

IT4490 - SOFTWARE DESIGN AND CONSTRUCTION

4. OVERVIEW OF ANALYSIS & DESIGN



Some slides extracted from IBM coursewares

1

Objectives: Analysis and Design Overview

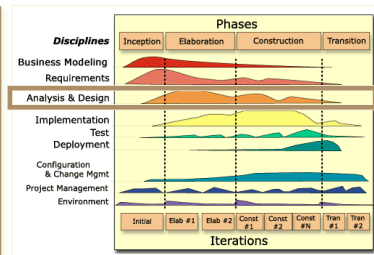
- Review the key Analysis and Design terms and concepts
- Introduce the Analysis and Design process, including roles, artifacts and workflow
- Explain the difference between Analysis and Design

2

Analysis and Design in Context

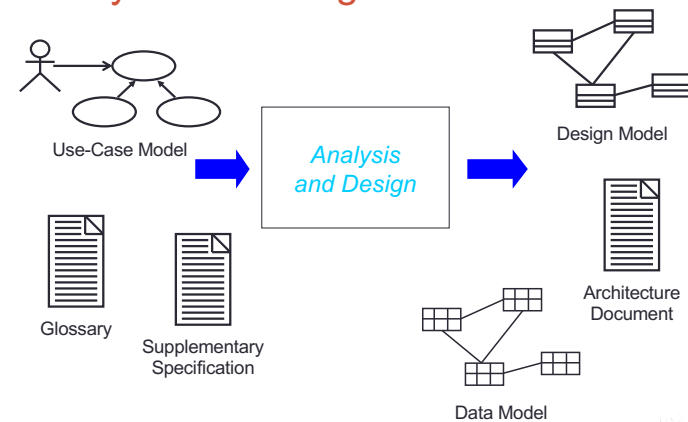
The purposes of Analysis and Design are to:

- Transform the requirements into a design of the system-to-be.
- Evolve a robust architecture for the system.
- Adapt the design to match the implementation environment, designing it for performance.



3

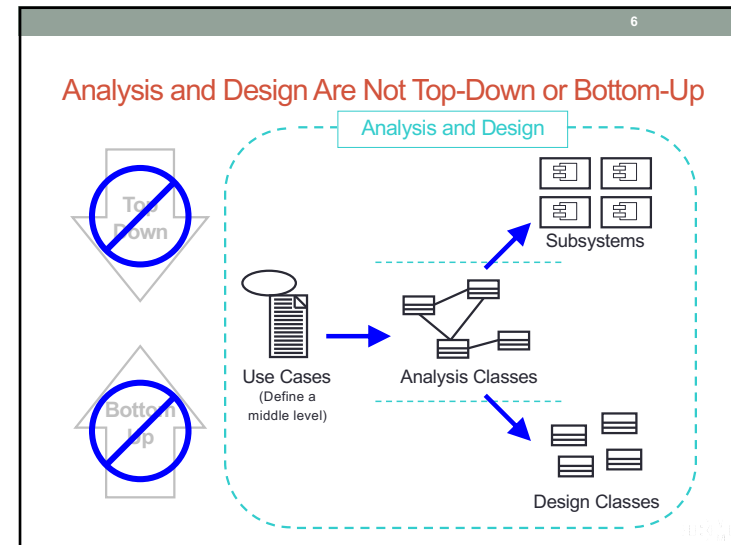
Analysis and Design Overview



4

Analysis Versus Design	
Analysis	Design
<ul style="list-style-type: none"> Focus on understanding the problem Idealized design Behavior System structure Functional requirements A small model 	<ul style="list-style-type: none"> Focus on understanding the solution Operations and attributes Performance Close to real code Object lifecycles Nonfunctional requirements A large model

5



6

What Is Software Architecture?

- Software architecture encompasses a set of significant decisions about the organization of a software.
 - Selection of the structural elements and their interfaces by which a software is composed
 - Behavior as specified in collaborations among those elements
 - Composition of these structural and behavioral elements into larger subsystems
 - Architectural style that guides this organization

Grady Booch, Philippe Kruchten, Rich Reitman, Kurt Bittner; Rational (derived from Mary Shaw)

