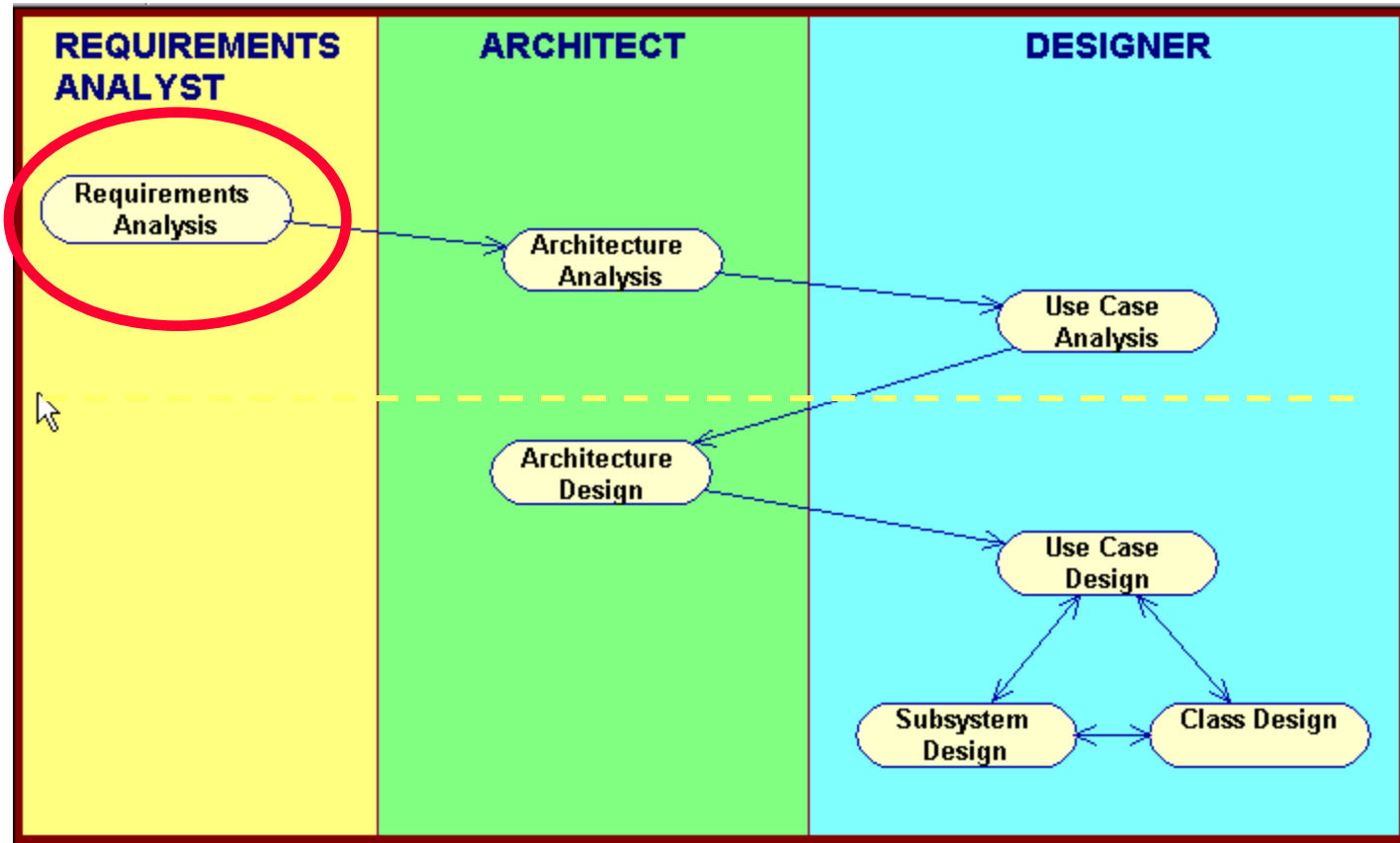# Lesson 4

Rational Unified Process Overview:

Harnessing Nature's Self-Referral Dynamics For Success

Basic RUP OOAD Activities

Overview of Requirements Analysis

Use cases are a widely adopted approach to capturing functional system requirements. Use cases are the integrating view in the RUP model of system architecture, and drive the development process throughout the entire lifecycle.

Roles:

1. System Analyst role leads and coordinates requirements elicitation and use-case modeling by outlining the system's functionality and delimiting the system; for example, identifying what actors exist and what use cases they will require when interacting with the system.

2. The Requirements Specifier role specifies the details of one or more parts of the system's functionality by describing different aspects of the requirements

Library System Problem Statement

You have been hired by Prince University to update their library record keeping. Currently the library has an electronic card catalog that contains information such as author, title, publisher, description, and location of all of the books in the library. All the library member information and book check-in and checkout information, however, is still kept on paper. This system was previously workable, because Prince University had only a few hundred students enrolled. Due to the increasing enrollment, the library now needs to automate the check-in/checkout system.

The new system will have a windows-based desktop interface to allow librarians to check-in and checkout books.

All books in the library have a unique bookid.The books in the library are ordered on the shelves by their bookid. The new system must allow library members to search through the electronic card catalog to find the bookid of the desired book.

