Unit 2.1

Requirement Engineering

# Requirement Analysis & Specification

# Requirement Engineering

Requirements describe

**What not How**

Produces one large document written in natural language contains a description of what the system will do without describing how it will do it

Crucial process steps

Quality of product → Process that creates it

Without well written document

-- Developers do not know what to build

-- Customers do not know what to expect

-- What to validate

# Requirement Engineering

Requirement Engineering is the displined application of proven principles, methods, tools and notations to describe a proposed system's intended behavior and is associated constraints.

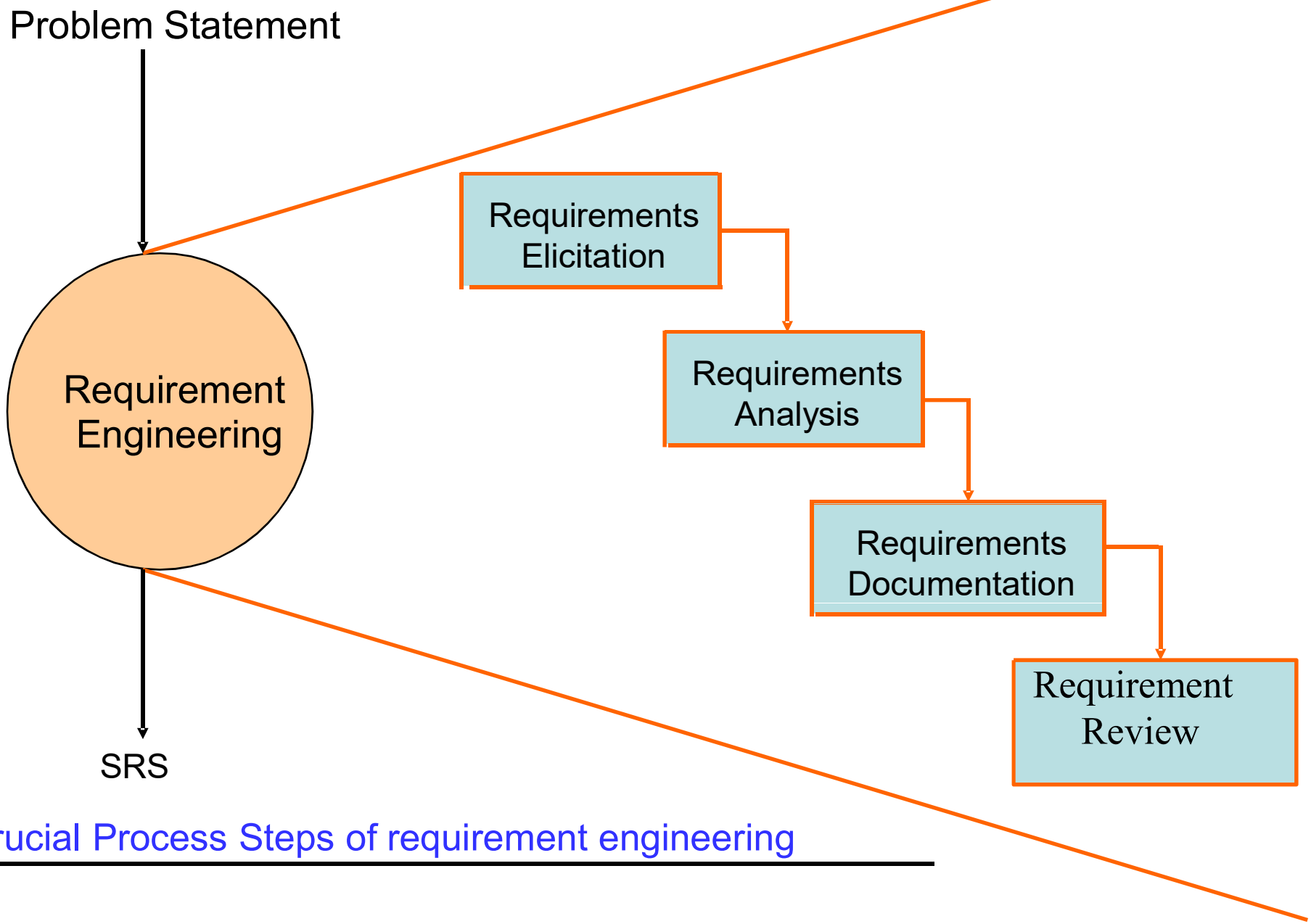
**Requirements engineering is a process of gathering and defining of what the services should be provided by the system.**

**SRS may act as a contract between developend customer**

Requirements are difficult to uncover

- Requirements change
- Over reliance on CASE Tools
- Tight project Schedule
- Communication barriers
- Market driven software development
- Lack of resources

