IBM Software Group

Mastering Object-Oriented Analysis and Design with UML

Module 3: Analysis and Design Overview

Rational. software

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

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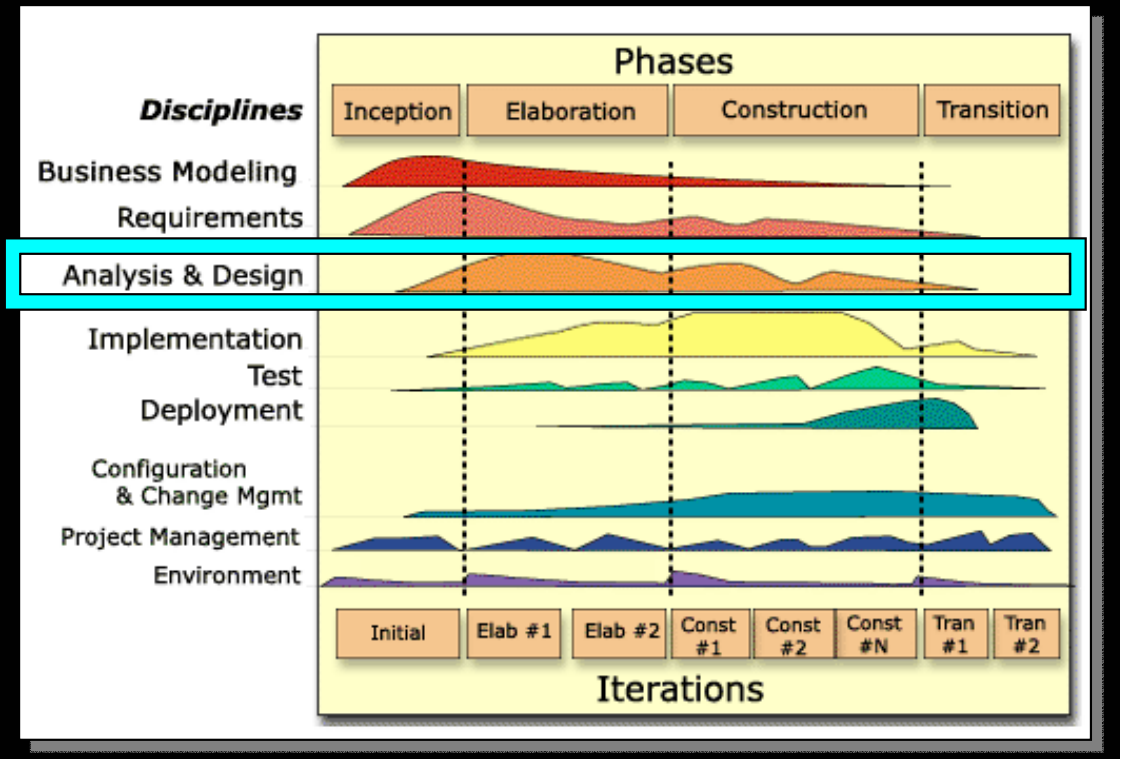
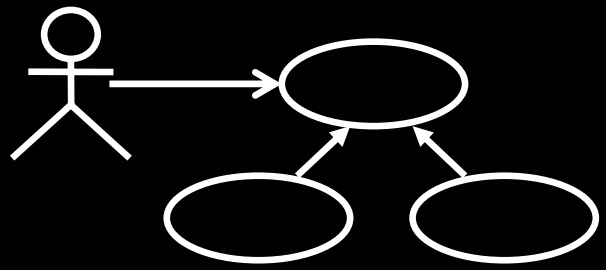
Analysis and Design in Context

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.**

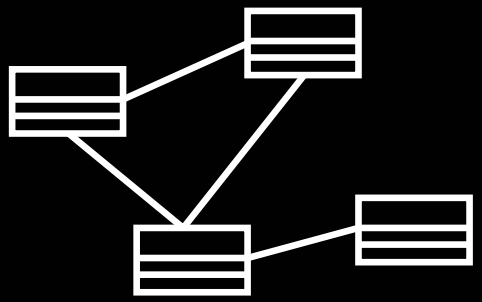


Analysis and Design Overview

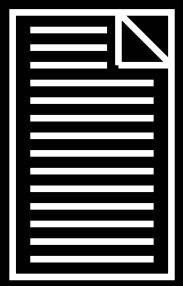


Use-Case Model

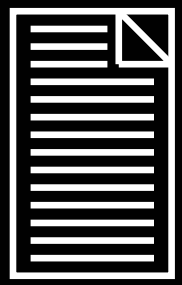
Analysis and Design



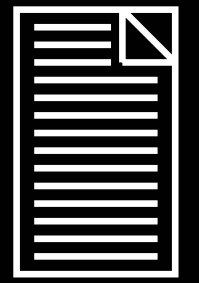
Design Model



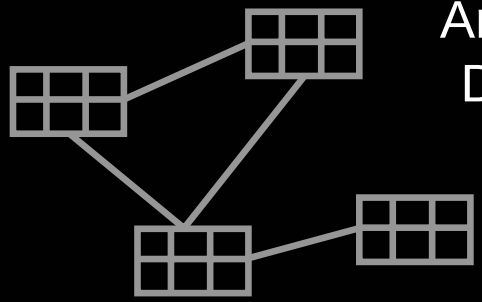
Glossary



Supplementary Specification



Architecture Document



Data Model

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Analysis & Design Overview Topics