The system will run on a number of individual desktops throughout the library. Librarians will have their own desktop computers that are not accessible by library members. Only librarians are able to check-in and checkout books.

The system will retain information on all library members. Only university students, faculty and staff can become library members. Students can check-out books for a maximum of 21 days. If a student returns a book later than 21 days, then he/she has to pay an overdue fee of 25 cents per day. University staff can also checkout books for a maximum of 21 days, but pay an overdue fee of 10 cents per day. Faculty can checkout books for a maximum of 100 days, and pay only 5 cents per day for every book returned late. The system will keep track of the amount of money that library members owe the library.

Requirements: Use-case diagram
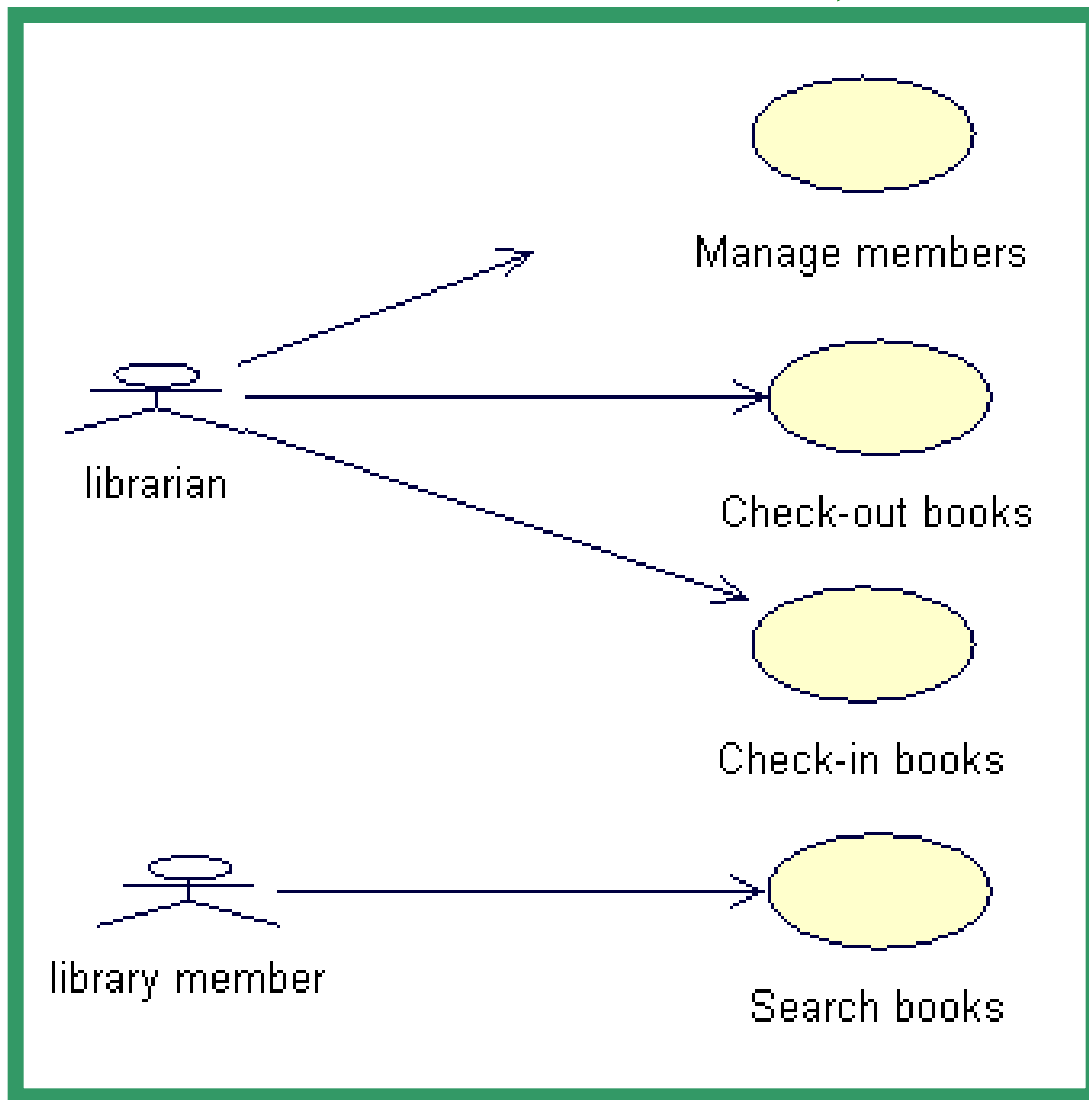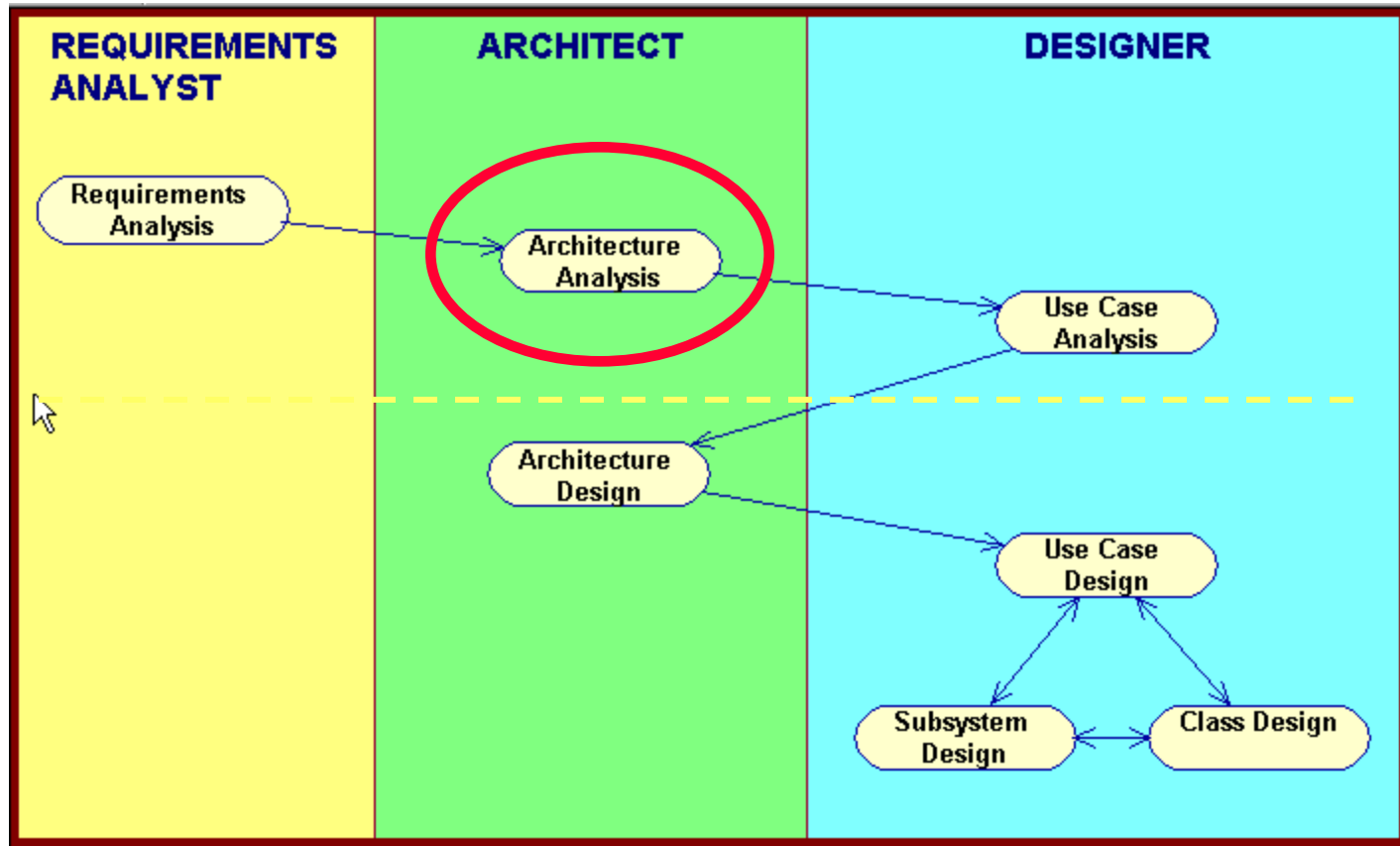

