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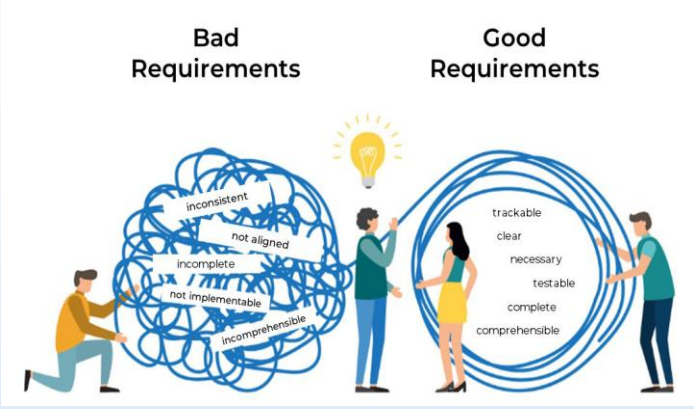
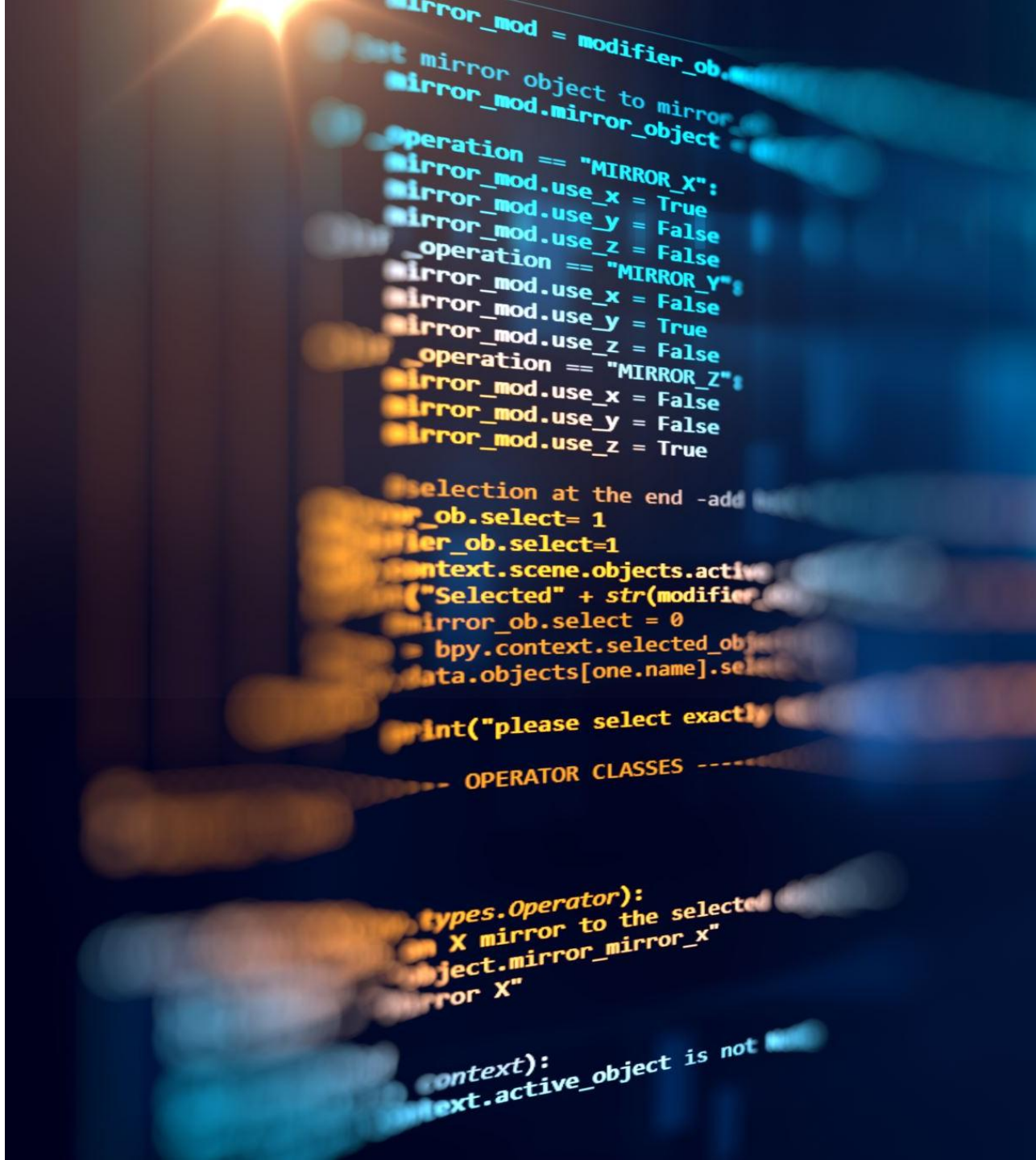


INFORMATION SYSTEMS 3A

Requirements Engineering Concepts

Contents



What is a Requirement

- The software requirements are description of features and functionalities of the target system.
- Requirements convey the expectations of users from the software product. The requirements can be obvious or hidden, known or unknown, expected or unexpected from the client's point of view.