- ★ Key Concepts
  - Analysis and Design Workflow

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Analysis Versus Design

- Analysis
  - Focus on understanding the problem
  - Idealized design
  - Behavior
  - System structure
  - Functional requirements
  - A small model
- Design
  - Focus on understanding the solution
  - Operations and attributes
  - Performance
  - Close to real code
  - Object lifecycles
  - Nonfunctional requirements
  - A large model

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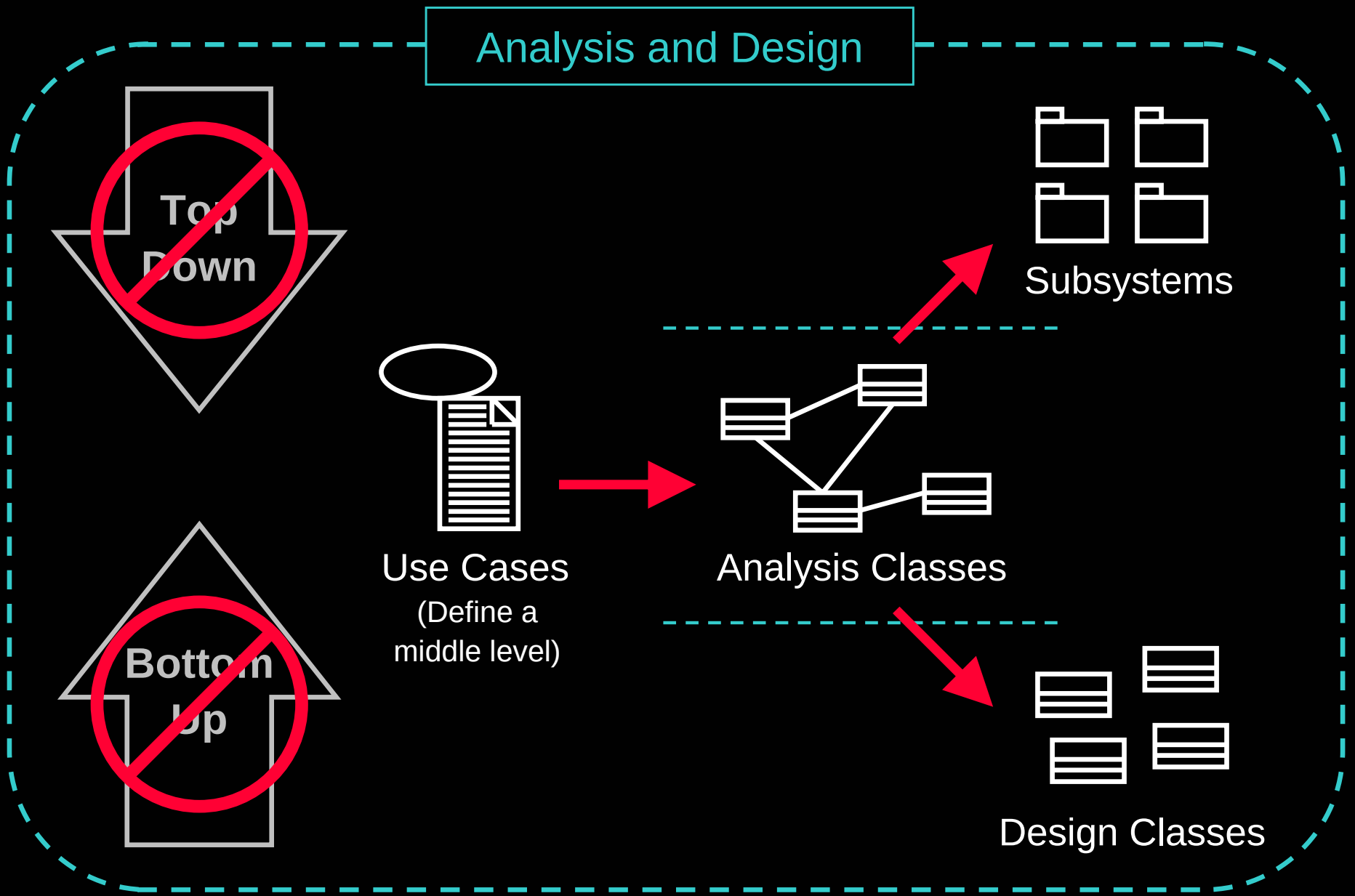
Analysis and Design Are Not Top-Down or Bottom-Up



What Is Architecture?