Anything missing?

Requirements: Use-case diagram

Manage members

librarian

Check-out books

Check-in books

library member
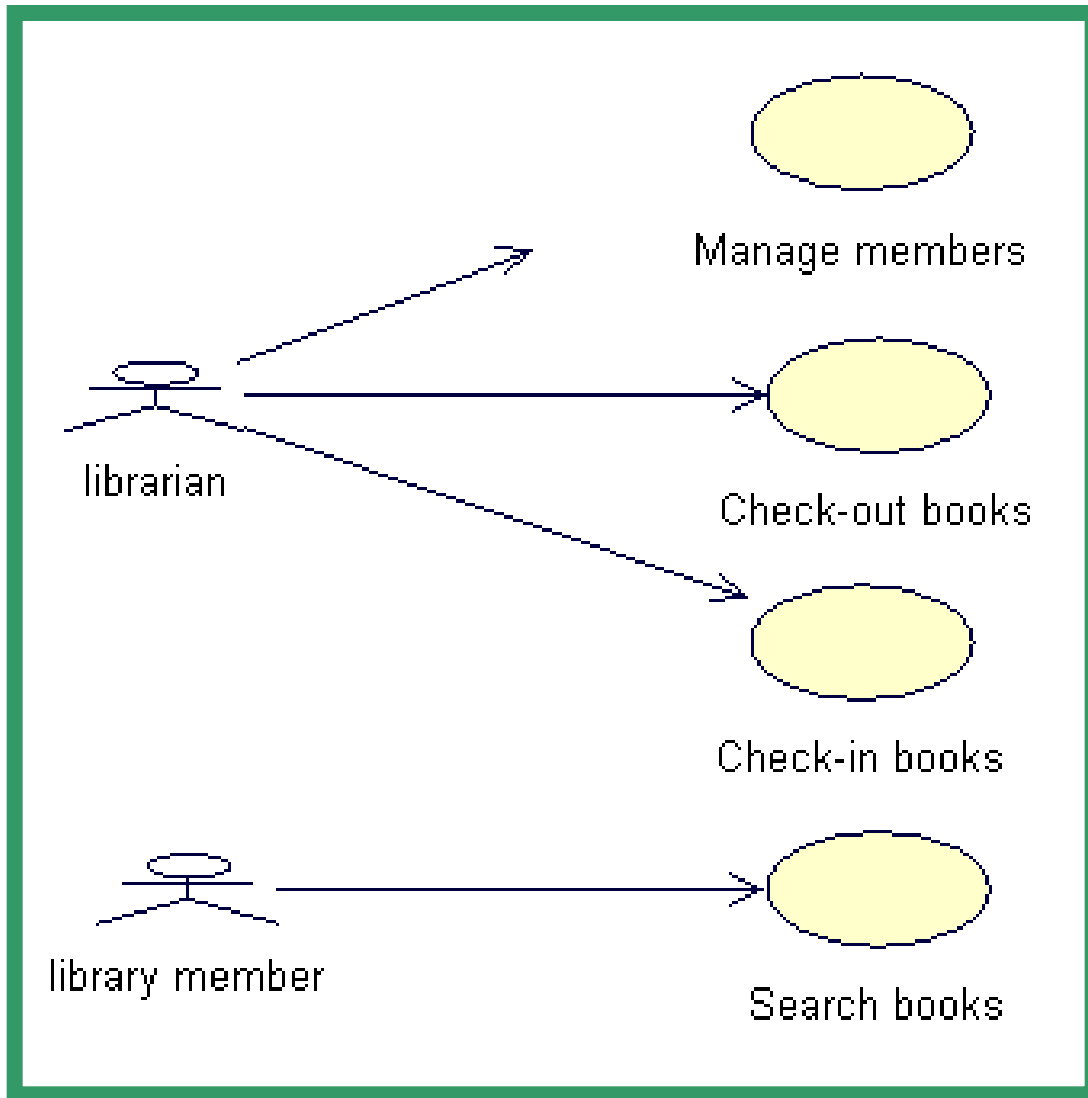
Search books

Members check out books?

Librarians search books?

Basic RUP OOAD Activities
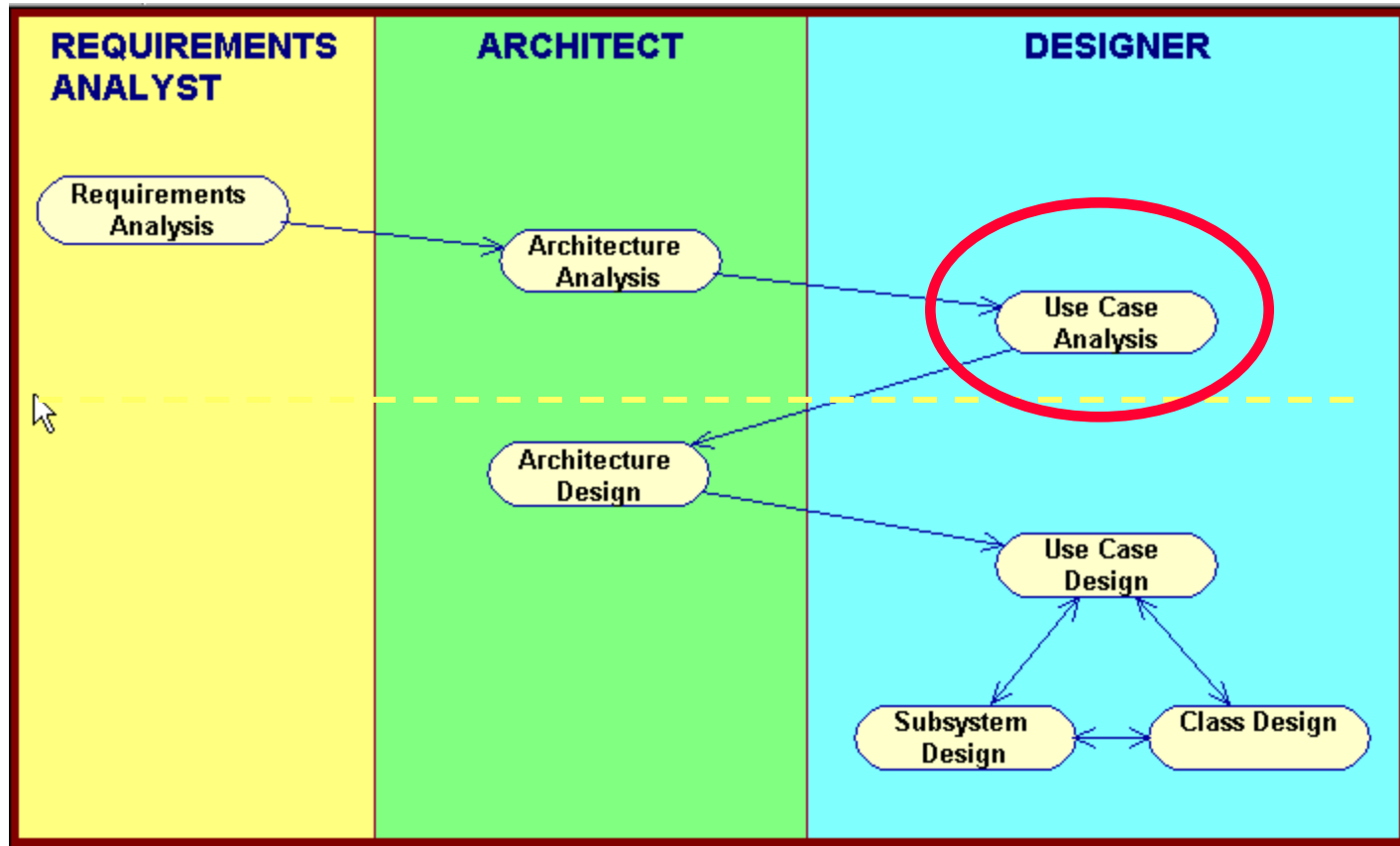
Overview of Arch Analysis

