Week 4

# CS2212
# Introduction to Software Engineering

# Requirements Modeling



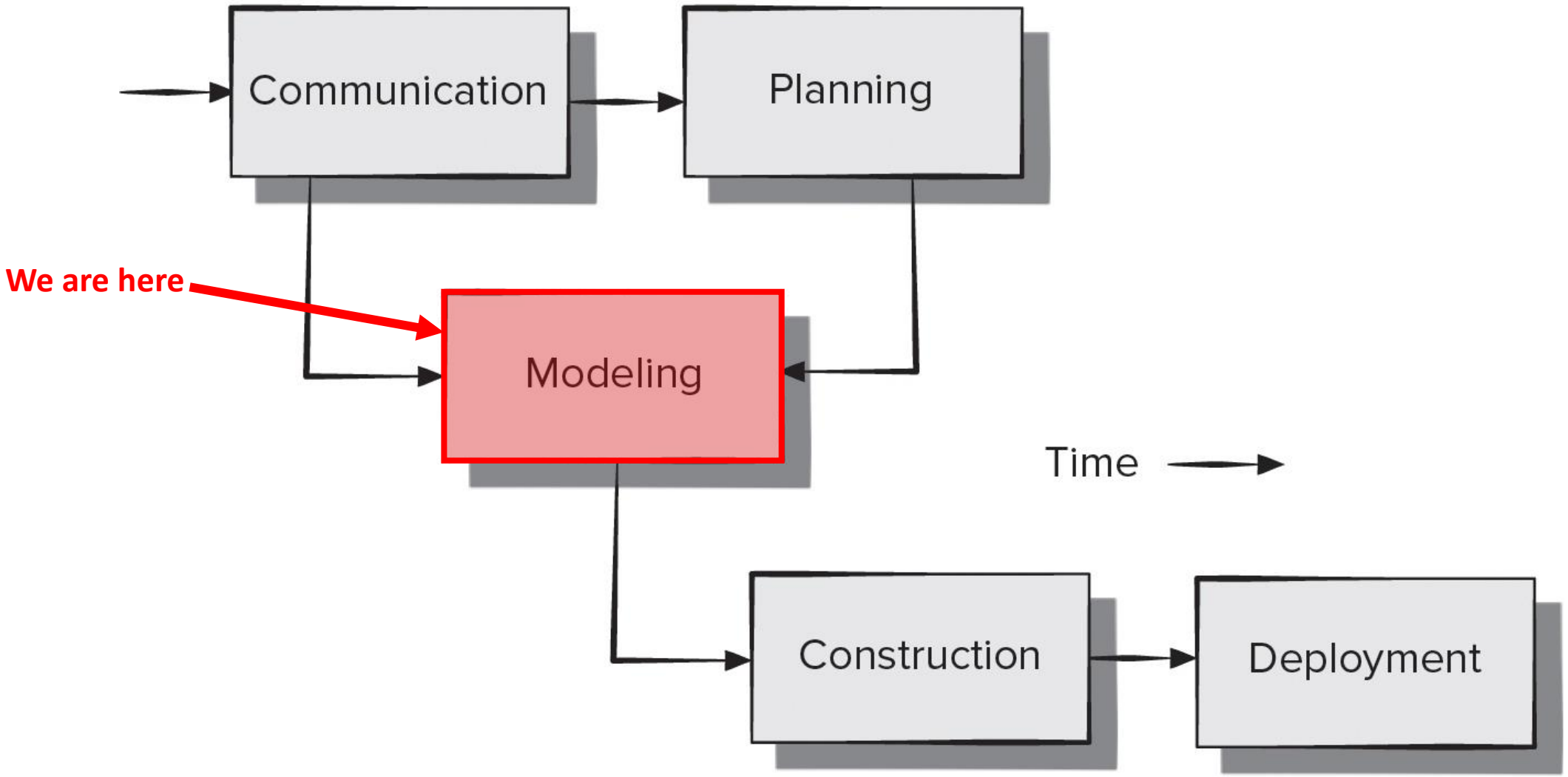
*Some images and content from Software Engineering: A Practitioner's Approach 9th Edition By Roger Pressman and Bruce Maxim*

# Requirements Analysis

- **A Requirements Analysis**:
  - **Specifies** the software's **operational characteristics**.
  - **Indicates** the software's **interface with other system elements**.
  - **Establishes constraints** that the software must meet.

- **Requirements Analysis allows a software engineer to:**
  - **Elaborate on** basic **requirements** established during earlier requirement engineering tasks
  - **Build models** that depict **user scenarios**, **functional activities**, **problem classes**, and their **relationships**, system and class **behaviour**, and the **flow of data** as it is transformed

# Requirements Analysis



# Requirements Models

- A **requirements model** must achieve **three primary objectives**:
  1. To describe what the customer requires.
  2. To establish a basis for the creation of a software design.
  3. To define a set of requirements that can be validated once the software is built.