- Software architecture encompasses a set of significant decisions about the organization of a software system.
  - Selection of the structural elements and their interfaces by which a system 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)

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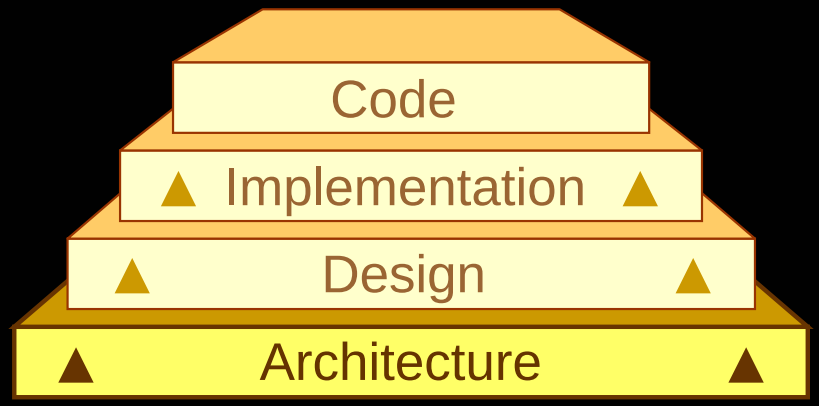
Architecture Constrains Design and Implementation

- 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.

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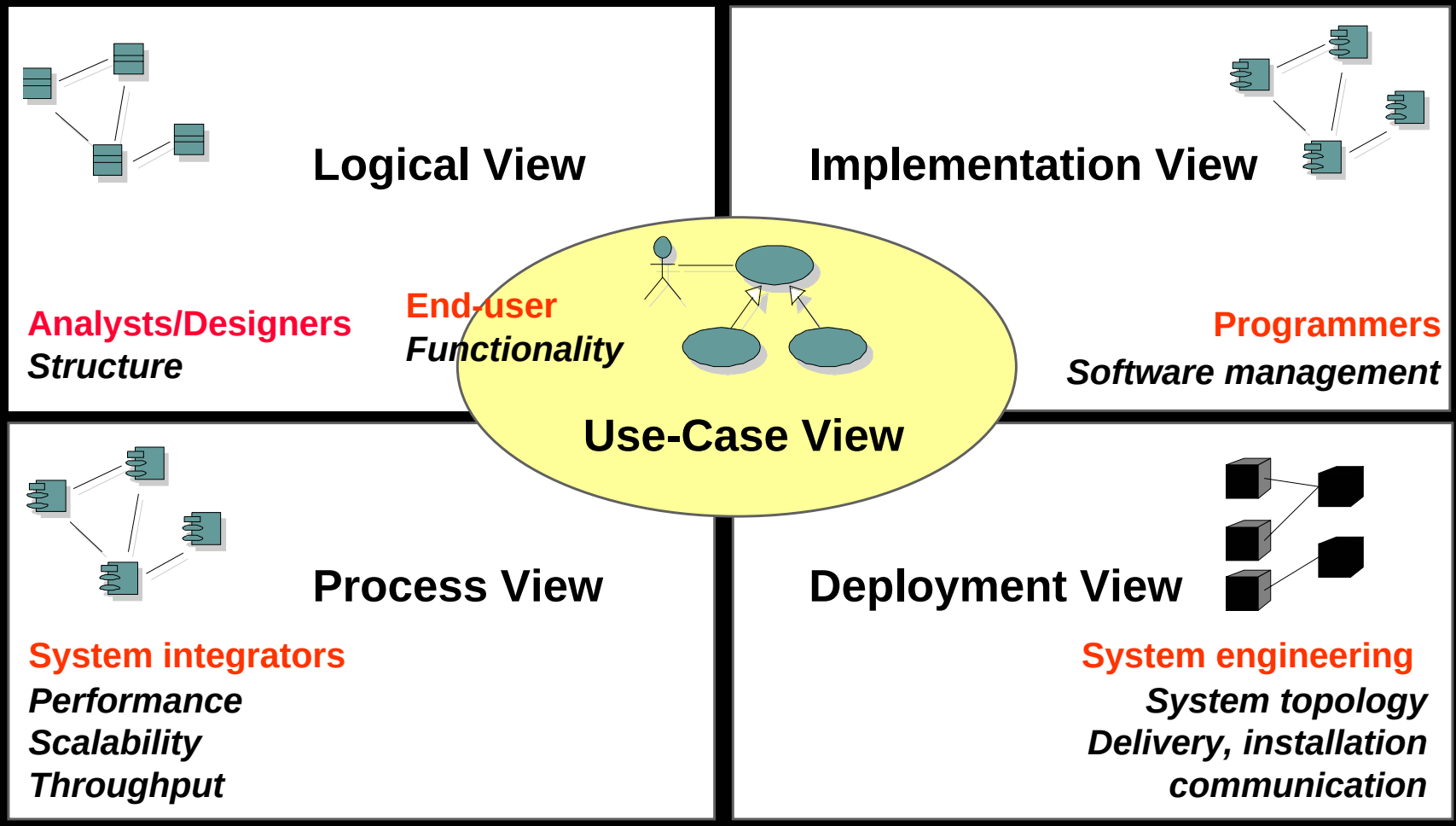
Software Architecture: The “4+1 View” Model