Architectural analysis is a preparation for UC analysis. It provides a comprehensive view of the problem domain and high level system design that will be used across all UC realizations.

Role:

The software architect role is responsible for the software architecture, which includes the key technical decisions that constrain the overall design and implementation for the project.

Basic RUP OOAD Activities

Overview of Use Case Analysis

Analysis is the process of understanding in detail

➢ the business domain (Systems Analysis)

➢ the user requirements (Use Case Analysis)

The defining feature of use case analysis is focusing analysis activities on individual use cases. Typically, this phase of analysis makes use of several types of UML diagrams:

1. Use sequence diagrams to determine the responsibilities required for participating classes to carry out each use case.

2. Collaboration diagrams (called Communication Diagrams in UML 2.0) reflect required associations among classes.

3. The VOPC (View of Participating Classes) diagram captures the structural relationships among classes. This is a special kind of *class diagram*

Role:

The designer role is responsible for designing a part of the system, within the constraints of the requirements, architecture, and development process for the project.

Basic RUP OOAD Activities
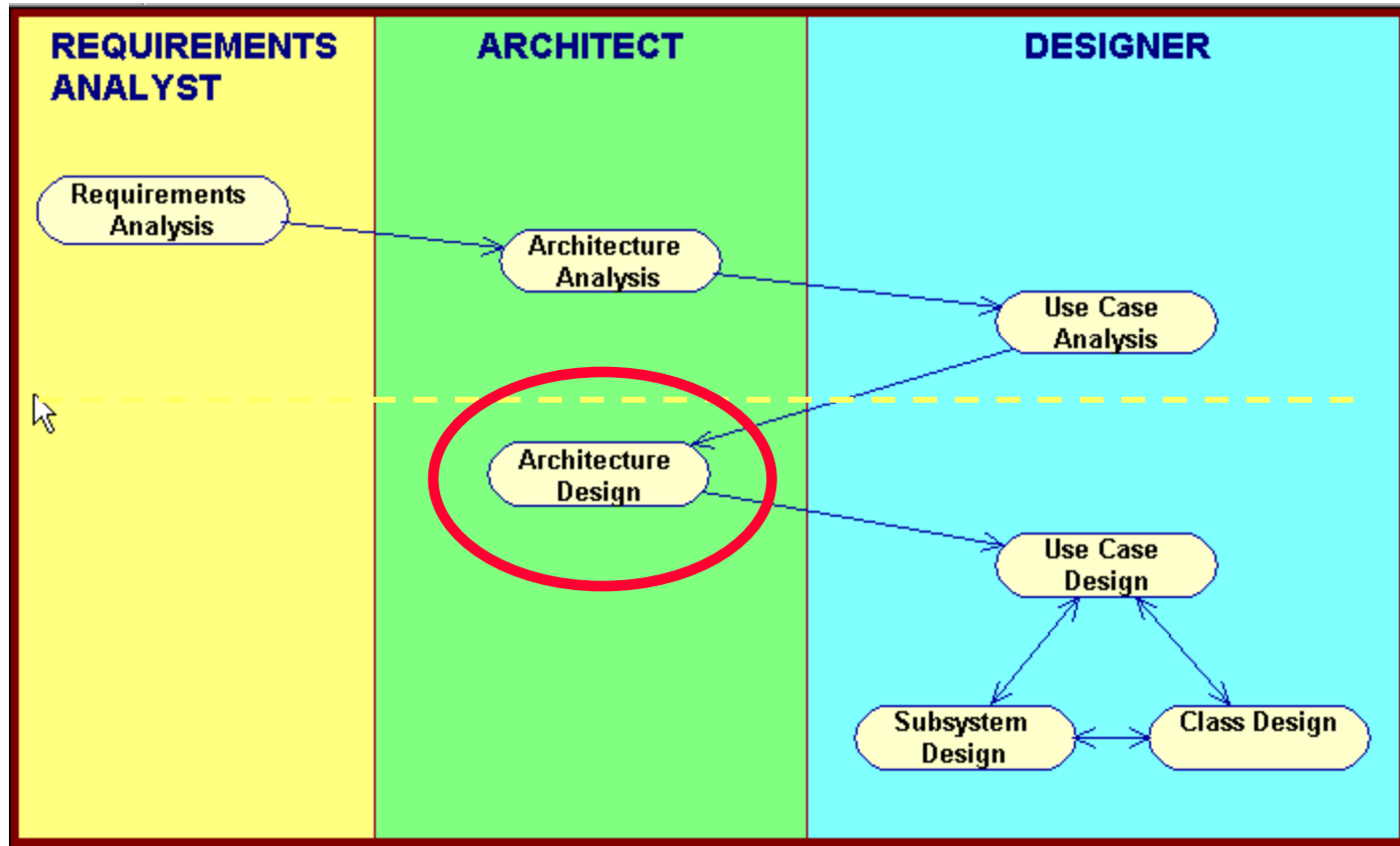
Overview of Arch Design

