



SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE NAME : 19CS302 AGILE SOFTWARE ENGINEERING

II YEAR /III SEMESTER

Unit 1- Introduction to Software Engineering

Topic 7: Understanding Requirements





Brain Storming



1. What are all the points or details that must be collected from the customer before developing the product?
2. How to validate the user requirement?



Requirement Engineering



- Processes used to discover, analyse and validate system requirements.
- The process of establishing what services are required and the constraints on the system's operation and development.
- Requirement engineering help software engineers to better understand the problem they will work to solve.
- It encompasses the set of tasks that lead to an understanding of what the business impact of the software will be, what the customer wants and how end-users will interact with the software.

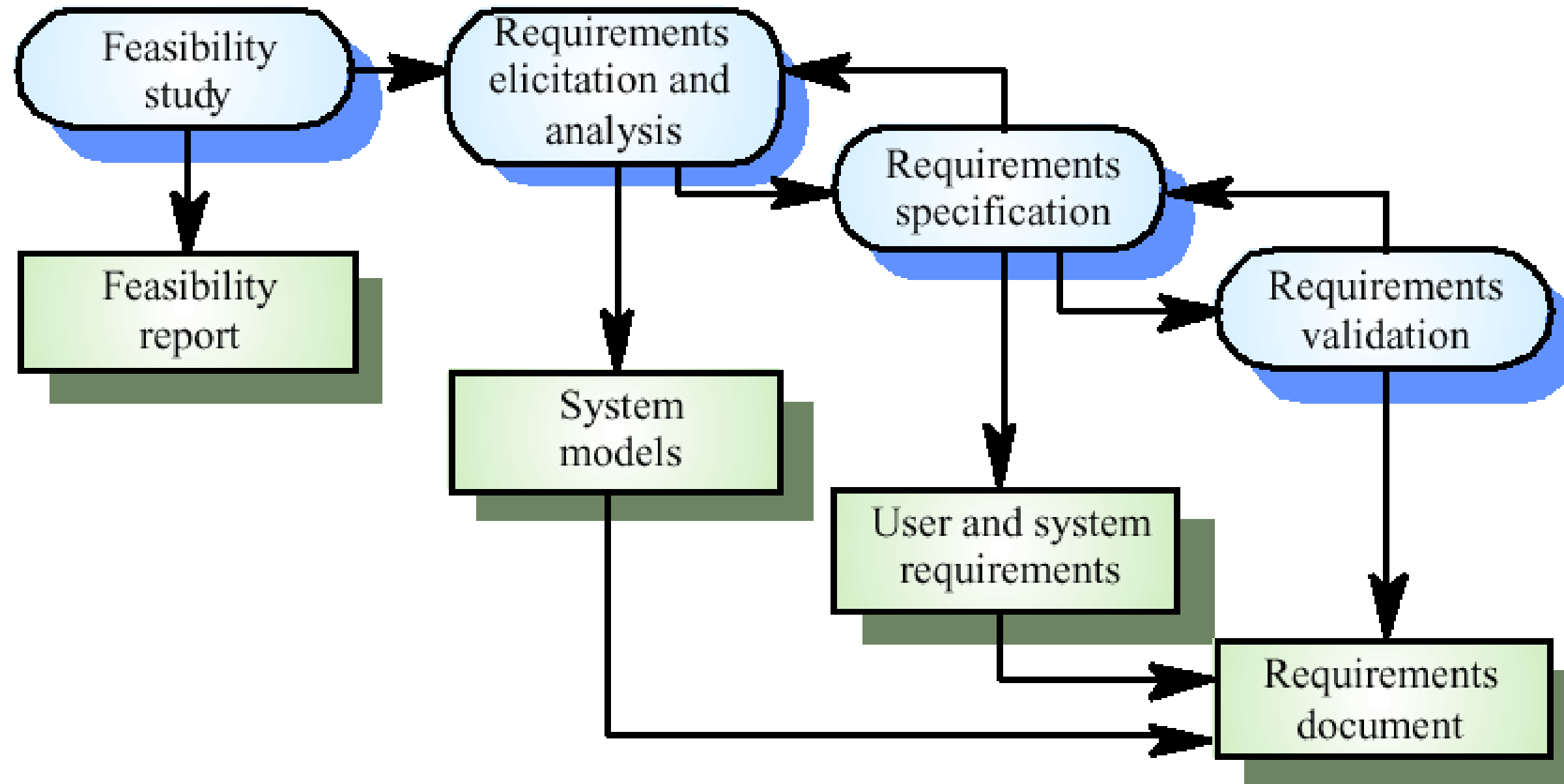


What is a requirement?