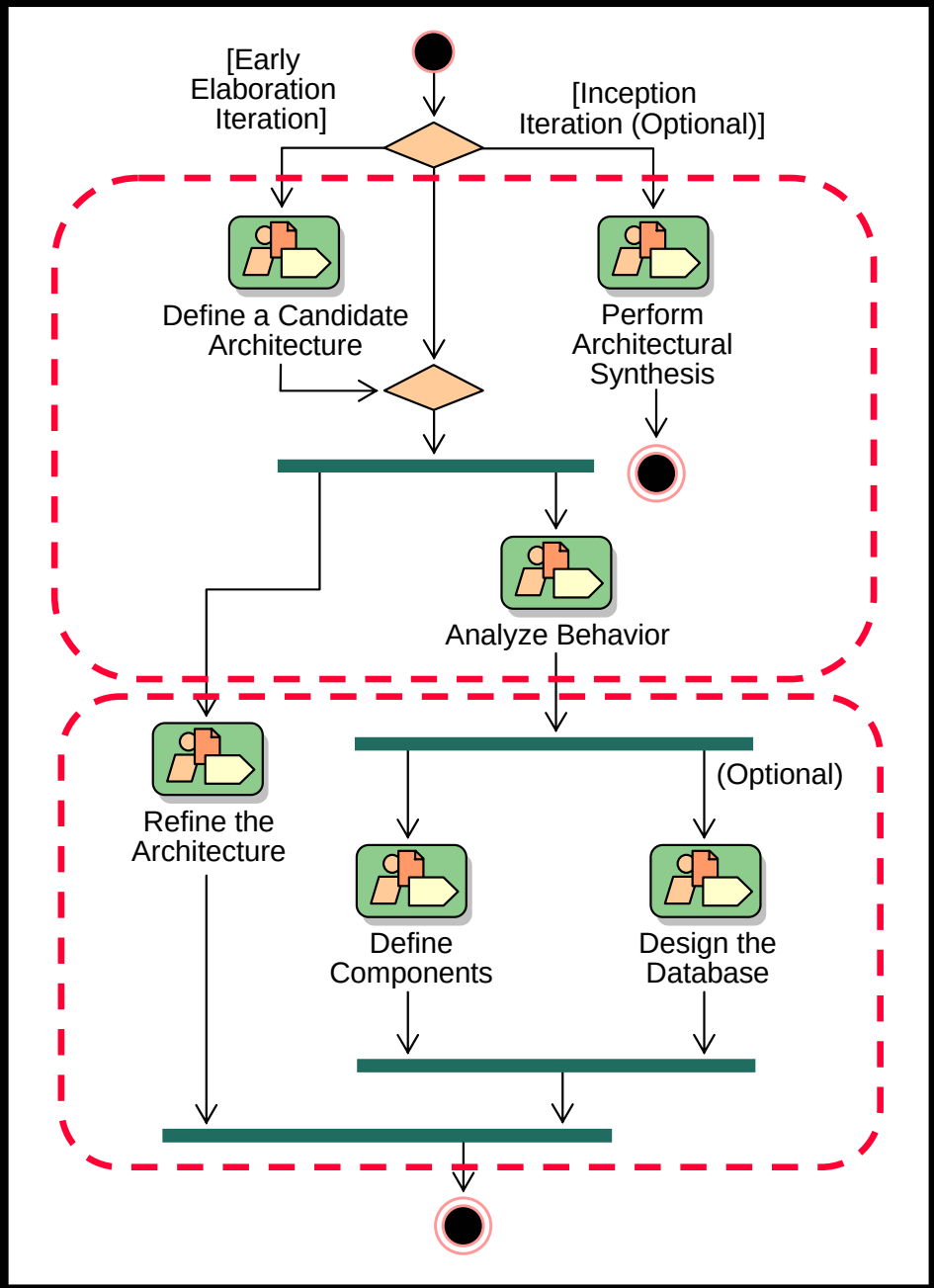
Analysis & Design Overview Topics

- Key Concepts
- ★ Analysis and Design Workflow

Analysis and Design Workflow

Analysis

Design