Requirement Engineering

- Requirements engineering (RE) is the process of defining, documenting, and maintaining requirements in the engineering design process.
- The system requirements are the descriptions of the system services and constraints that are generated during the requirements engineering process.

Types of Requirements

User requirements

User requirements are defined using natural language, tables, and diagrams as these can be understood by all users.

Should describe functional and non-functional requirements in such a way that they are understandable by system users who don't have detailed technical knowledge.

System requirements

More detailed specifications of system functions, services, and constraints than user requirements.

They are intended to be a basis for designing the system.

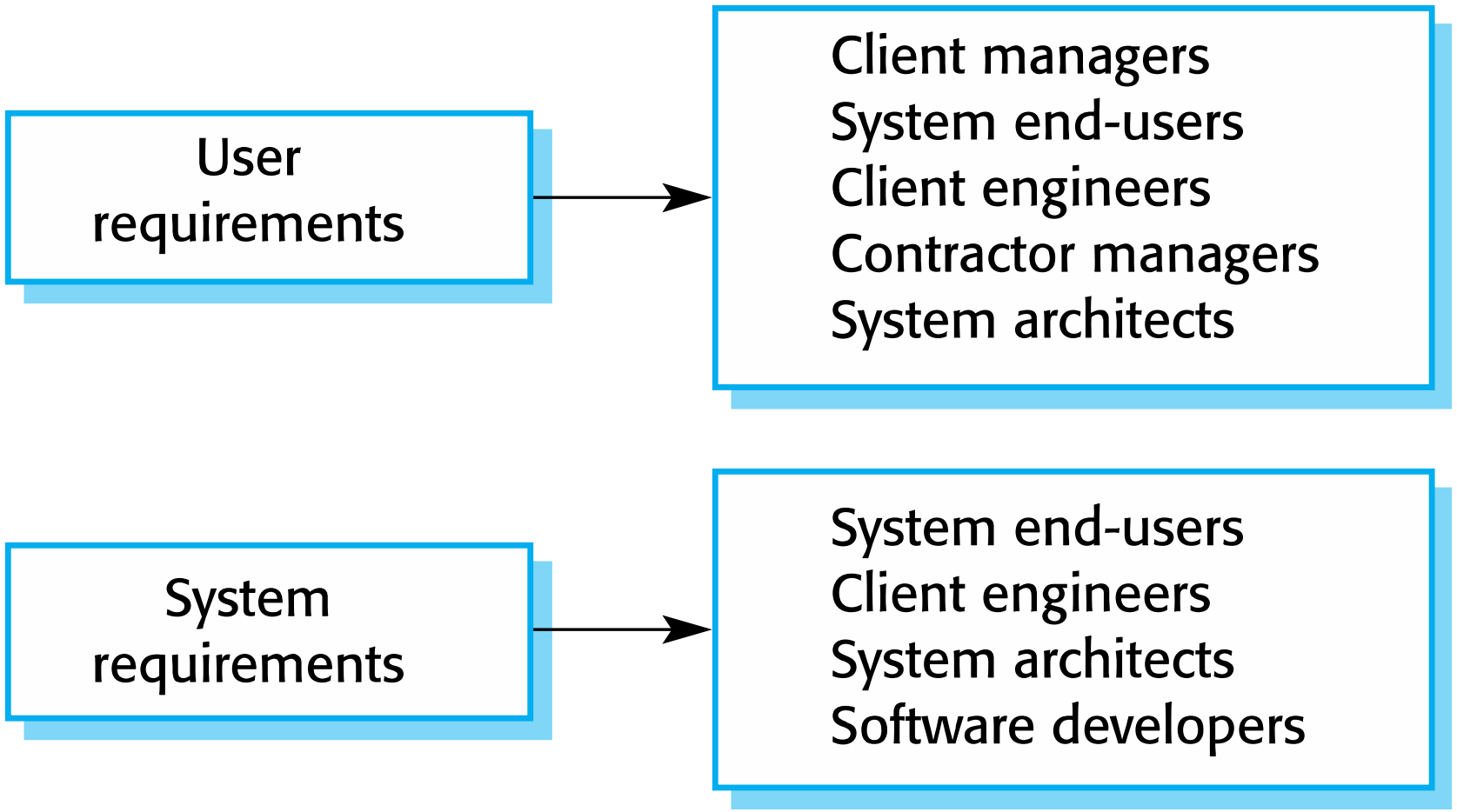
User requirements definition

1. The Mentcare system shall generate monthly management reports showing the cost of drugs prescribed by each clinic during that month.

System requirements specification

1.1 On the last working day of each month, a summary of the drugs prescribed, their cost and the prescribing clinics shall be generated.
1.2 The system shall generate the report for printing after 17.30 on the last working day of the month.
1.3 A report shall be created for each clinic and shall list the individual drug names, the total number of prescriptions, the number of doses prescribed and the total cost of the prescribed drugs.
1.4 If drugs are available in different dose units (e.g. 10mg, 20mg, etc) separate reports shall be created for each dose unit.
1.5 Access to drug cost reports shall be restricted to authorized users as listed on a management access control list.

Readers of different types of requirements specification



Functional and Non-functional requirements

Functional requirements

- In software development, functional requirements describe what a system should do, defining its features and functionalities.
- Functional requirements define "what" a system does.

Non-functional requirements

- Non-functional requirements specify how the system should behave, focusing on qualities like performance, security, usability, and reliability, essentially defining the system's quality attributes rather than its specific actions.
- Non-functional requirements define "how well" it does it.

Sl.No	Functional Requirement	Non-functional Requirement
1.	Defines all the services or functions required by the customer that must be provided by the system	Defines system properties and constraints e.g. reliability, response time and storage requirements. Constraints are I/O device capability, system representations, etc.
2.	It describes what the software should do.	It does not describe what the software will do, but how the software will do it.
3.	Related to business. For example: Calculation of order value by Sales Department or gross pay by the Payroll Department	Related to improving the performance of the business. For example: checking the level of security. An operator should be allowed to view only my name and personal identification code.
4.	Functional requirement are easy to test.	Nonfunctional requirements are difficult to test
5.	Related to the individual system features	Related to the system as a whole
6.	Failure to meet the individual functional requirement may degrade the system	Failure to meet a non-functional requirement may make the whole system unusable.

