Software Engineering-BSCE-301L

Module 3:

Modeling Requirements

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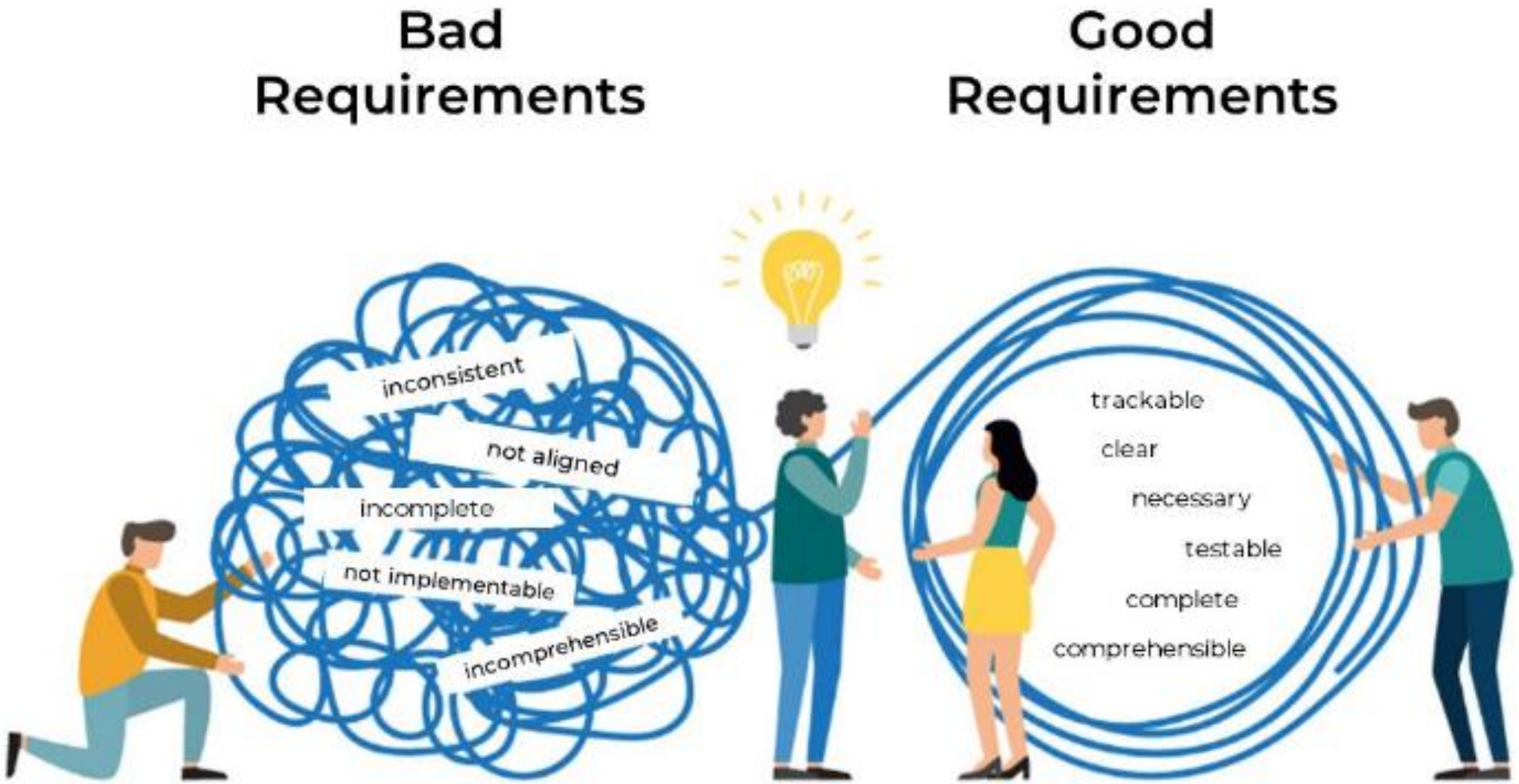
Outline

- Software Requirements and its Types
- Requirements Engineering Process
- Requirement Elicitation
- System Modeling – Requirements Specification and Requirement Validation
- Requirements Elicitation techniques
- Requirements management in Agile

Software Requirements and its Types

- The requirement can be defined as a high-level abstract statement or a detailed mathematical functional specification of a system's services, functions, and constraints.
- They are depictions of the characteristics and functionalities of the target system.
- Requirements denote the expectations of users from the software product.
- The requirement should be open to interpretation and detailed enough to understand.
- It is essential to know about software requirements because it minimizes the developer's time and effort and the development cost.
- We have also discussed requirement engineering and the process in one of our articles.