- **Requirements** are descriptions of the services that a **software** system must provide and the constraints under which it must operate. **Requirements** can range from high-level abstract statements of services or system constraints to detailed mathematical functional specifications.



Requirement Engineering Process





Feasibility studies

- A feasibility study decides whether or not the proposed system is worthwhile
- A short focused study that checks
 - If the system contributes to organisational objectives
 - If the system can be engineered using current technology and within budget
 - If the system can be integrated with other systems that are used



Elicitation and analysis



- Sometimes called requirements elicitation or requirements discovery
- Involves technical staff working with customers to find out about the application domain, the services that the system should provide and the system's operational constraints
- May involve end-users, managers, engineers involved in maintenance, domain experts, trade unions, etc. These are called *stakeholders*
- Requirements elicitation practice include the following:
 - Interviews
 - Questionnaires
 - User observation
 - Workshops
 - Brain storming
 - Use cases
 - Role playing
 - And prototyping



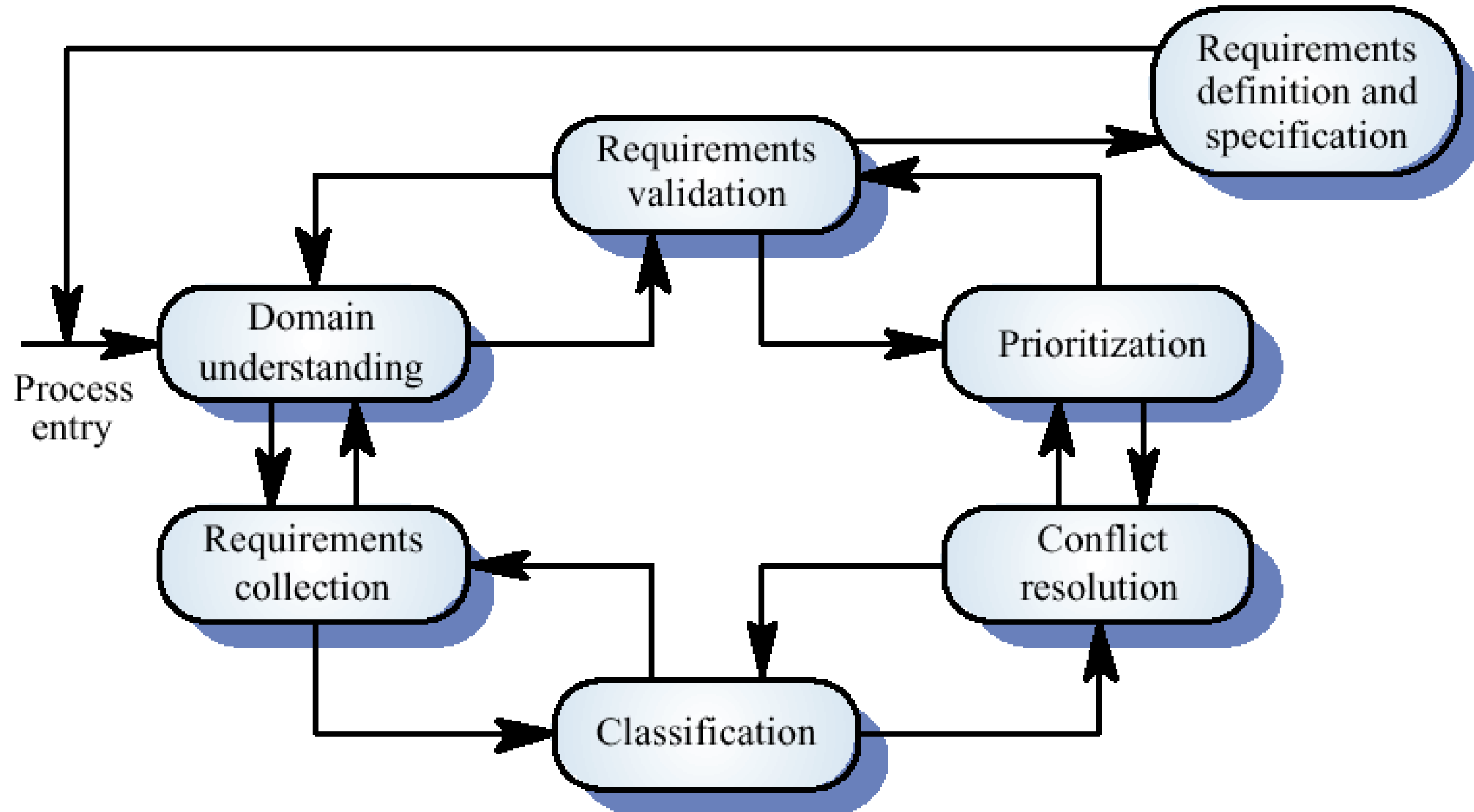
Problems of requirements analysis



- Stakeholders don't know what they really want
- Stakeholders express requirements in their own terms
- Different stakeholders may have conflicting requirements
- Organisational and political factors may influence the system requirements
- The requirements change during the analysis process. New stakeholders may emerge and the business environment change



The requirements analysis process





Requirements Analysis



- Requirements Analysis, determining whether the stated requirements are clear, complete, consistent and unambiguous.

Stakeholder Identification

- Stakeholders are people or organizations that have a valid interest in the system. They may be affected by it directly or indirectly.

Stake holders may include:

- Anyone who operates the system
- Anyone who benefits from the system
- Anyone involved in purchasing or procuring the system
- People opposed to the system (negative stakeholders)

Organizations responsible for the system



Conti...



Stakeholder Interviews

- Interviews are a common technique used in requirement analysis.
- This technique can serve as a means of obtaining the highly focused knowledge from different stakeholders perspectives
- **Types of Requirements:**
- **Customer Requirements:**
- Operational distribution or deployment: Where will the system be used?
- Mission profile or scenario: How will the system accomplish its mission objective?
- Performance and related parameters: What are the critical system parameters to accomplish the mission?



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- Utilization environments: how are the various system components to be used?
- Effectiveness requirements: How effective or efficient must the system be in performing its mission?
- Operational life cycle: How long will the system be in use by the user?