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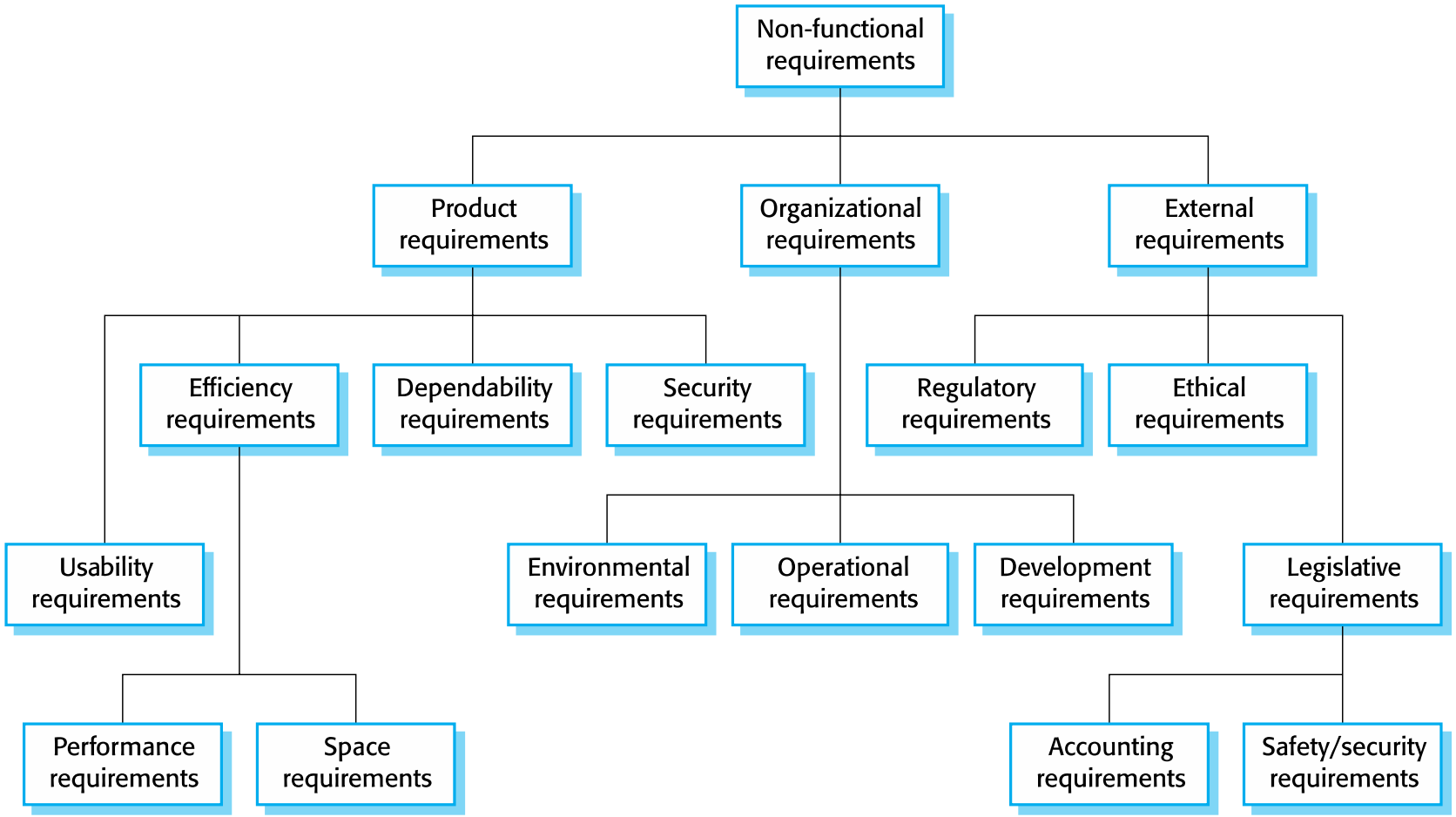