# Requirement Engineering

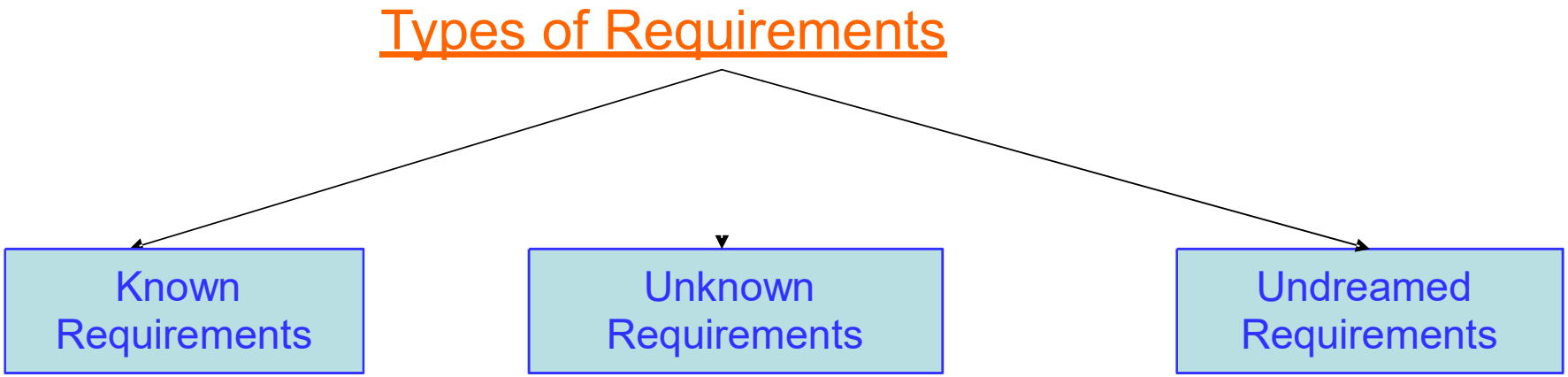



Crucial Process Steps of requirement engineering

# Requirement Engineering

- Tasks and techniques that lead to an understanding of requirements is called requirement engineering.
- Requirement engineering provides the appropriate mechanism for understanding
  - What customer wants
  - Analyzing needs
  - Assessing feasibility
  - Negotiating a reasonable solution
  - Specifying solution unambiguously
  - Validating the specification
  - Managing requirements

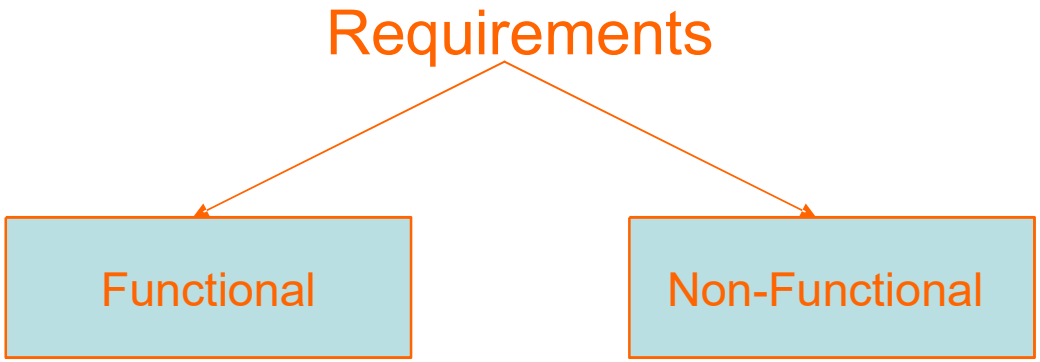
# Types of Requirements




Stakeholder: Anyone who should have some direct or indirect influence on the system requirements

--- User

--- Affected persons



# Types of Requirements

Functional requirements describe what the software has to do They are often called product features

Non Functional requirements are mostly quality requirements That stipulate how well the software does, what it has to do

Availability
Reliability
Usability
Flexibility

} For Users

Maintainability
Portability
Testability

} For Developers

# Functional requirements

Any requirement which specifies what the system should do.

A functional requirement will describe a particular behaviour of function of the system when certain conditions are met, for example: “Send email when a new customer signs up” or “Open a new account”.

Typical functional requirements include:

- Business Rules
- Transaction corrections, adjustments and cancellations
- Administrative functions
- Authentication
- Authorization levels
- Audit Tracking
- External Interfaces
- Reporting Requirements
- Historical Data
- Legal or Regulatory Requirements

**Functional requirements describe what the software has to do**

# Non-Functional requirements

Any requirement which specifies how the system performs a certain function.

A non-functional requirement will describe how a system should behave and what limits there are on its functionality.