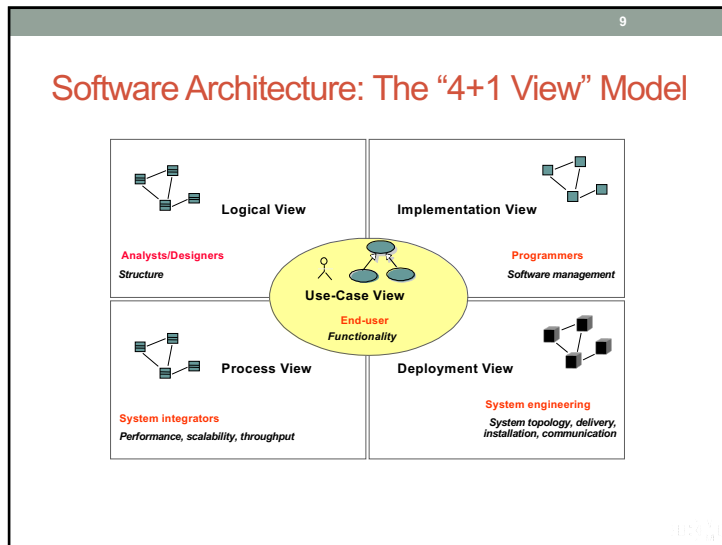
7

Architecture Constrains Design and Implementation

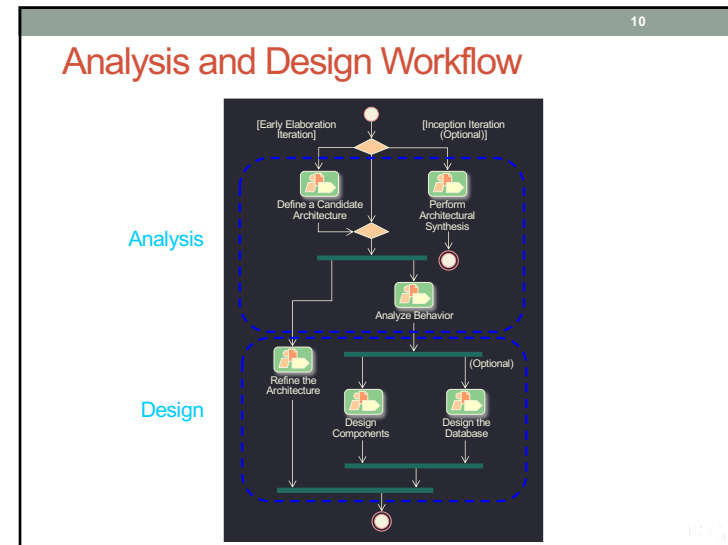
- Architecture involves a set of strategic design decisions, rules or patterns that constrain design and construction.

Architecture decisions are the most fundamental decisions, and changing them will have significant effects.

8



9



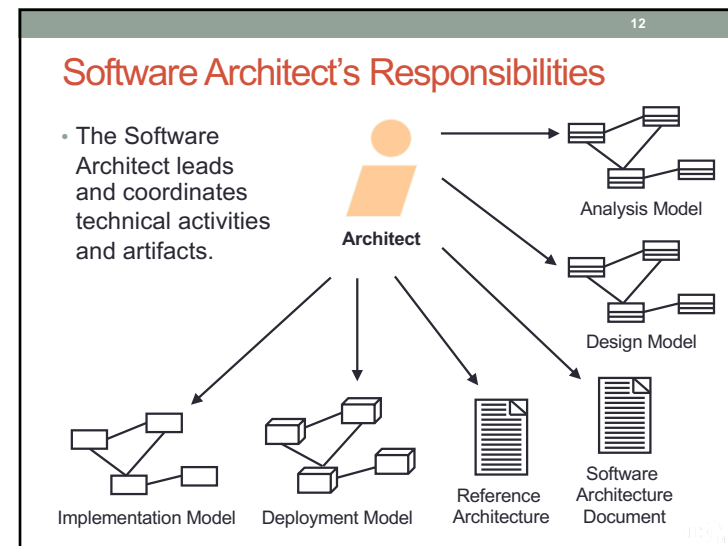
10

11

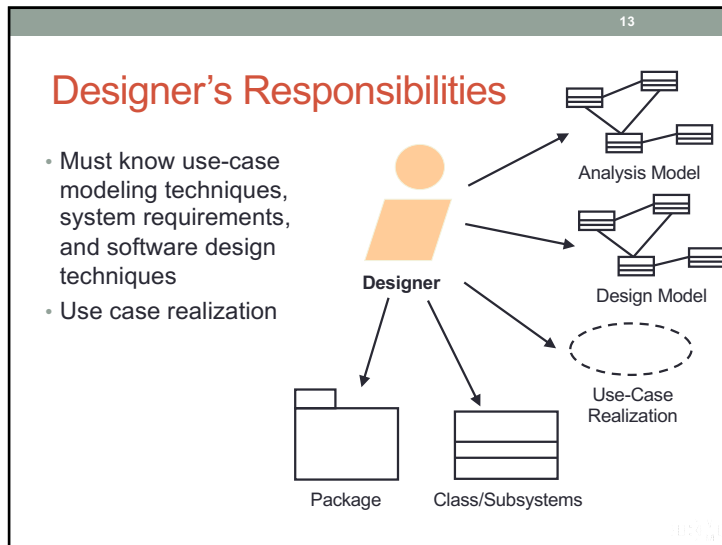
Analysis and Design Steps

Activity	Step	Description	Doer
Define a candidate architecture	1. Architectural Analysis	• Once at early Elaboration • Skip if architectural risk is low	Architect
Analyze behavior	2. Use case Analysis	• Per Use case	Designer
Refine the architecture	3. Identify Design Elements	• Coupling and cohesion • Reusability	Architect
	4. Identify Design Mechanisms	• Design patterns	
	5. Describe Run-time Architecture	• Skip if not multi-threading • Process View	
Design components	6. Describe Distribution	• Physical Architecture	Designer
	7. Use case Design	• Per Use case	
	8. Subsystem Design		
Design DB	9. Class Design		Designer
	10. Database Design		