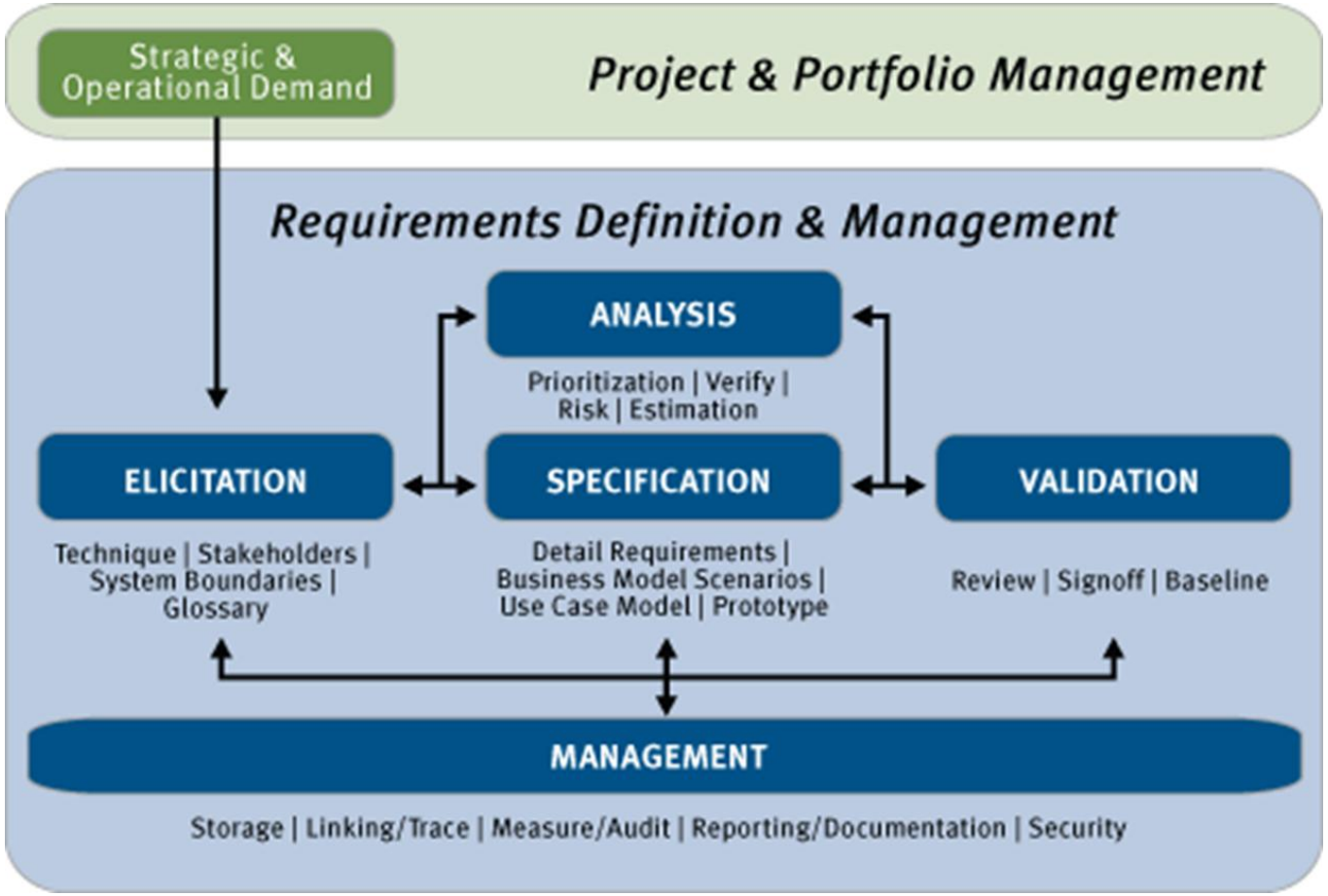
Types of nonfunctional requirement