Typical Non-Functional requirements include:

- Response time
- Throughput
- Utilization
- Static volumetric
- Scalability
- Capacity
- Availability
- Reliability
- Recoverability
- Maintainability
- Serviceability
- Security
- Regulatory
- Manageability
- Environmental
- Data Integrity
- Usability
- Interoperability

**non-functional requirements are mostly quality requirement that specifies how well the software does what it is supposed to do.**

# Library Management System

## Function Requirements

- Add Article: New entries must be entered in database
- Update Article: Any changes in articles should be updated in case of update
- Delete Article: Wrong entry must be removed from system
- Inquiry Members: Inquiry all current enrolled members to view their details
- Inquiry Issuance: Inquiry all database articles
- Check out Article: To issue any article must be checked out
- Check In article: After receiving any article system will reenter article by Checking
- Inquiry waiting for approvals: Librarian will generates all newly application which is in waiting list
- Reserve Article: This use case is used to reserve any book with the name of librarian, it can be pledged
- Set user Permission: From this user case Librarian can give permission categorically, alsoenabling/disabling of user permission can be set through this use case

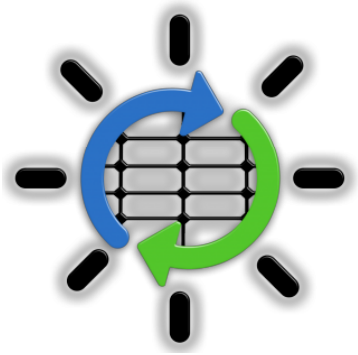
# Library Management System

## Non-Function Requirements

- Safety Requirements: The database may get crashed at any certain time due to virus or operating system failure. Therefore, it is required to take the database backup
- Security Requirements: We are going to develop a secured database for the university. There are different categories of users namely teaching staff, administrator, library staff ,students etc., Depending upon the category of user the access rights are decided. It means if the user is an administrator then he can be able to modify the data, delete, append etc., all other users other than library staff only have the rights to retrieve the information about database.
- Software Constraints: The development of the system will be constrained by the availability of required software such as database and development tools. The availability of these tools will be governed by

# Requirements Engineering Tasks

## 1 Inception



- Roughly define scope
- A basic understanding of a problem, people who want a solution, the nature of solution desired

At project inception, you establish a basic understanding of the problem, the people who want a solution, the nature of the solution that is desired, and the effective- ness of preliminary communication and collaboration between the other stakeholders and the software team.

**Feasibility Study** is a crucial phase in software development

# Requirements Engineering Tasks

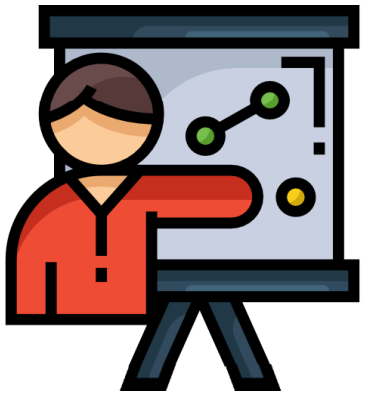
## 2 Elicitation (Requirement Gathering)

- Define requirements
- The practice of collecting the requirements of a system from users, customers and other stakeholders

In **requirements** engineering, **requirements elicitation** is the practice of researching and discovering the **requirements** of a system from users, customers, and other stakeholders. The practice is also sometimes referred to as "**requirement gathering**".

# Requirements Engineering Tasks cont.

## 3 Elaboration



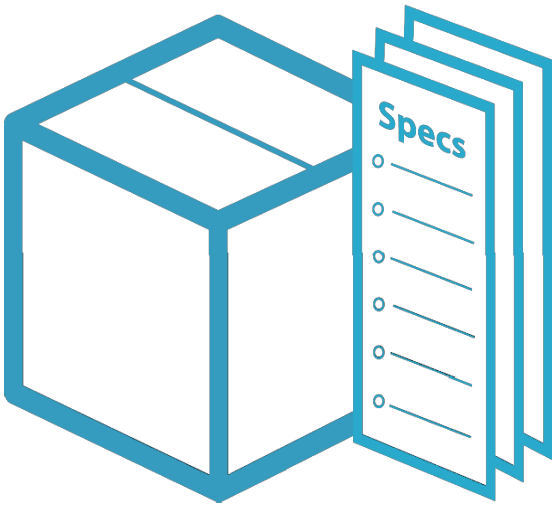
- Further define requirements
- Expand and refine requirements obtained from inception & elicitation
- Creation of User scenarios, extract analysis class and business domain entities

## 4 Negotiation

- Reconcile conflicts
- Agree on a deliverable system that is realistic for developers and customers

# Requirements Engineering Tasks cont.

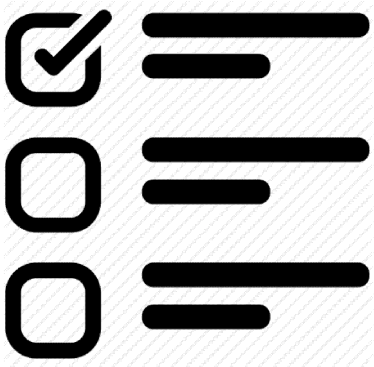
## 5 Specification




- Create analysis model
- It may be written document, set of graphical models, formal mathematical model, collection of user scenarios, prototype or collection of these
- SRS (Software Requirement Specification) is a document that is created when a detailed description of all aspects of software to build must be specified before starting of project

# Requirements Engineering Tasks cont.

## 6 Validation



- Ensure quality of requirements
- Review the requirements specification for errors, ambiguities, omissions (absence) and conflicts

## 7 Requirements Management

- It is a set of activities to identify, control & trace requirements & changes to requirements (Umbrella Activities) at any time as the project proceeds.