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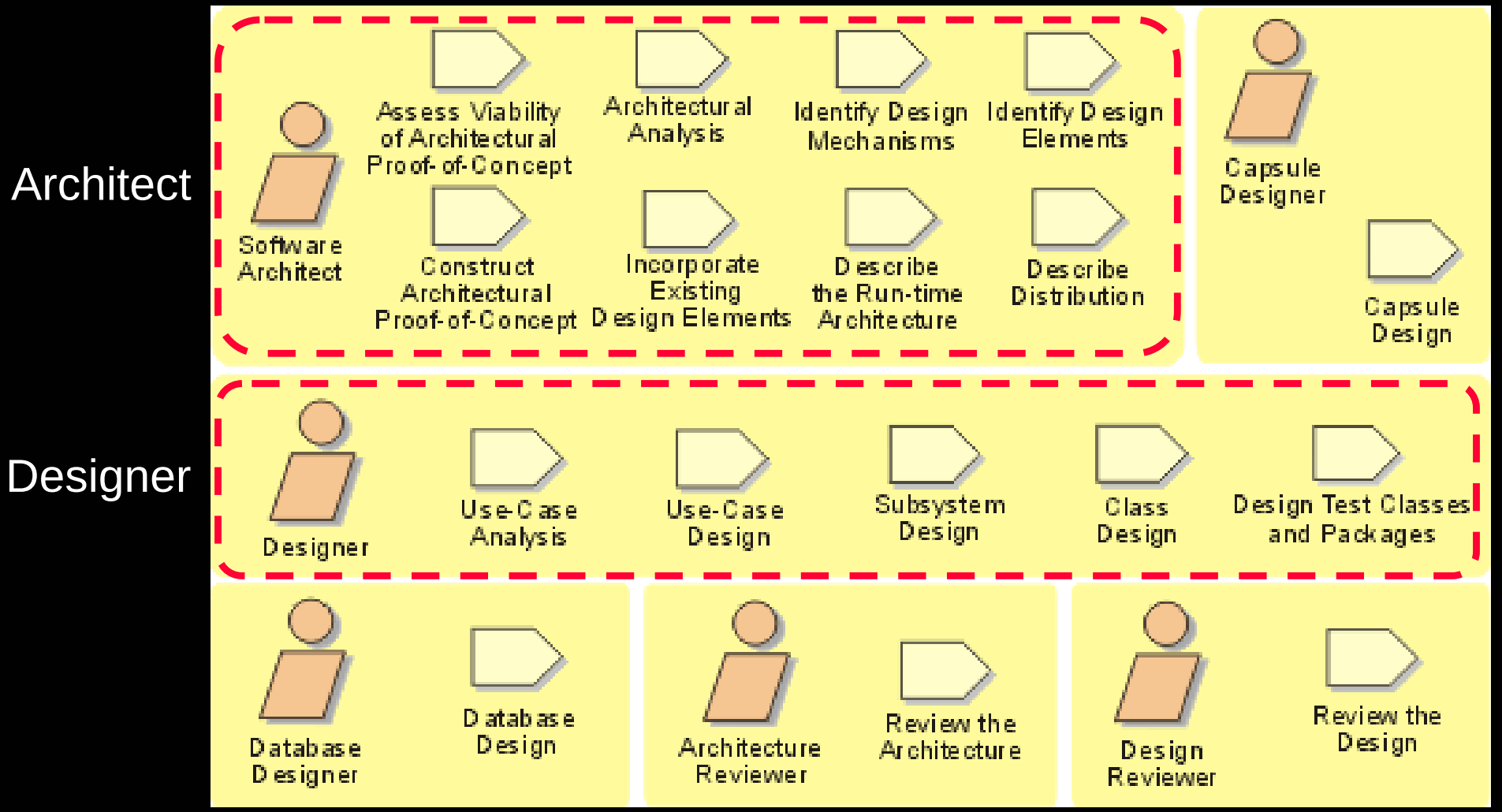
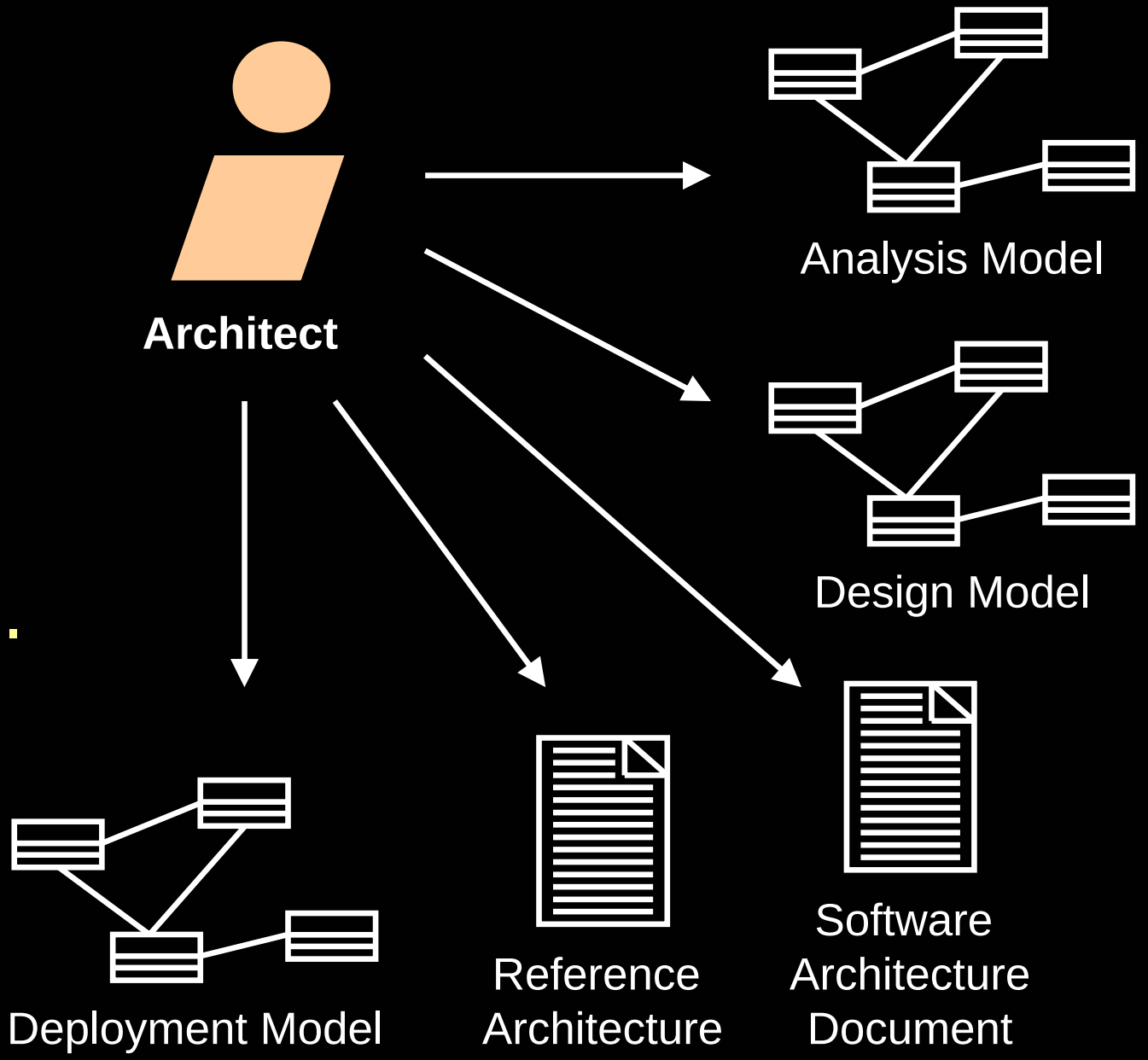
Analysis and Design Activity Overview



