

System Integration & Architecture

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Lecture 4

Project Phases and the Project Life Cycle

- A project life cycle is a collection of project phases
- Project phases vary by project or industry, but some general phases include
 - concept
 - development
 - implementation
 - support

Phases of the Project Life Cycle

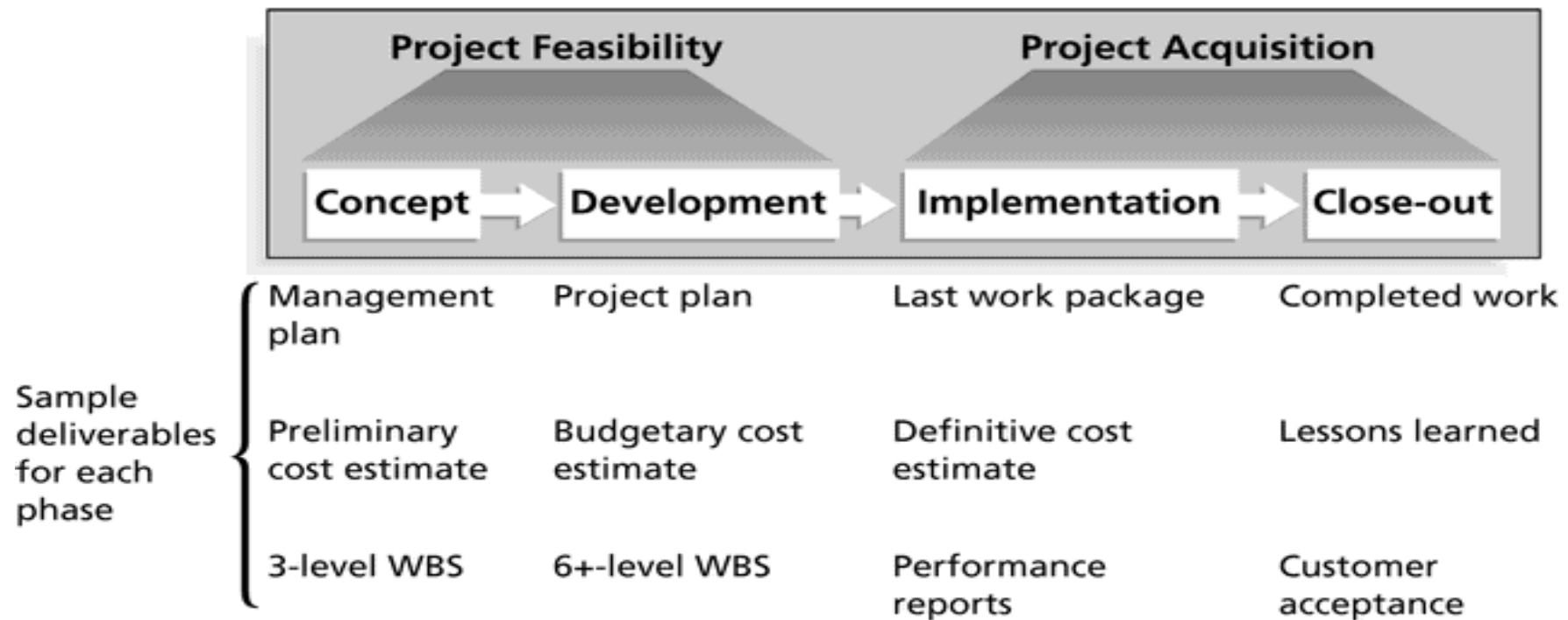


Figure 2-3. Phases of the Project Life Cycle

Product Life Cycles

- Products also have life cycles
- **The Systems Development Life Cycle (SDLC)** is a framework for describing the phases involved in developing and maintaining information systems
- **Systems development projects can follow**
 - **Predictive models:** The scope of the project can be clearly articulated and the schedule and cost can be predicted.
 - **Adaptive models:** Projects are mission driven and component based, using time-based cycles to meet target dates.

Predictive Life Cycle Models

- The waterfall model has well-defined, linear stages of systems development and support.
- The spiral model shows that software is developed using an iterative or spiral approach rather than a linear approach.
- The incremental release model provides for progressive development of operational software.
- The prototyping model is used for developing prototypes to clarify user requirements.
- The RAD model is used to produce systems quickly without sacrificing quality.