The architect makes system-wide preparations that guide and coordinate the design activities of individual designers.

- Identify design classes

- Identify packages

- Identify subsystems and their interfaces

- Identify the system layering strategy

- Identify reusable parts at the system level

- Identify components/tools and technology used for the whole project.
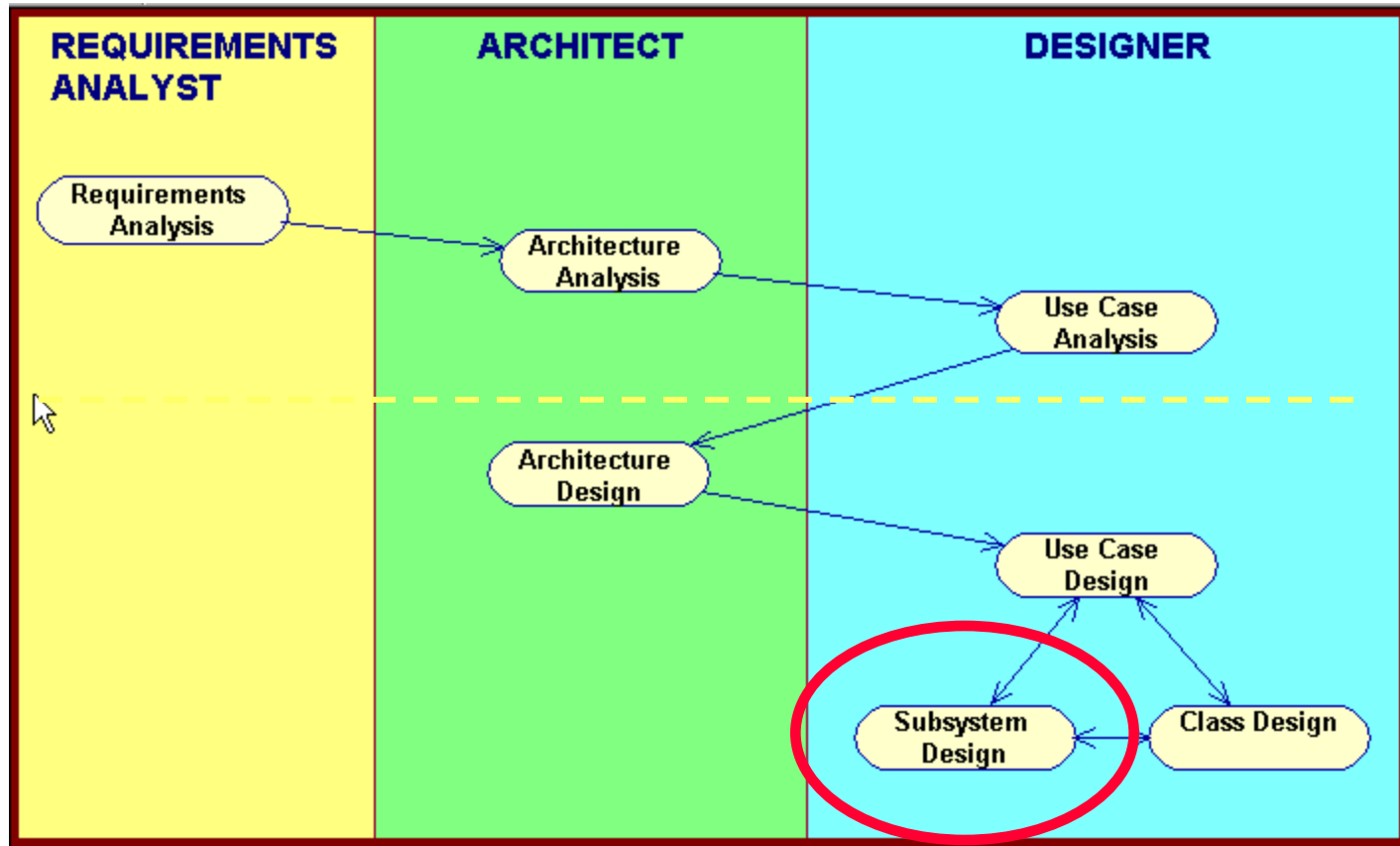
Basic RUP OOAD Activities
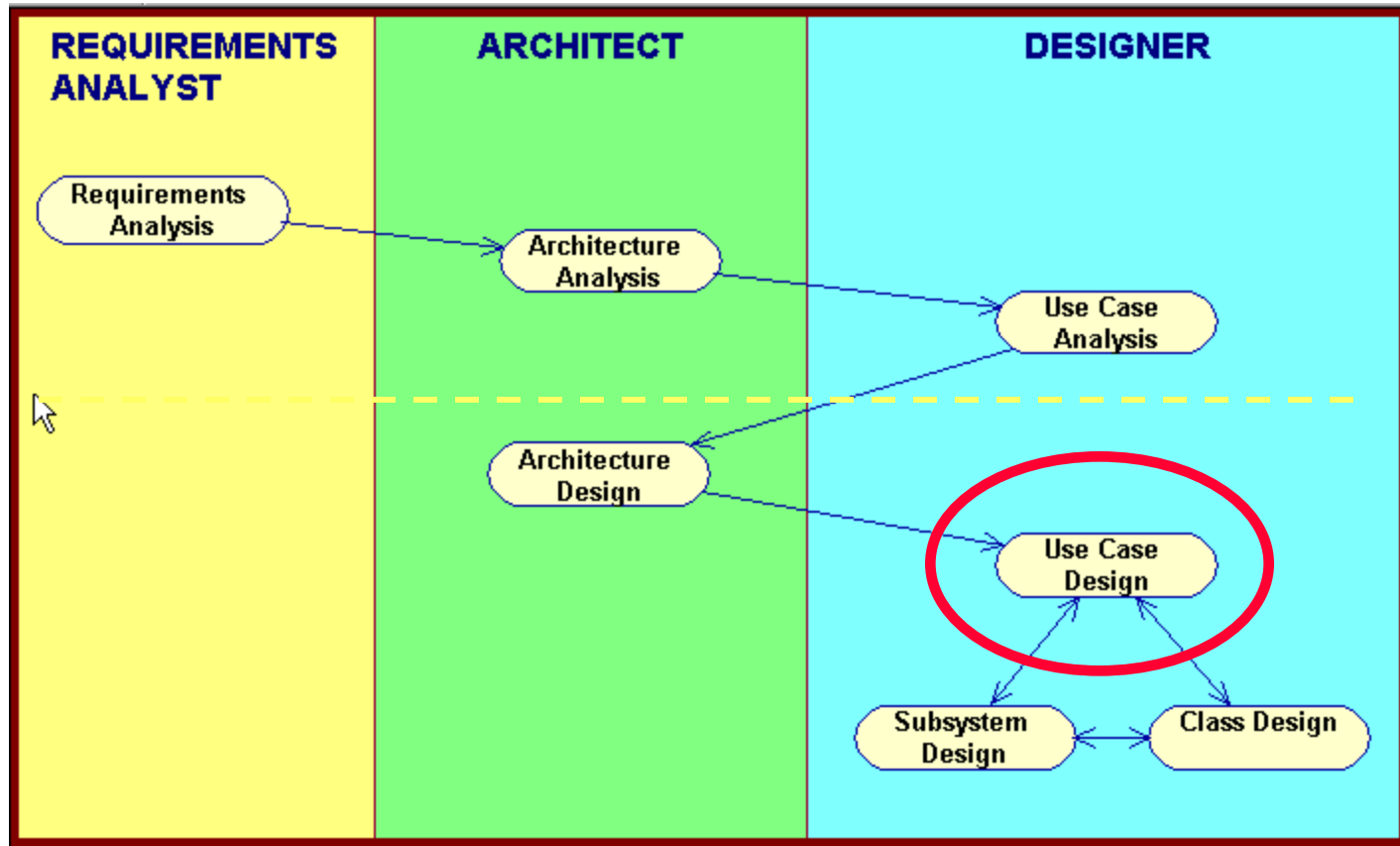
Overview of Use Case Design

During use case design designers inspect and elaborate architectural design results from the perspective of the use cases.

We update our use case diagrams with the architect's design classes, subsystems, layers, components, etc., as needed.

Basic RUP OOAD Activities

Overview of Subsystem Design

Subsystem design involves working out the details of subsystem operations. The steps are basically the same as those of use case analysis and use case design, except now the work is restricted to a single subsystem (at a time) and there is correspondingly more design detail.

As in use case design, main outputs are interaction (dynamic) and class (static) diagrams of the subsystem elements.