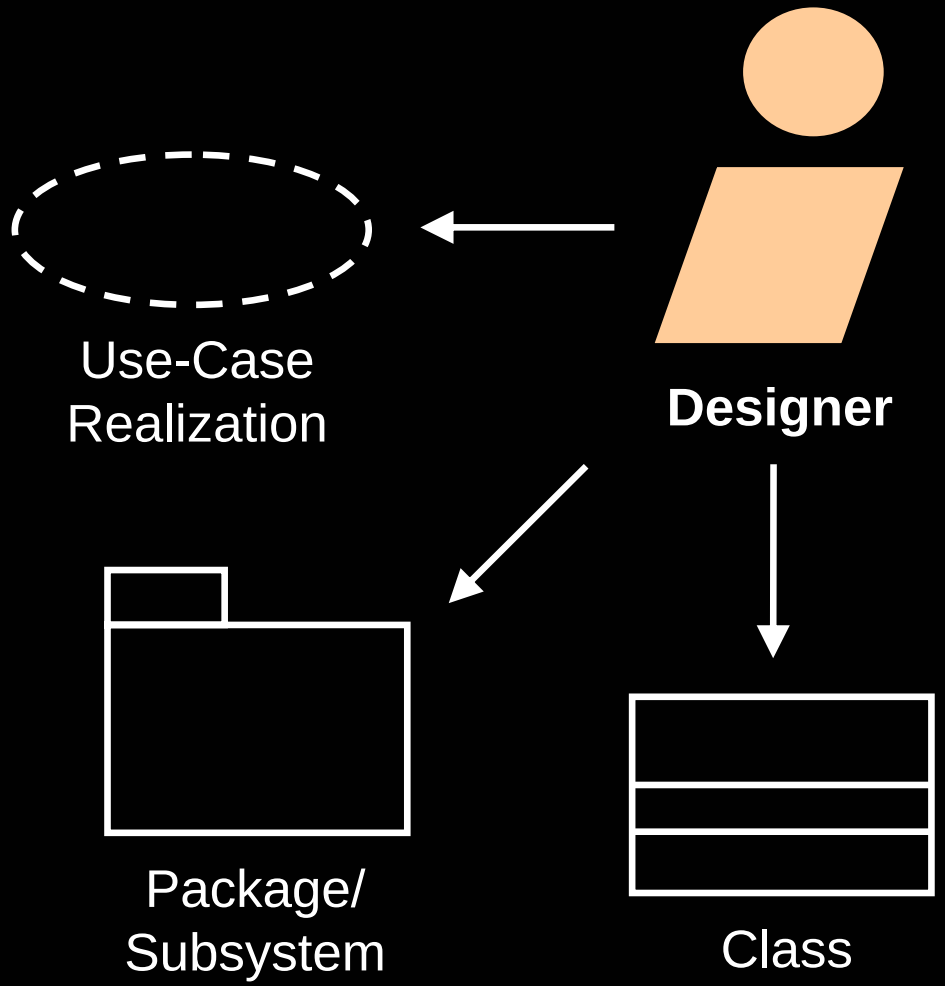
Software Architect's Responsibilities

- The Software Architect leads and coordinates technical activities and artifacts.