Adaptive Life Cycle Models

- **Extreme Programming (XP):** Developers program in pairs and must write the tests for their own code. XP teams include developers, managers, and users.
- **Scrum:** Repetitions of iterative development are referred to as sprints, which normally last thirty days. Teams often meet every day for a short meeting, called a scrum, to decide what to accomplish that day. Works best for object-oriented technology projects and requires strong leadership to coordinate the work

Distinguishing Project Life Cycles and Product Life Cycles

- The project life cycle applies to all projects, regardless of the products being produced
- Product life cycle models vary considerably based on the nature of the product
- Most large IT systems are developed as a series of projects
- Project management is done in all of the product life cycle phases

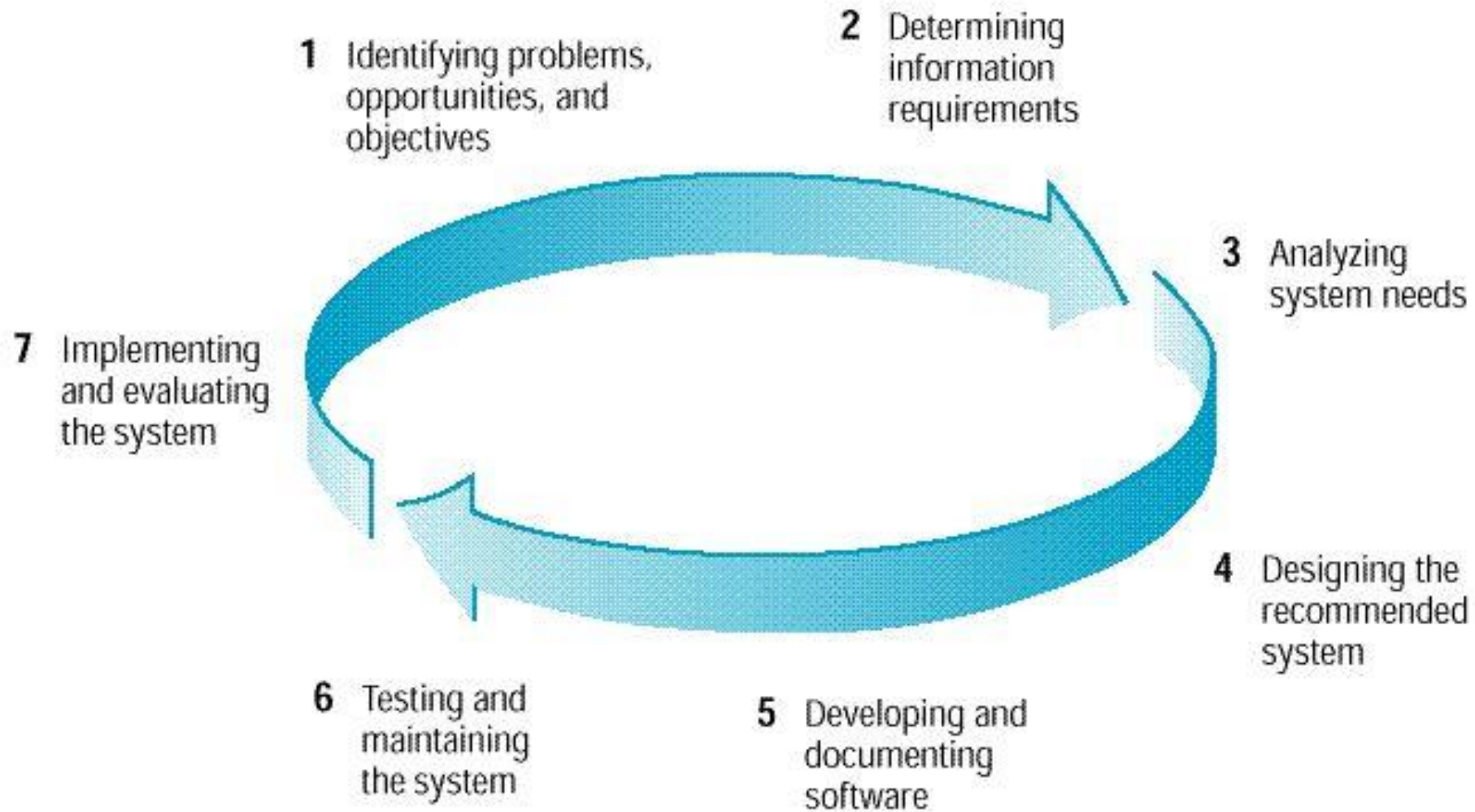
Why Have Project Phases and Management Reviews?