- Environment: what environments will the system be expected to operate in an effective manner?



Conti...



- **Types of Requirements:**

- **Architectural Requirements:**

- A formal description and representation of a system, organized in a way that support reasoning about the structure of the system which comprises system components, the externally visible properties of those components, the relationships and the behavior between them, and provides a plan from which products can be procured and systems developed, that will work together to implement the overall system.



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- **Types of Requirements:**

- **Functional Requirements:**

- Defines functions of a software system or its components. They may be calculations, technical details, data manipulation and processing and other specific functionality that define “what a system is supposed to accomplish?”
- They describe particular results of a system.
- Functional requirements are supported by Non-functional requirements.



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- **Types of Requirements:**

- **Non-Functional Requirements:**

- They are requirements that specify criteria that can be used to judge the operation of a system, rather than specific behavior.
- Functional requirements define what the system is supposed to **do**, whereas non-functional requirements define how a system is supposed to **be**.
- Non-functional requirements can be divided into two main categories:
 - Execution qualities, such as security and usability, which are observable at runtime.
 - Evolution qualities, such as testability, maintainability and scalability.



Requirements Specifications

- Requirements Specification is the direct result of a requirement analysis and can refer to:
 - **Software Requirements Specification**
 - **Hardware Requirements Specification**



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A Software Requirements Specification (SRS) – a requirements specification for a software system – is a complete description of the behavior of a system to be developed. It includes a set of use cases that describe all the interactions the users will have with the software. In addition to use cases, the SRS also contains non-functional requirements (such as performance requirements, quality standards, or design constraints)



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- A Software Requirements Specification (SRS)
 - The software requirement specification document enlists all necessary requirements for project development. To derive the requirements we need to have clear and thorough understanding of the products to be developed.
 - A general organization of an SRS is as follows:
 - Introduction
 - Purpose, Scope, Definitions, System Overview, References
 - Overall Description
 - Product Perspective, Product functions, User characteristics, constraints, assumptions and dependencies.
 - Specific Requirements
 - External Interface requirements, functional requirements, performance requirements, design constraints, logical database requirement, software system attributes.