Software Requirements and its Types



Types of software requirements

Business requirements	User requirements	Software requirements
Outline measurable goals for the business.	Reflect specific user needs or expectations.	Identify features, functions, non-functional requirements and use cases.
Define the *why* behind a software project.	Describe the *who* of a software project.	Delve into the *how* of a software project.
Match project goals to stakeholder goals.	Highlight how users interact with it.	Describe software as functional modules and non-functional attributes.
Maintain a BRD with requirements, updates or changes.	Create a URS, or make them part of the BRD.	Compose an SRS, and, optionally, an FRS.

Software Requirements and its Types

❑Business requirements

❑Business needs drive many software projects.

❑A business requirements document (BRD) outlines measurable project goals for the business, users and other stakeholders.

❑Business analysts, leaders and other project sponsors create the BRD at the start of the project. This document defines the *why* behind the build.

❑For software development contractors, the BRD also serves as the basis for more detailed document preparation with clients.

❑A BRD is composed of one or more statements. No universally established format exists for BRD statements, but one common approach is to align goals:

❑ Write statements that match a project goal to a measurable stakeholder or business goal. The basic format of a BRD statement looks like:

"The [project name] software will [meet a business goal] in order to [realize a business benefit]."

Software Requirements and its Types

❑User Requirements

❑User requirements reflect the specific needs or expectations of the software's customers.

❑Organizations sometimes incorporate these requirements into a BRD, but an application that poses extensive user functionality or complex UI issues might justify a separate document specific to the needs of the intended user.

❑User requirements -- much like user stories -- highlight the ways in which customers interact with software.

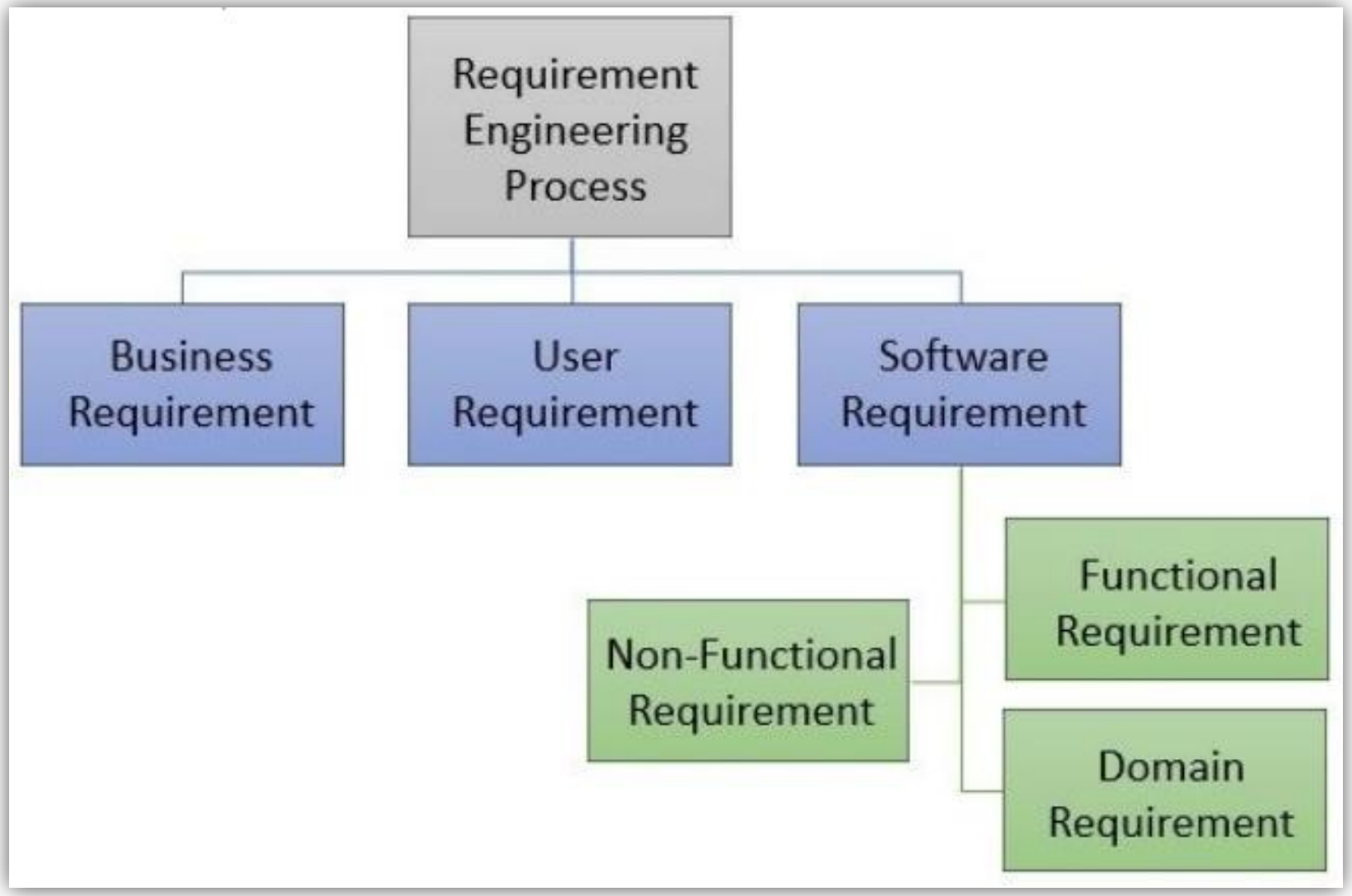
❑There is no universally accepted standard for user requirements statements, but here's one common format:

"The [user type] shall [interact with the software] in order to [meet a business goal or achieve a result]."

Software Requirements and its Types

❑**Software Requirements:** There are three types of Software requirements as follows:

1. Functional requirements
2. Non-Functional requirements
3. Domain requirements



Software Requirements and its Types

❑**Functional requirements** are such software requirements that are demanded explicitly as basic facilities of the system by the end-users.

❑So, these requirements for functionalities should be necessarily incorporated into the system as a part of the contract.

❑They describe system behavior under specific conditions, they are the functions that one can see directly in the final product, and it was the requirements of the users as well.

❑It describes a software system or its components.

❑These are represented as inputs to the software system, its behavior, and its output.

❑It can be a calculation, data manipulation, business process, user interaction, or any other specific functionality which defines what function a system is likely to perform.

❑A functional requirement can range from the high-level abstract statement of the sender's necessity to detailed mathematical functional requirement specifications.

1. Natural language

2. A structured or formatted language with no rigorous syntax and formal specification language with proper syntax.

Software Requirements and its Types

❑**Non-functional Requirements(NFRs)** requirements are defined as the quality constraints that the system must satisfy to complete the project contract.

❑But, the extent may vary to which implementation of these factors is done or get relaxed according to one project to another.

❑They are also called non-behavioral requirements or quality requirements/attributes.

❑They deal with issues like, Performance, Reusability, Flexibility, Reliability, Maintainability, Security, Portability

❑**Non-Functional Requirements are classified into many types.**

- Interface Constraints
- Economic Constraints
- Operating Constraints
- Performance constraints**:** storage space, response time, security, etc.
- Life Cycle constraints: portability, maintainability, etc.

Software Requirements and its Types

❑**Domain requirements** are the requirements related to a particular category like software, purpose or industry, or other domain of projects.

❑Domain requirements can be functional or non-functional.

❑These are essential functions that a system of specific domains must necessarily exhibit.

❑The common factor for domain requirements is that they meet established standards or widely accepted feature sets for that category of the software project.

❑Domain requirements typically arise in military, medical, and financial industry sectors.

❑They are identified from that specific domain and are not user-specific.

1. **Software in medical equipment:** In medical equipment, software must be developed per IEC 60601 regarding medical electrical equipment's basic safety and performance. The software can be functional and usable but not acceptable for production because it fails to meet domain requirements.
2. **An Academic Software:** Such software must be developed to maintain records of an institute efficiently. Domain requirement of such software is the functionality of being able to access the list of faculty and list of students of each grade.

Note for Students

- This power point presentation is for lecture, therefore it is suggested that also utilize the text books and lecture notes.