- A project should successfully pass through each of the project phases in order to continue on to the next
- Management reviews (also called phase exits or kill points) should occur after each phase to evaluate the project's progress, likely success, and continued compatibility with organizational goals

System Development Life Cycle

(Kendall & Kendall terminology)

Figure 1.2 The Seven Phases of the Systems Development Life Cycle



Topic 1

Requirements

Requirements

- A system cannot be analyzed, designed, implemented and evaluated unless the problem is understood and requirements elicited.
- Requirements are fundamental basis of all the system development processes.
- System architects will always base of the requirements elicited by the system analyst to design an architectural view of the system. Besides much as the system is designed and there is need for integration say business process integration, legacy integration, new systems integration, business-to-business integration, integration of commercial-off-the-shelf (COTS) products, interface control and management, testing, integrated program management, integrated Business Continuity Planning (BCP), requirement is the basis.

Sub Topics

- Requirements elicitation, documentation, and maintenance
- Modeling tools and methodologies Using Unified Modeling Language
- Testing

Core learning outcomes:

- Compare and contrast the various requirements modeling techniques.
- Distinguish between non-functional and functional requirements.
- Identify and classify the roles played by external users of a system.
- Explain and give examples of use cases.
- Explain the structure of a detailed use case.
- Detail a use case based on relating functional requirements.
- Describe the types of event flows in a use case and under which conditions they occur.
- Explain how requirements gathering fits into a system development lifecycle.
- Explain how use cases drive testing throughout the system lifecycle.

What are requirements?

- Requirements are statements that identify the essential needs of a system in order for it to have value and utility.