Requirements Validation and Verification



- Validation (& Verification), is the process of checking whether the requirements, as identified, do not contradict the expectations about the system of various stakeholders and do not contradict each other.
- It is Requirements Quality Control



Validation Vs. Verification



- **Validation:** “Am I building the right product?” checking a work product against higher-level work products or authorities that frame this particular product.
- Requirements are validated by stakeholders

- **Verification:** “Am I building the product right?” checking a work product against some standards and conditions imposed on this type of product and the process of its development.
- Requirements are verified by the analysts mainly



More about validation



- Requirements validation makes sure that requirements meet stakeholders' goals and don't conflict with them.

Requirement Engineering Process



How the customer explained it



How the Project Leader understood it



How the Analyst designed it

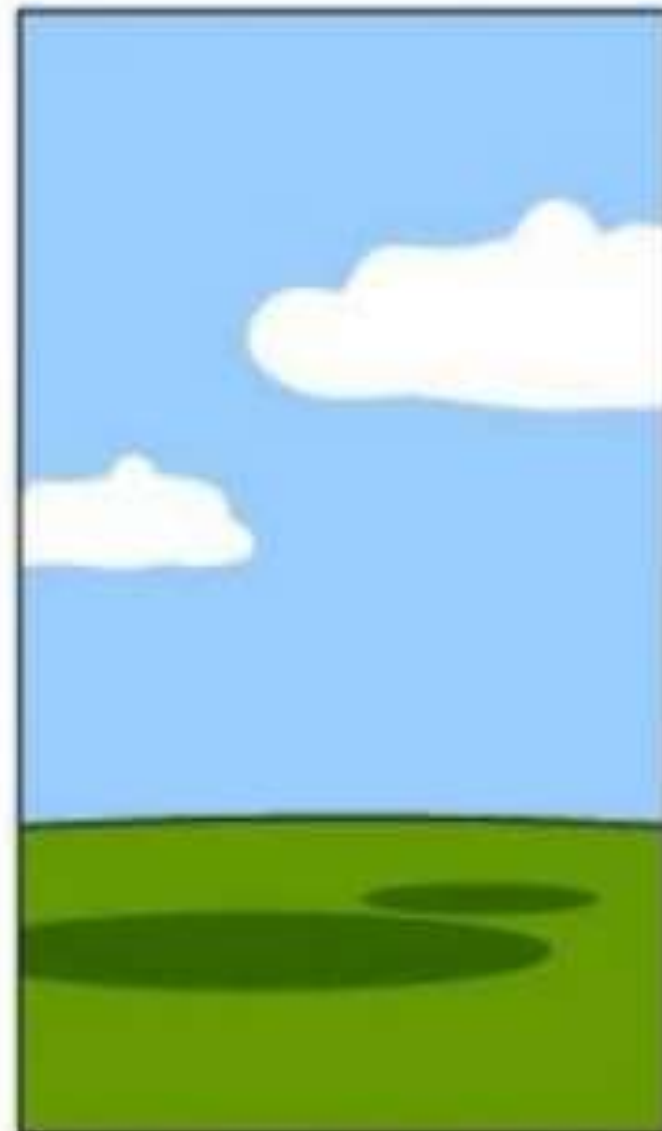


How the Programmer wrote it

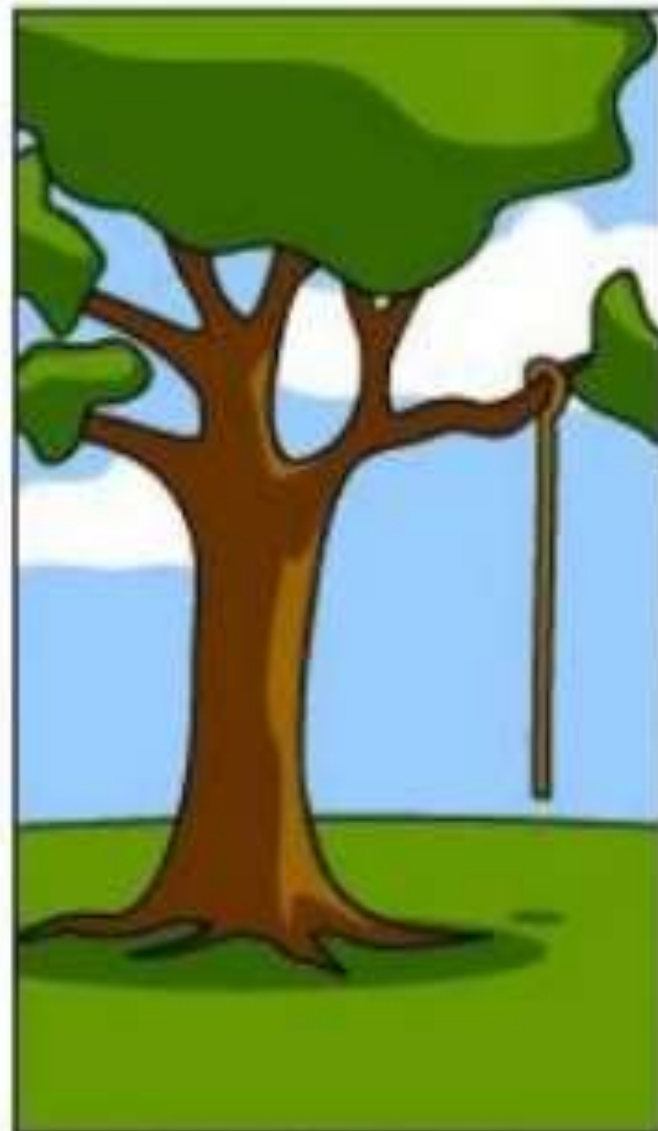


How the Business Consultant described it

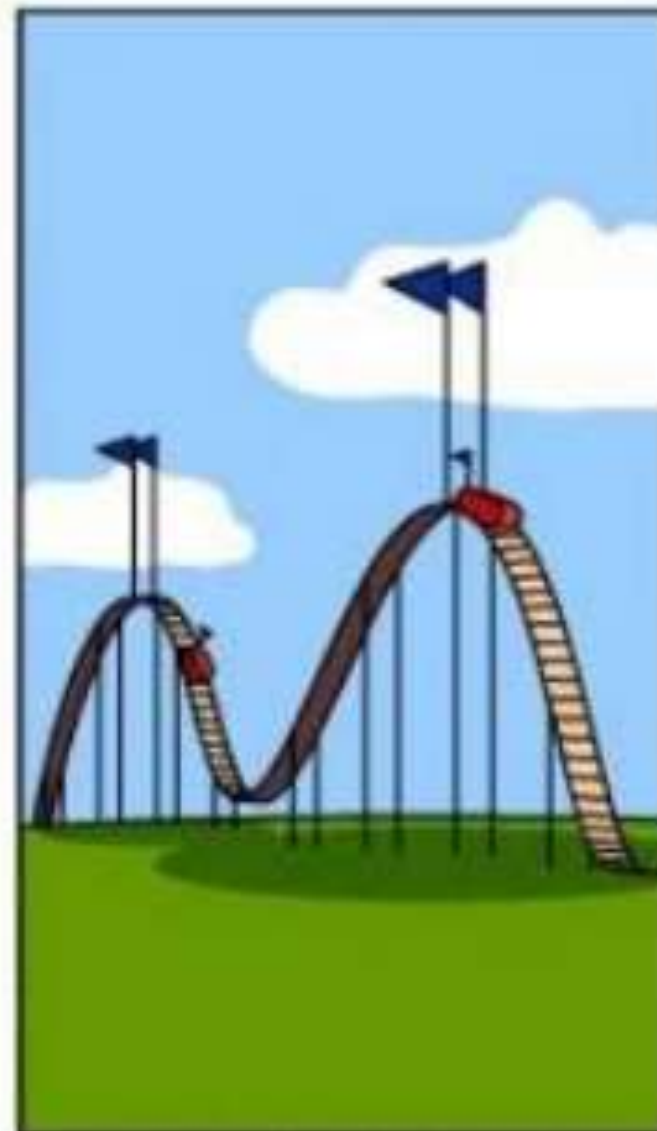
Requirement Engineering Process



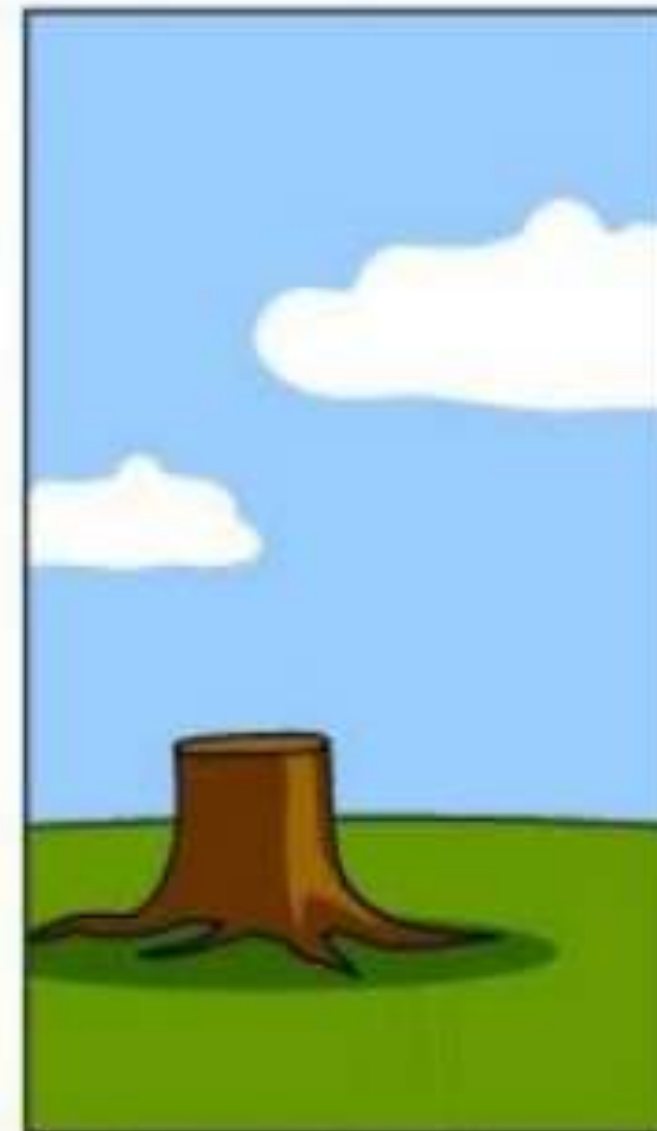
How the project was documented



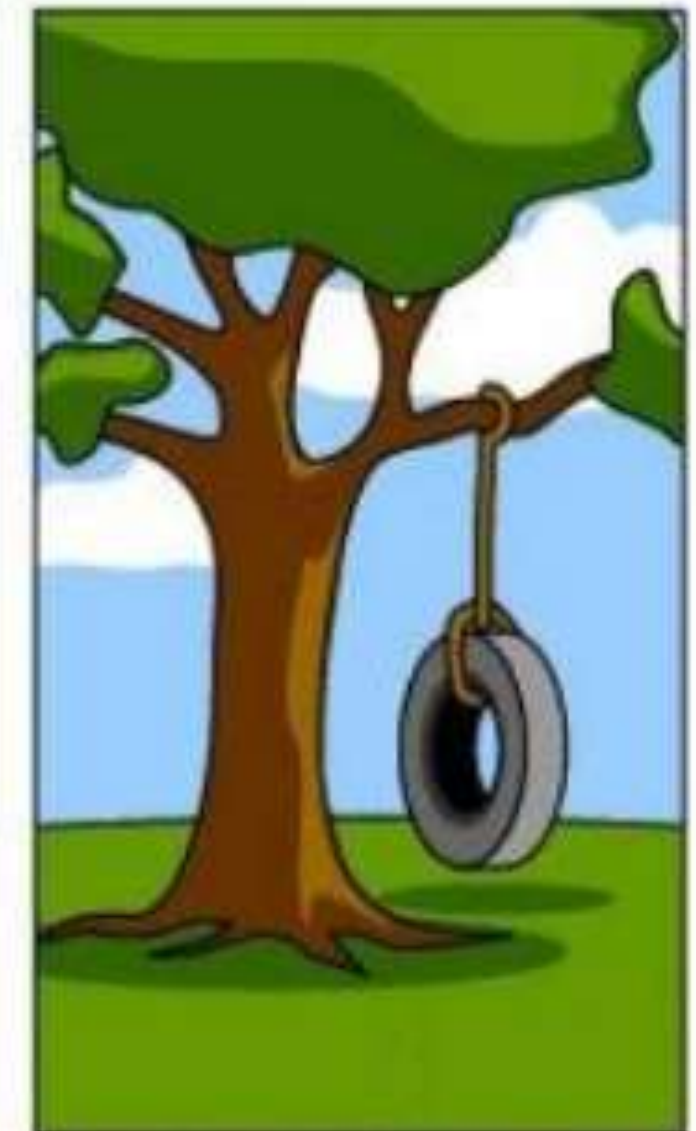
What operations installed



How the customer was billed



