design concerns from a specified design viewpoint. *See also:* **design concern, design element, design viewpoint.**

3.13 design viewpoint: The specification of the elements and conventions available for constructing and using a design view. *See also:* **design view**.

3.14 diagram (type): A logically coherent fragment of a design view, using selected graphical icons and conventions for visual representation from an associated design language, to be used for representing selected design elements of interest for a system under design from a single viewpoint *See also:* **design subject**.

IEEE SDD 标准

右侧表中的设计视点(design viewpoints)涵盖了COMET的用例、分析和设计阶段的内容。

1. IEEE SRS和SDD只是一种**参考标准**，未考虑所有需求分析和设计建模方法的流程，且更新较慢(SDD是09年的最新版本)；
2. 按照IEEE SRS和SDD的描述，SRS一般包含文字性的需求描述，而SDD包含用例、分析和设计的全部内容，但**在实际使用中，不同的项目和组织可按需调整**。

→ **理解各个阶段/各个设计视点的用途和建模方法是关键！本课程采用COMET。**

Table 1—Summary of design viewpoints

Design viewpoint	Design concerns	Example design languages
Context (5.2)	Systems services and users	IDEF0, UML use case diagram, Structured Analysis context diagram
Composition (5.3) Can be refined into new viewpoints, such as: functional (logical) decomposition, and run-time (physical) decomposition.	Composition and modular assembly of systems in terms of subsystems and (pluggable) components, buy vs. build, reuse of components	Logical: UML package diagram, UML component diagram, Architecture Description Languages, IDEF0, Structure chart, HIPO Physical: UML deployment diagram
Logical (5.4)	Static structure (classes, interfaces, and their relationships) Reuse of types and implementations (classes, data types)	UML class diagram, UML object diagram
Dependency (5.5)	Interconnection, sharing, and parameterization	UML package diagram and component diagram
Information (5.6) with data distribution overlay and physical volumetric overlay	Persistent information	IDEF1X, entity-relation diagram, UML class diagram
Patterns (5.7)	Reuse of patterns and available Framework template	UML composite structure diagram
Interface (5.8)	Service definition, service access	Interface definition languages (IDL), UML component diagram
Structure (5.9)	Internal constituents and organization of design subjects, components and classes	UML structure diagram, class diagram
Interaction (5.10)	Object communication, messaging	UML sequence diagram, UML communication diagram
State dynamics (5.11)	Dynamic state transformation	UML state machine diagram, statechart (Harel's), state transition table (matrix), automata, Petri net
Algorithm (5.12)	Procedural logic	Decision table, Warnier diagram, JSP, PDL
Resources (5.13) May be refined into resource based viewpoints with possible overlays	Resource utilization	UML Real-time Profile, UML class diagram, UML Object Constraint Language (OCL)

IEEE SDD 标准

- The required contents of an SDD:
  - Identification of the SDD
  - Identified **design stakeholders**
  - Identified **design concerns**
  - **Selected design viewpoints**, each with type definitions of its allowed design elements and design languages
  - **Design views**
  - Design overlays
  - **Design rationale**

要放置哪些 Design viewpoints 、Design views是可以按需选择的

One possible way to organize and format an SDD

Frontspiece
- Date of issue and status
- Issuing organization
- Authorship
- Change history

Introduction
- Purpose
- Scope
- Context
- Summary

References

Glossary

Body
- Identified stakeholders and design concerns
- Design viewpoint 1
- Design view 1
- …
- Design viewpoint n
- Design view n
- Design rationale

一份 SDD 模板简介

简要介绍一份SDD模板:
以校园超速监控系统为例

SSE212课程实践: SDD

SSE212课程实践系统--
图书自助借还系统