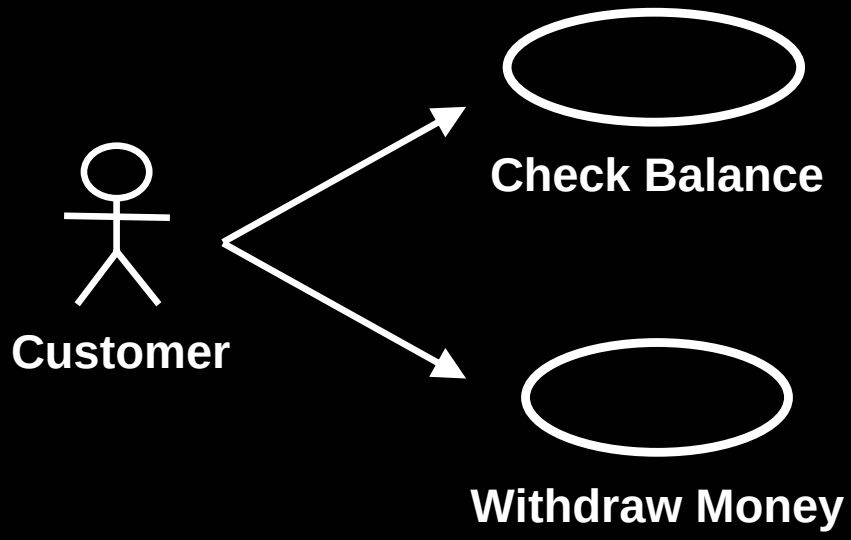
Designer's Responsibilities

- The designer must know use-case modeling techniques, system requirements, and software design techniques.



Review: Analysis and Design Is Use-Case Driven

- Use cases defined for a system are the basis for the entire development process.
- Benefits of use cases:
  - Concise, simple, and understandable by a wide range of stakeholders.
  - Help synchronize the content of different models.