Basic RUP OOAD Activities
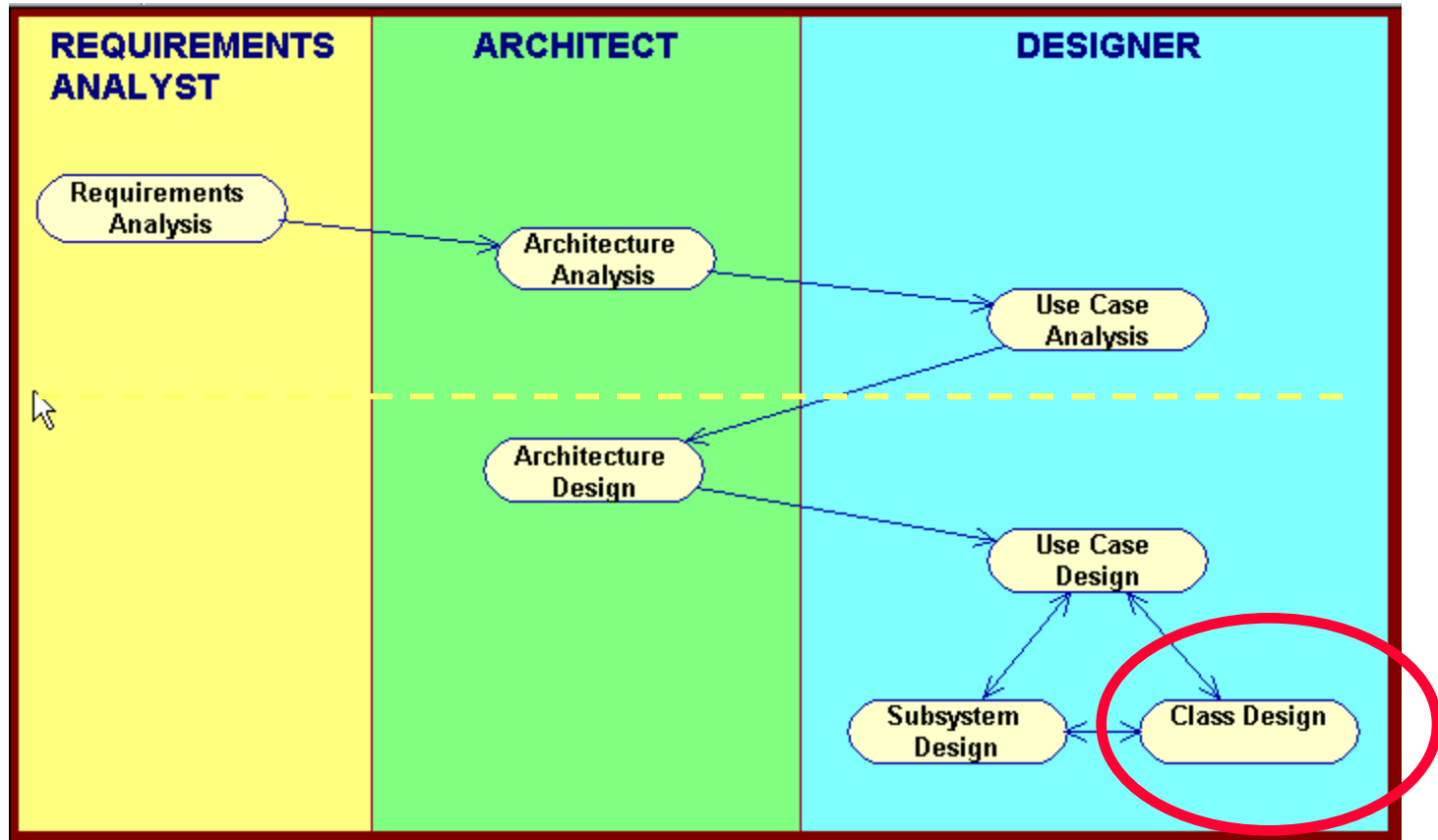
Overview of Class Design

Class design is a final preparation for implementation. The overall architecture as well as the functional structure is already set. Class design is making final design refinements.

We focus on refining the operations, attributes, and the relationships for all our classes.

Construction and Transition Roles:

1. Implementer:

The implementer role is responsible for developing and testing components, in accordance with the project's adopted standards, for integration into larger subsystems. When test components, such as drivers or stubs, must be created to support testing, the implementer is also responsible for developing and testing the test components and corresponding subsystems.

2. Tester:

The Tester role is responsible for the core activities of the test effort, which involves conducting the necessary tests and logging the outcomes of that testing.

RUP Artifacts

Requirements

1. Use-case diagram
2. Use-case descriptions

Architectural Analysis

1. Key abstractions
2. Upper level architectural layers

Use-case Analysis

1. Sequence diagrams
2. Collaboration diagrams
3. VOPC diagrams
4. Analysis class to analysis mechanism map

Architectural Design

1. Subsystem context diagram
2. Analysis class to design elements map
3. Design elements to "owning" package map

Use-case Design

1. Updated interaction diagrams including design elements
2. Updated VOPC class diagrams including design elements

Subsystem Design

1. Interaction diagram for each interface definition
2. Class diagram for subsystem

Class Design

1. Refined and updated VOPC class diagrams

Review of Key Points

➢ What are the analysis activities?

➢ What are the design activities?

➢ What activities are the primary responsibility of the architect?

➢ What activities are the primary responsibility of the designer?

➢ What are the 3 diagram artifacts produced during use case analysis?

➢ What is the purpose of use case analysis?