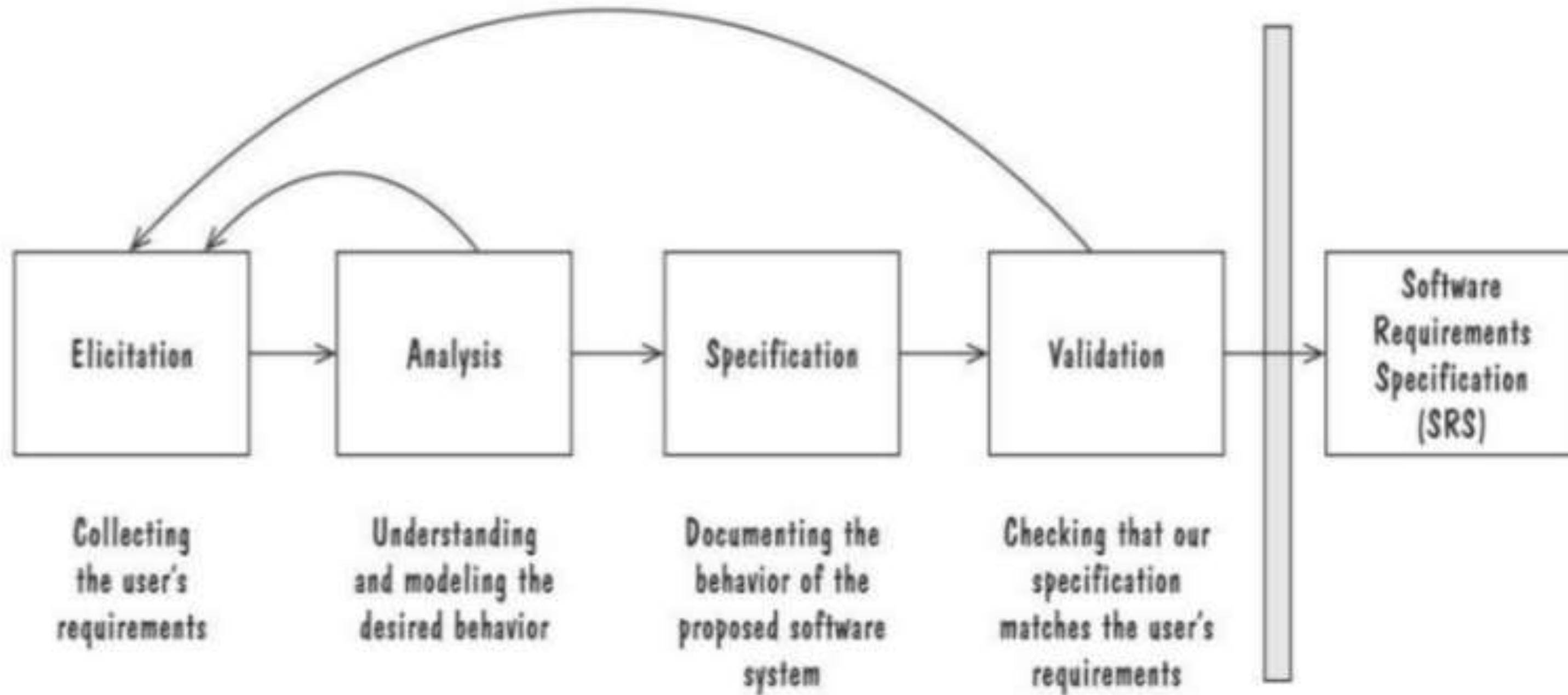
How it was supported



What the customer really needed



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Assessment 1



1. What is System requirement?

Ans : _____

2. What is User requirement?

Ans : _____





References



1. Roger S. Pressman, Software engineering- A practitioner's Approach, 10th Edition, McGraw-Hill, 2017.
2. Ken Schawber, Mike "Agile Software Development with Scrum" Pearson Education, 2nd Edition, 2015.

Thank You