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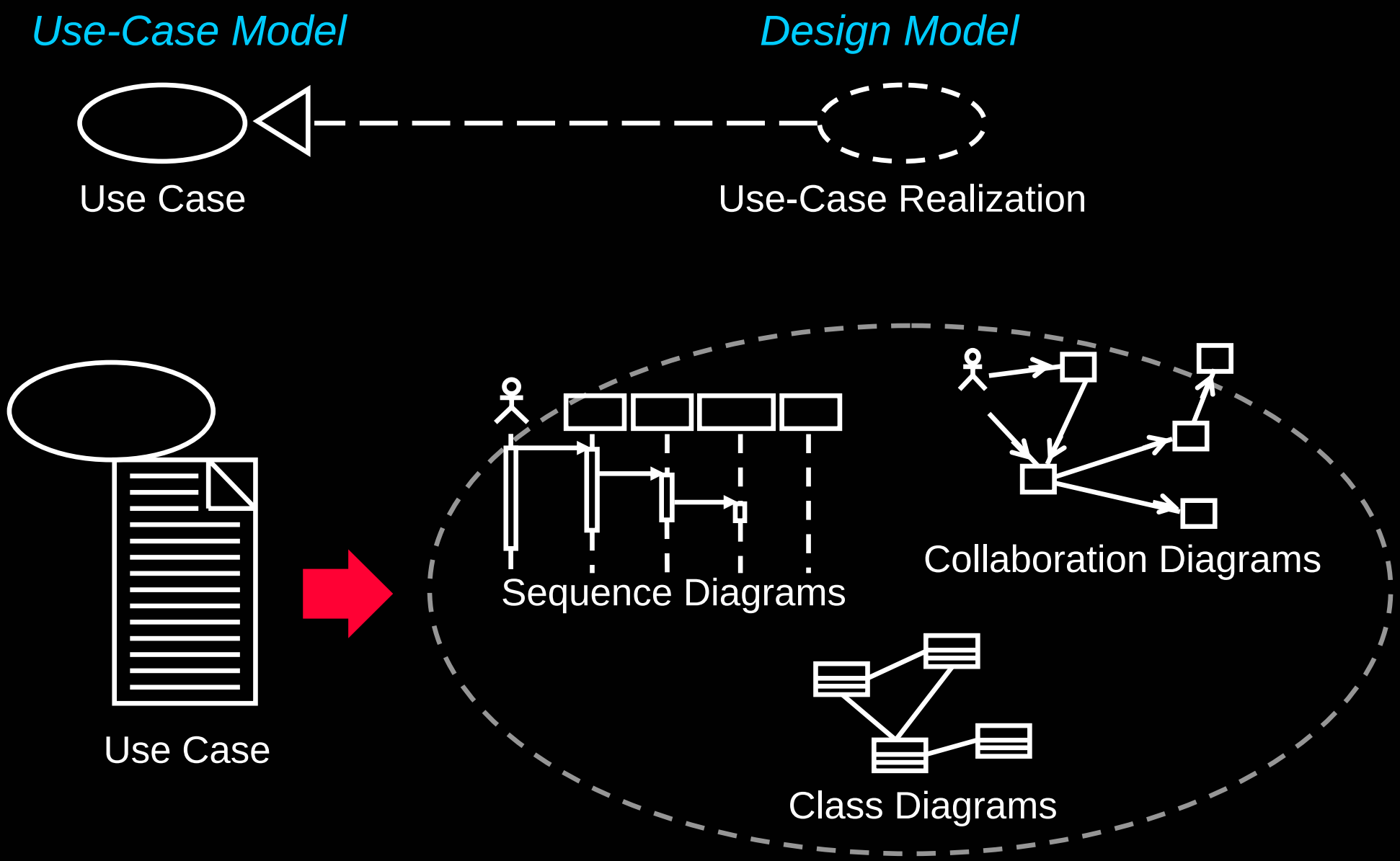
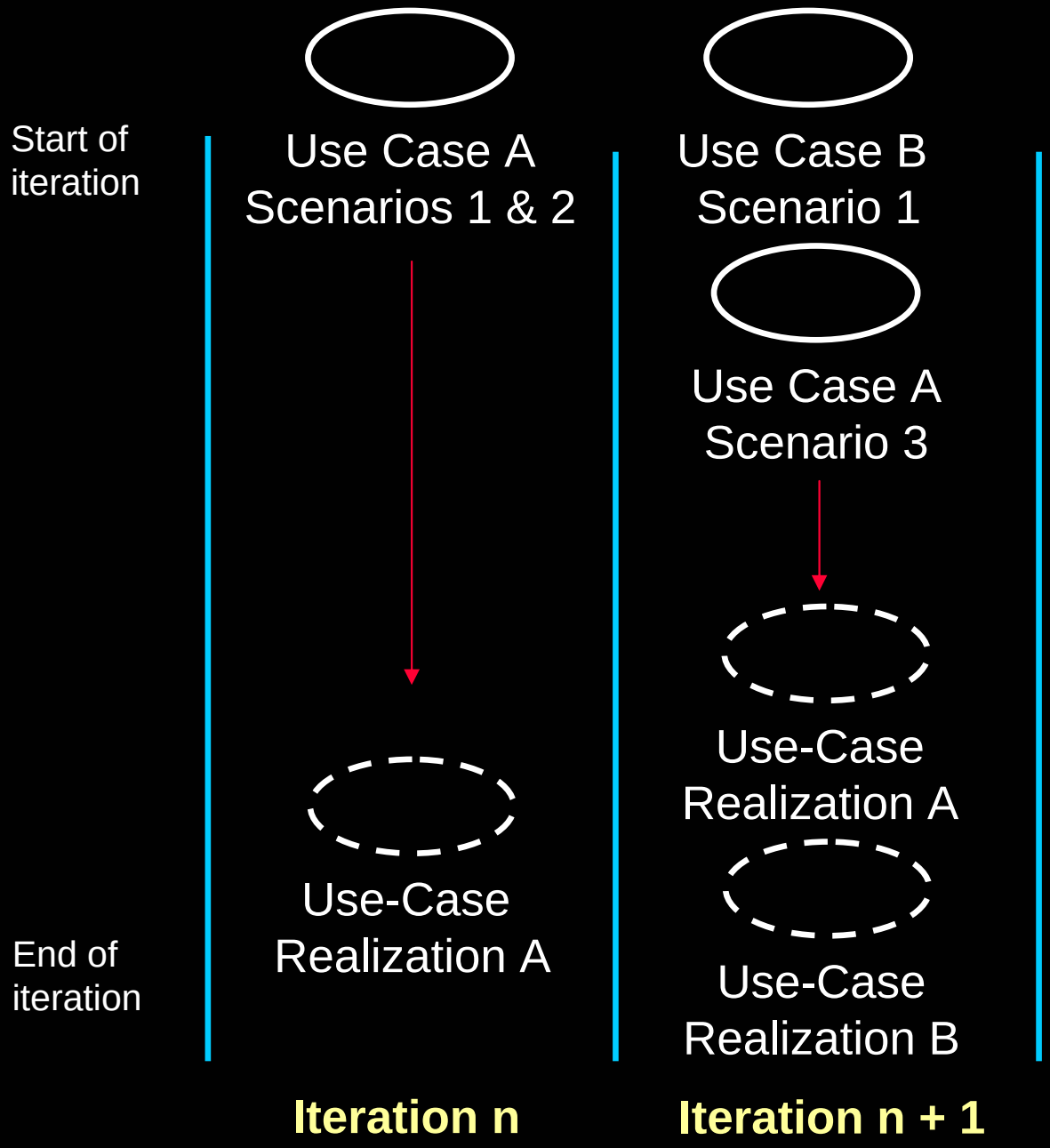
What Is a Use-Case Realization?



Analysis and Design in an Iterative Process



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?