- A **requirements model** **bridges the gap** between a **system-level description** and a **software design**.

# As A Bridge

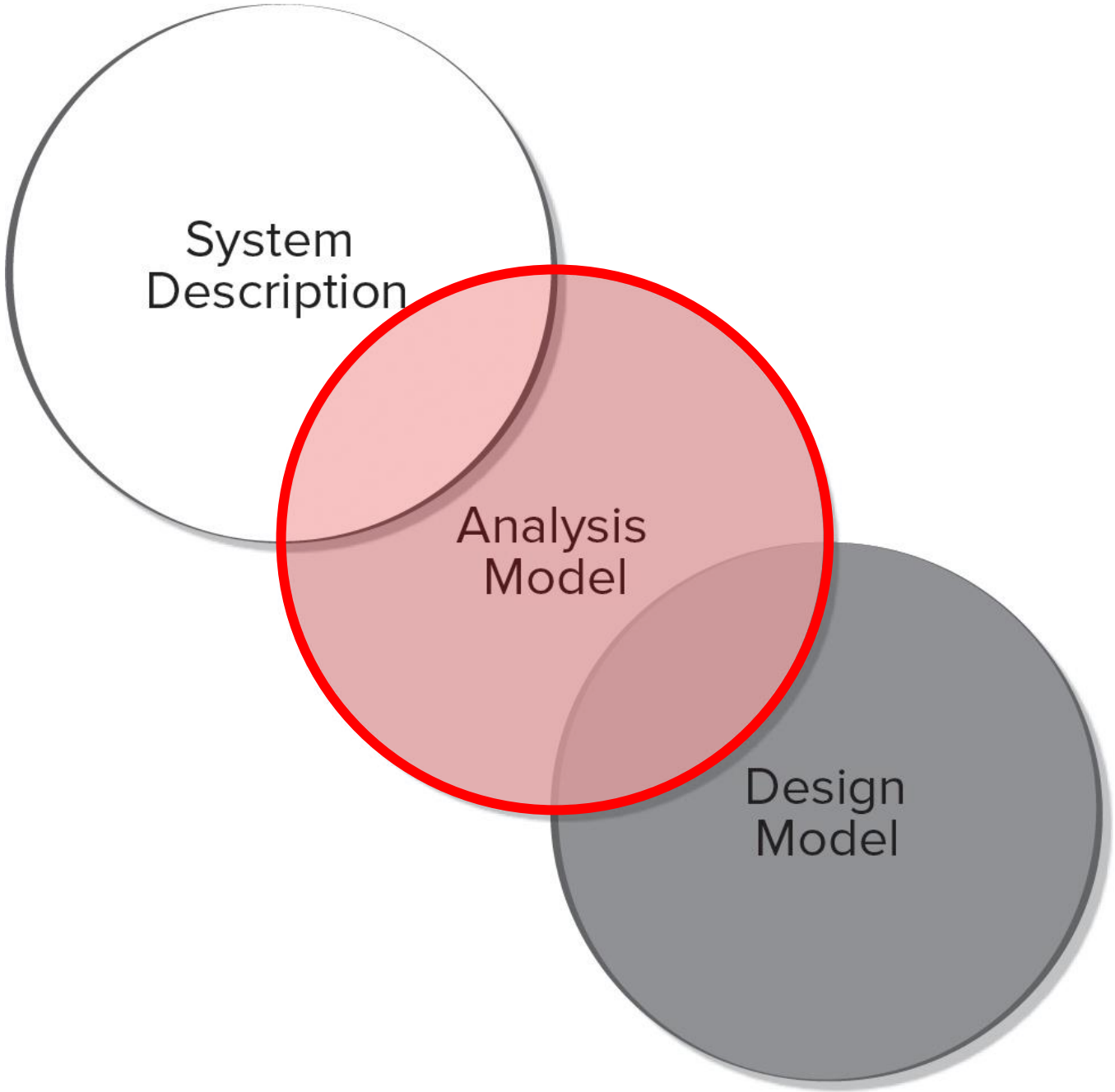



*Figure 8.1 from your textbook.*

# Requirements Models

**Scenario-Based Models:** depict requirements from the point of view of various system “actors.”

**Class-Oriented Models:** represent object-oriented classes *(attributes and operations)* and how classes collaborate to achieve system requirements.