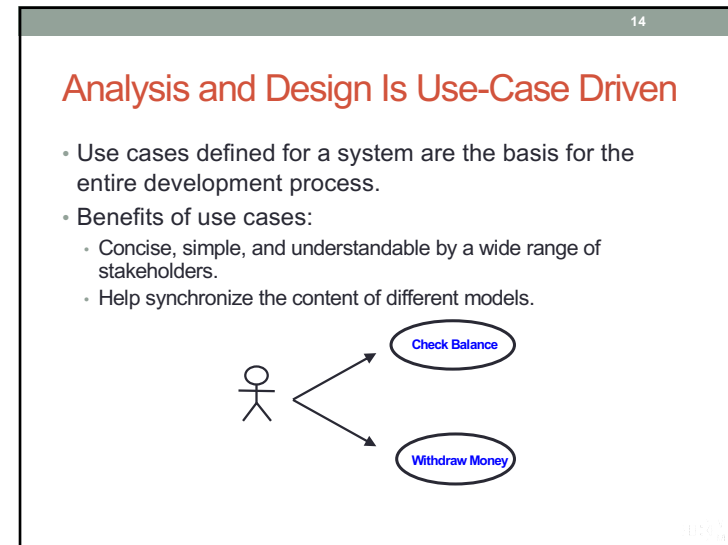
11



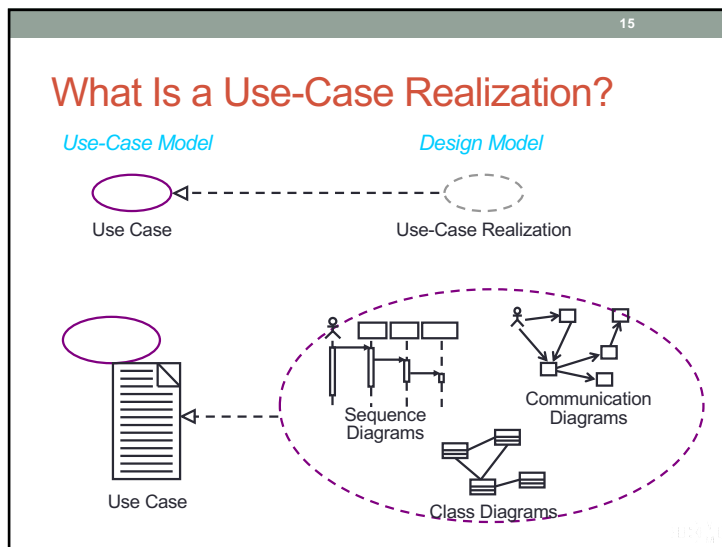
12



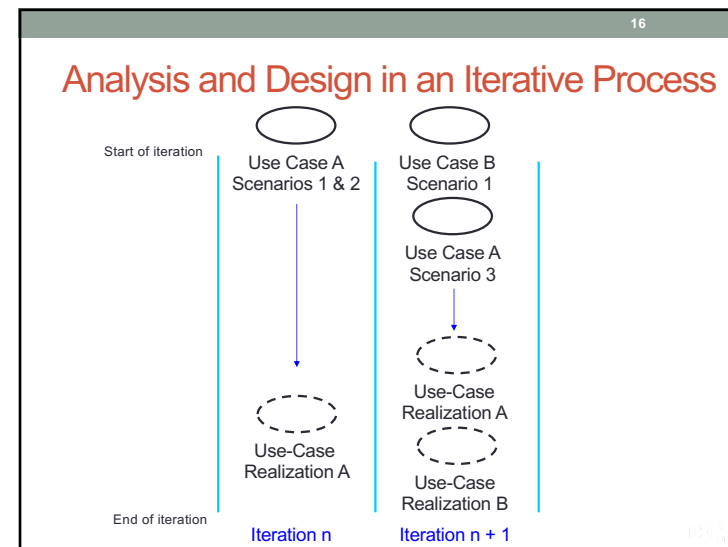
13



14



15



16

Review: Analysis and Design Overview

- What is the purpose of the Analysis and Design Discipline?
- What are the input and output artifacts?
- Name and briefly describe the 4+1 Views of Architecture.
- What is the difference between Analysis and Design?
- What is architecture?