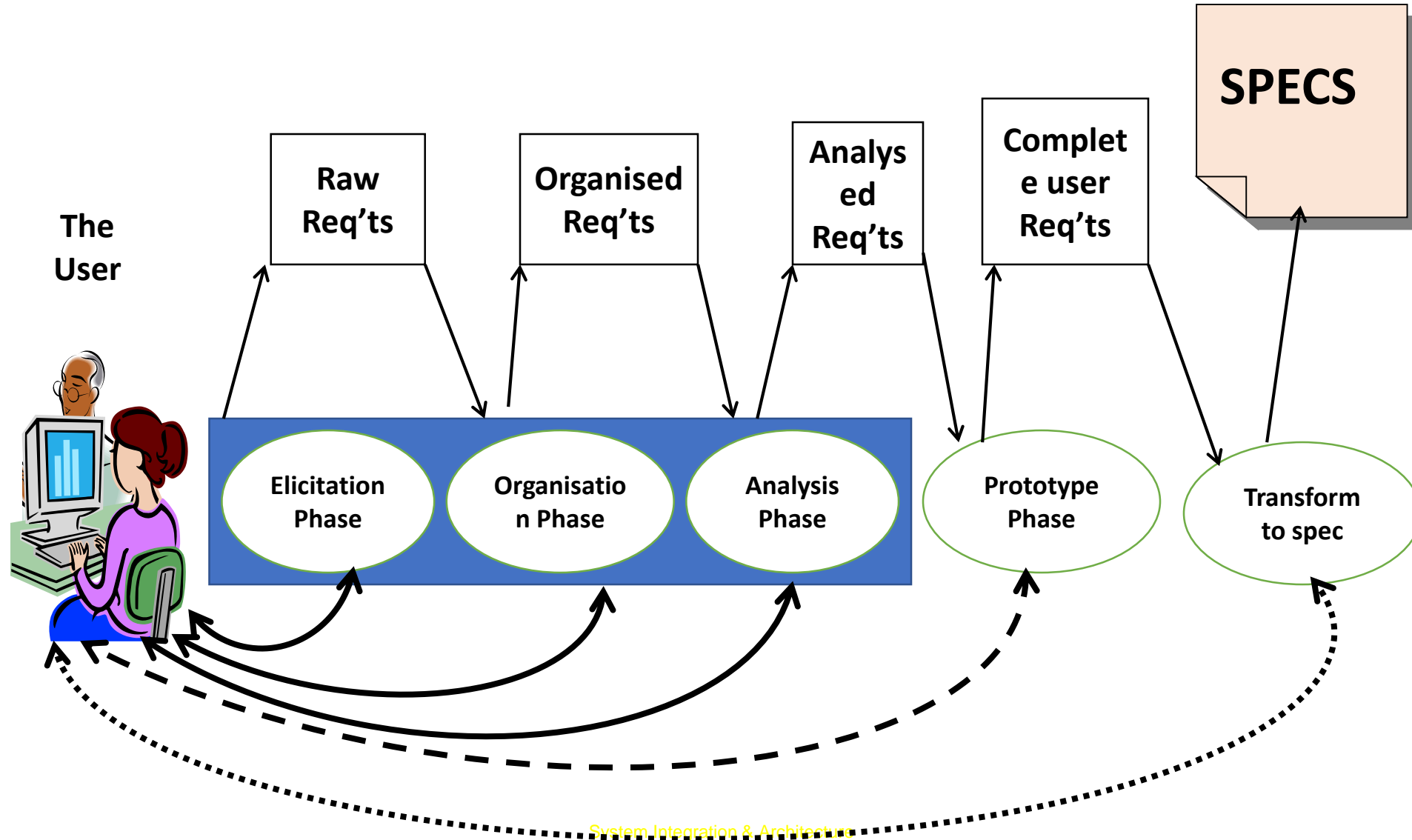
Characteristics of Good Req'ts

- 1. Describes What, Not How.
- 2. Atomic. i.e., it should have a single purpose
- 3. Unique.
- 4. Documented and Accessible.
- 5. Identifies Its Owner.
- 6. Approved. After a requirement has been revised, reviewed, and rewritten, it must be approved by its owner.
- 7. Traceable. A good requirement is traceable; it should be possible to trace each requirement back to its source.
- 8. Necessary.

Characteristics of Good Req'ts cont....

- 9. Complete.
- 10. Unambiguous
- 11. Quantitative and testable
- 12. Identifies applicable states
- 14. States Assumptions. All assumptions should be stated.
- 15. Use of Shall, Should, and Will. A mandatory requirement should be expressed using the word shall (e.g., "The system shall conform to all state laws
- 16. **Avoids Certain Words.** The words optimize, maximize, and minimize should not be used in stating requirements, because we could never prove that we had achieved them.

Requirements Life cycle



Requirement Life Cycle .. Cont..

- **Elicitation Phase**

The starting point of the requirements engineering process is an elicitation process that involves a number of people to ensure consideration of a broad scope of potential ideas and candidate problems

- **Organisation Phase**

In this step there is no transformation of the requirements, but simple classification and categorization. For example, requirements may be grouped into functional vs. nonfunctional requirements.

- **Analysis Phase**

This represents a transformation.

Requirement Life Cycle .. Cont..

- **Prototype Phase**

In this way poorly understood requirements may be tested and perhaps strengthened, corrected, or refined. This activity is often done as a proof of concept and serves to induce feedback from both the stakeholders and engineers.

- **Requirements documentation and specification**

This represents the requirements as the finished product of the stakeholder requirements team. The requirements are compiled into a requirements list or into some equivalent document format. These collected requirements are then transformed into a specification.

Requirements elicitation, documentation, and maintenance

Requirements elicitation

- Requirements determination **addresses the gathering and documenting** of the true and real requirements for the Information System being developed.
- Requirements is the **wants and /or needs** of the user within a problem domain. elicit

Requirements determination questions

- Requirements determination questions
 - Who does it?
 - What is done?
 - Where is it done?
 - When is it done
 - How is it done
 - Why is it done?