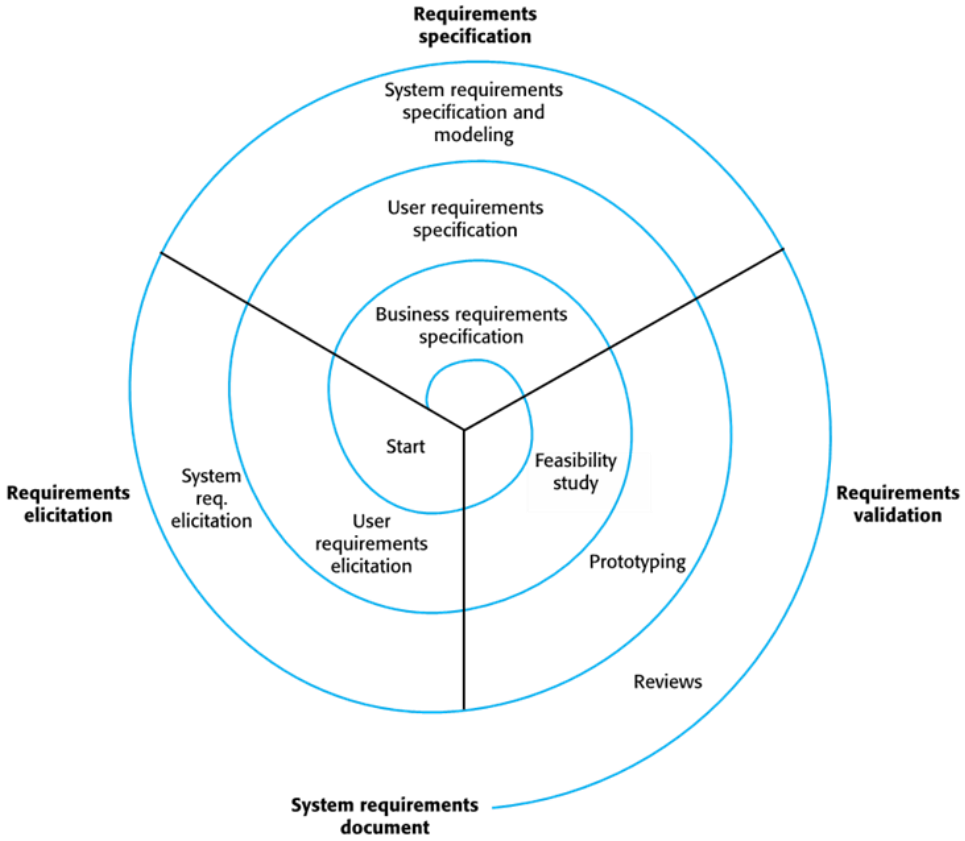


Key tasks in requirements engineering

- **Elicitation**
- **Specification**
- **Validation**
- **Management**



Requirements engineering processes



Spiral view of the req eng process in Sommerville, 2016

Requirements elicitation

- Requirements Elicitation is the process of finding out the requirements for an intended software system by communicating with clients, end users, system users, and others who have a stake in the software system development.

