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Software Requirements Engineering

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1



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Chapter 1

Introduction to Software Requirements Engineering

2

Outline

- What is Software Requirements ?
- What is Requirement Engineering?
- Why Software Requirements Engineering is Important?



3

Objectives of the Lesson

- Understand the significance of software requirements engineering.
- Learn basic concepts and terminology.
- Familiarize with the processes and techniques for gathering requirements.

4

What is Software Requirement ?

Software requirements are formal descriptions of the capabilities, features, and constraints that a software system must possess to meet the needs and expectations of its stakeholders. They serve as a bridge between the problem domain *(what users need)* and the solution domain *(how the software will address those needs)*.



5

What is Requirement Engineering?

Requirement Engineering is a crucial phase in the software development lifecycle that focuses on defining, documenting, and maintaining requirements for a system. It's the process of systematically eliciting, analyzing, specifying, validating, and managing the needs and constraints of stakeholders for a software project.



6

What is Requirement Engineering?

Key aspects of Requirement Engineering include:

1. **Requirements Elicitation:** Gathering requirements from stakeholders through interviews, surveys, workshops, and other techniques.
2. **Requirements Analysis:** Examining and refining the collected requirements to ensure they are clear, consistent, and feasible.
3. **Requirements Specification:** This activity creates formal models to specify functional and non-functional requirements. It documents them clearly using tools like ER diagrams and DFDs, ensuring they are prioritized and manageable. The goal is a clear, comprehensive document for both developers and stakeholders.



7

What is Requirement Engineering?

Key aspects of Requirement Engineering include:

4. **Requirements Validation:** Confirming that the specified requirements accurately represent stakeholder needs and are realistic and achievable.
5. **Requirements Management:** Tracking and controlling changes to requirements throughout the project lifecycle.



8

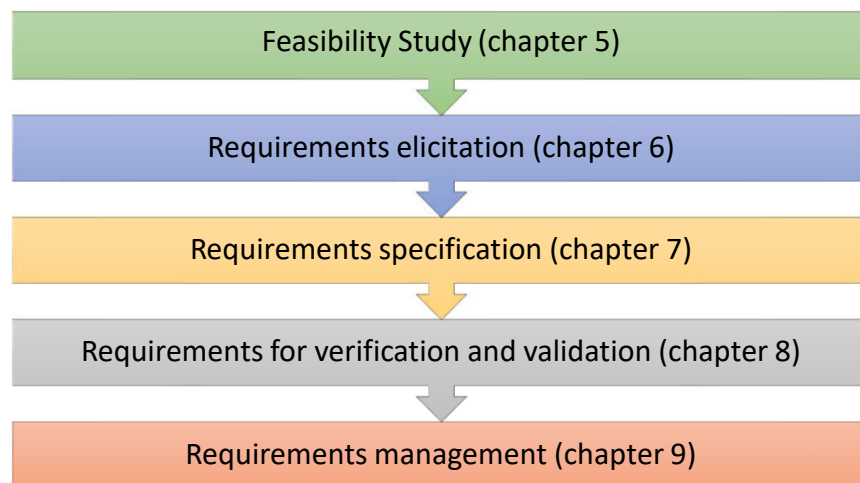
The main goals of Requirement Engineering

1. Ensure that the final product meets user needs and expectations
2. Reduce development costs by identifying and addressing issues early
3. Improve communication between stakeholders and development teams
4. Provide a solid foundation for system design and implementation
5. Facilitate project planning and risk management
6. Effective Requirement Engineering is essential for project success, as poorly defined or misunderstood requirements often lead to project failures, cost overruns, and unsatisfactory end products.



9

Requirements Engineering Process



10

Why Software Requirement Engineering is Important?



Software Requirement Engineering is crucial for several reasons:

1. Clarity and Direction
 - Provides a clear understanding of what the software should do
 - Sets a definitive direction for the development process
2. Stakeholder Alignment
 - Ensures all stakeholders have a shared vision of the project
 - Reduces misunderstandings and conflicts between parties
3. Cost and Time Efficiency
 - Helps identify and resolve issues early, reducing costly changes later
 - Streamlines development by focusing efforts on agreed-upon features

11

Why Software Requirement Engineering is Important?



4. Quality Assurance
 - Forms the basis for testing and validation
 - Helps ensure the final product meets user needs and expectations
5. Risk Management
 - Identifies potential risks and constraints early in the project
 - Allows for proactive problem-solving and mitigation strategies
6. Scope Management
 - Clearly defines project boundaries
 - Helps prevent scope creep and feature bloat



12

Why Software Requirement Engineering is Important?



7. Improved Planning

- Enables more accurate estimation of resources and timelines
- Facilitates better project scheduling and resource allocation

8. Enhanced Communication

- Provides a common reference point for all team members
- Improves communication between technical and non-technical stakeholders

9. Traceability

- Allows for tracking how requirements are implemented
- Facilitates impact analysis for proposed changes



13

Why Software Requirement Engineering is Important



10. Legal and Contractual Compliance

- Provides a basis for contractual agreements
- Helps ensure regulatory compliance where applicable



11. User Satisfaction

- Increases the likelihood of delivering a product that meets user needs
- Leads to higher user acceptance and satisfaction

12. Maintenance and Evolution

- Facilitates easier maintenance and future enhancements
- Provides a reference for understanding system functionality long after development

14

Conclusion

Software requirements and requirements engineering are very important in developing quality software that meets user needs. Focusing on these steps will help in the success of any software development project.

15

Class Activity

1. What is the first step in the Requirements Engineering process, and why is it crucial?
2. How does requirements analysis differ from requirements elicitation?
3. What are the key components of a well-written software requirement specification (SRS)?
4. Why is requirements validation considered an essential step in the Requirements Engineering process?
5. How does requirements management contribute to the overall success of a software project?

16

Thank You