**Behavioural Models:** depict how the software reacts to internal or external “events.”

**Data Models:** depict the information domain for the problem.

**Flow-Oriented Models:** represent functional elements of the system and how they transform data in the system.

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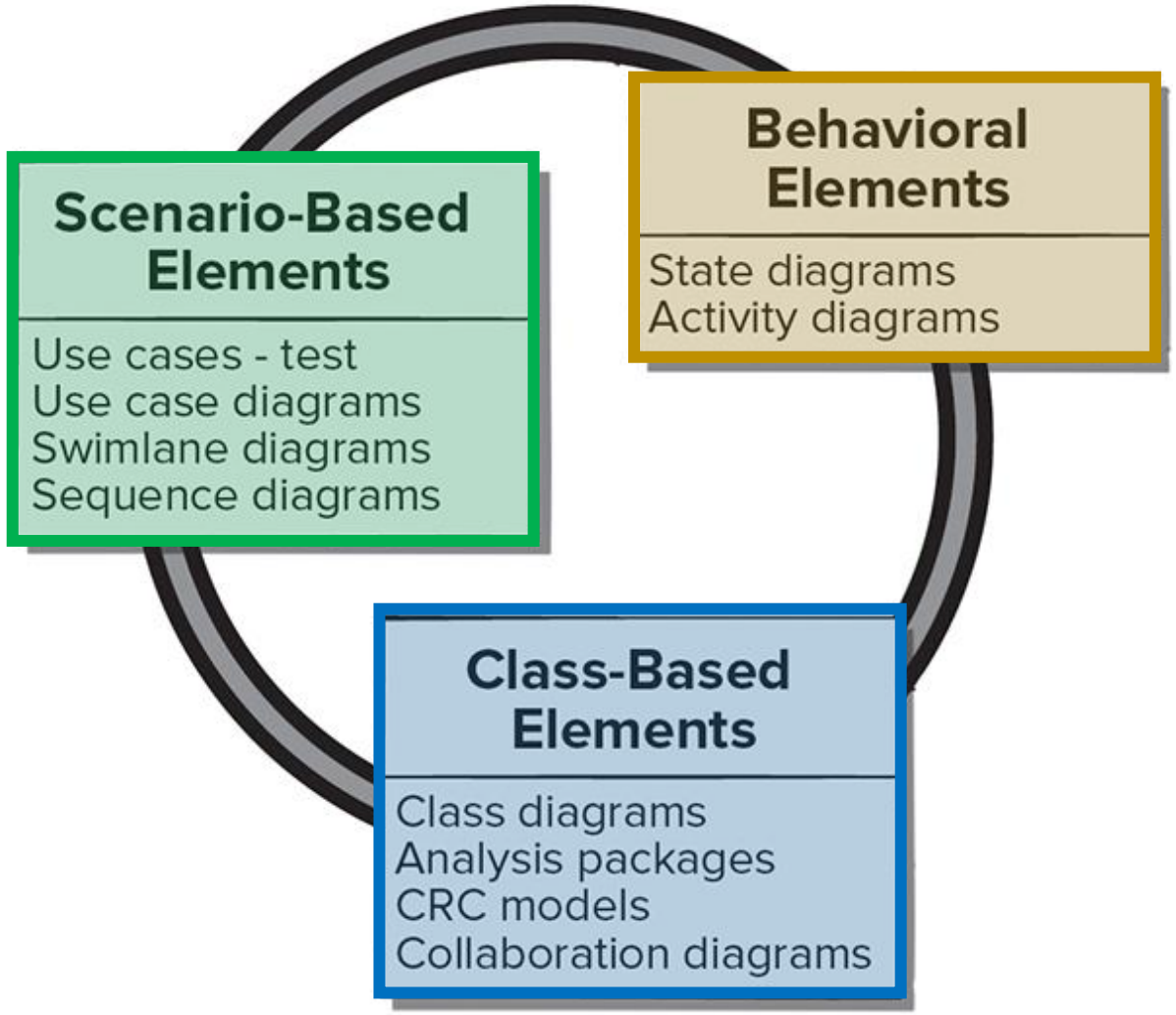
# Requirements Modeling Principles




Analysis Model

# Rules of Thumb

- The **level of abstraction** should be **relatively high** - focus on requirements visible in problem or business domains.
- **Analysis model** should provide insight into **information domain**, **function**, and **behaviour** of the software.
- **Delay consideration of infrastructure and other non-functional models** until later in the modeling activity.
- The **analysis model** provides **value to all stakeholders,** keep the model as **simple as it can be**.

# Requirements Modeling Principles

- **Principle 1:** The information domain of a problem must be represented and understood.
- **Principle 2:** The functions that the software performs must be defined.
- **Principle 3:** The behaviour of the software (as a consequence of external events) must be represented.
- **Principle 4:** The models that depict information, function, and behaviour must be partitioned in a manner that uncovers detail in a layered (or hierarchical) fashion.
- **Principle 5:** The analysis task should move from essential information toward implementation detail.