There are various ways to discover the requirements:

- **Interviews** are a strong medium to collect requirements. Organizations may conduct several types of interviews.
- **Surveys** Organization may conduct surveys among various stakeholders by querying about their expectations and requirements from the upcoming system.
- **Questionnaires** A document with a pre-defined set of objective questions and respective options is handed over to all stakeholders to answer, which are collected and compiled.
  Brainstorming An informal debate is held among various stakeholders and all their inputs are recorded for further requirements analysis.

Challenges of requirements elicitation

- Clients don’t always understand ICT and hence, find it difficult to express what they want the system to do
- Developers don’t always understand implicit knowledge of the business domain
- Stakeholders will have different perspectives on the software.
- Political influence on requirements
- Requirements change during this stage

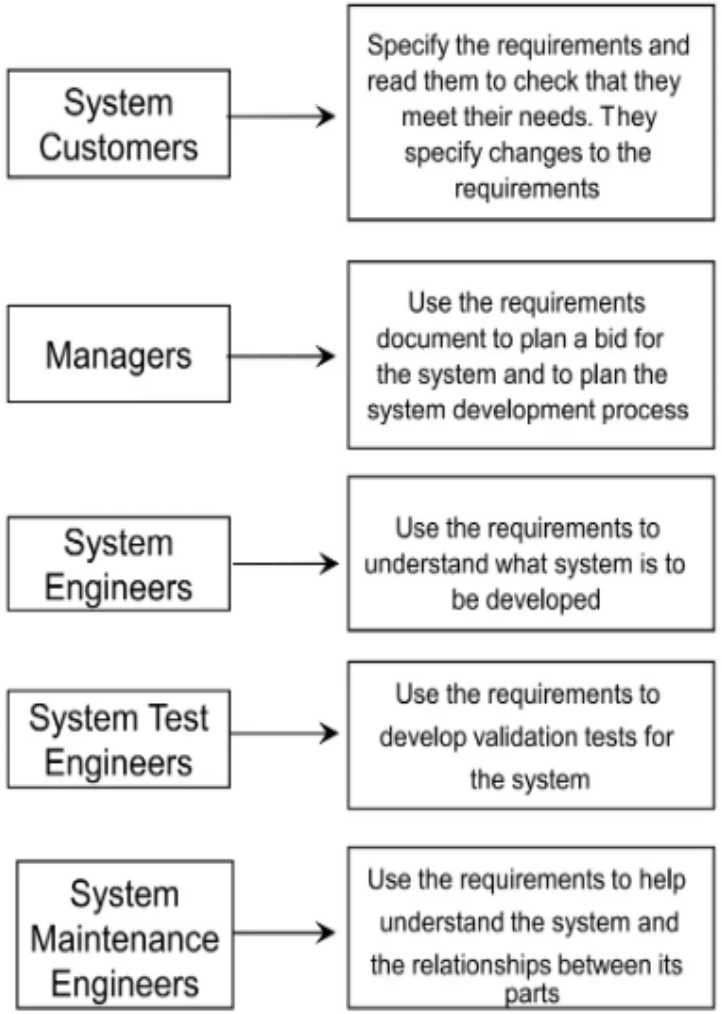
Requirements specification

- The process of writing down the user and system requirements in a requirements document.
- **Approaches**
  - Natural language specification
  - Structured specifications e.g. VOLERE
  - Uses cases
  - Software requirements specification (SRS)
  - Agile software development approaches

The Software Requirements Document

- The requirements document is the official statement of what is required of the system developers.
- Should include both a definition of user requirements and a specification of the system requirements.
- It is NOT a design document. As far as possible, it should set of WHAT the system should do rather than HOW it should do it

Users of a Requirement document



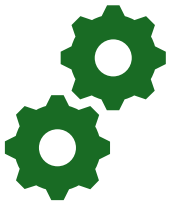
Requirements validation

- Concerned with demonstrating that the requirements define the system that the customer wants.
- Requirements error costs are high so validation is very important
  - Fixing a requirements error after delivery may cost up to 100 times the cost of fixing an implementation error.
- Validity
- Consistent
- Complete
- Real
- Verifiable

Requirements validation techniques

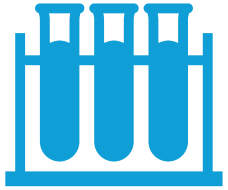
Requirements reviews

Systematic manual analysis of the requirements.



Prototyping

Using an executable model of the system to check requirements. Covered in Chapter 2.



Test-case generation

Developing tests for requirements to check testability.

Requirements evolution