SEN 311 SW Requirements Engineering - LectureNote 1

Prepared by Oneme Egume

28/10/2025

Course Objectives

The course intends to:

a) Understanding key elements in Requirement Engineering.

b) Prepare for and undertake the requirements elicitation tasks.

c) Analyze clients needs.

d) Create models for requirements.

e) Prepare SW requirements' specifications using industry standard.

f) Prepare for and undertake specification reviews.

Learning Outcomes

(a) Identify and analyse stakeholders and their needs.

(b) Apply the core principles of RE.

(c) Elicit and specify requirements using industry standards.

(d) Apply corresponding reference structures (frameworks)

(e) Create models of requirements using a variety of notations and techniques including domain and usage models.

(f) Apply quality assurance techniques

Introduction

The requirements of a system are the descriptions of the features or services that the system exhibits within the specified constraints.

The requirements collected from the customer are organized in some systematic manner and presented in the formal document called software requirements specification (SRS) document.

In the context of SW Engineering, what is a requirement? A requirement is a statement that describes what software system should do or how it should perform. It defines the needs, expectation, and constraints of the users, customers, and other stakeholders that the system must satisfy.

Introduction - 2

What is Engineering? Engineering is the application of scientific , mathematical, and technical knowledge to design, build, and maintain systems, machines, structures, or processes that solve real-world problems that improve human life

What is Requirement Engineering? Requirement Engineering (RE) is the systematic process of discovering, analysing, documenting, and managing the requirements of software systems.

In simple terms, it is the process of investigating the users needs and ensuring that the final software needs those needs.

Definition: RE is the discipline concerned with identifying what a system should do and under what constraints it must operate before the actual design and coding begins. It ensure that the **RIGHT SYSTEM IS BUILT**; not that the system is built correctly.

Introduction - 3

Requirements Engineering is the process of gathering, analyzing, documenting, validating, and managing requirements.

The main goal of requirements engineering is to clearly understand the customer requirements and systematically organize these requirements in the SRS.

Software Requirement

A requirement is a detailed, formal description of system functionalities. It specifies a function that a system or component must be able to perform for customer satisfaction.

IEEE defines a requirement as:

a) "a condition of capability of a system required by customer to solve a problem or achieve an objective."

b) "a capability that a product must possess or something a product must do in order to ultimately satisfy customer need, contract, constraint, standard, specification or other formally imposed documents."

c) "a documented representation of a condition or capability as in (a) or (b)."

Main Activites in Requrement Engineering

1) Requirement Elicitation: Requirememt garthering from stakeholders (users, customers, domain experts,) though interviews, surveys, observations, or workshop.
2) Requirement Analysis: Studying and refining collected requirements to remove conflicts, ambiguities and inconsistencies.
3) Requirement specification: Documenting the requirements in a clear and organised form, usually in SRS document.
4) Requirement Validation: Ensuring that the documented requirements accurately reflect what the users wants and are feasible to implement. This SRS must be reviewed top mgt and approval must be obtained.
5) Requirement Management: Tracking and controlling changes to the requirements throughout the project life cycle.

Importance of Requirement Engineering

a) Ensures clean and common understanding developers and users

b) Reduces errors. rework, and project cost.

c) Forms the foundation for design, testing and maintenance.

d) Helps build software that meets user expectations.

Software requirement diagrammatically

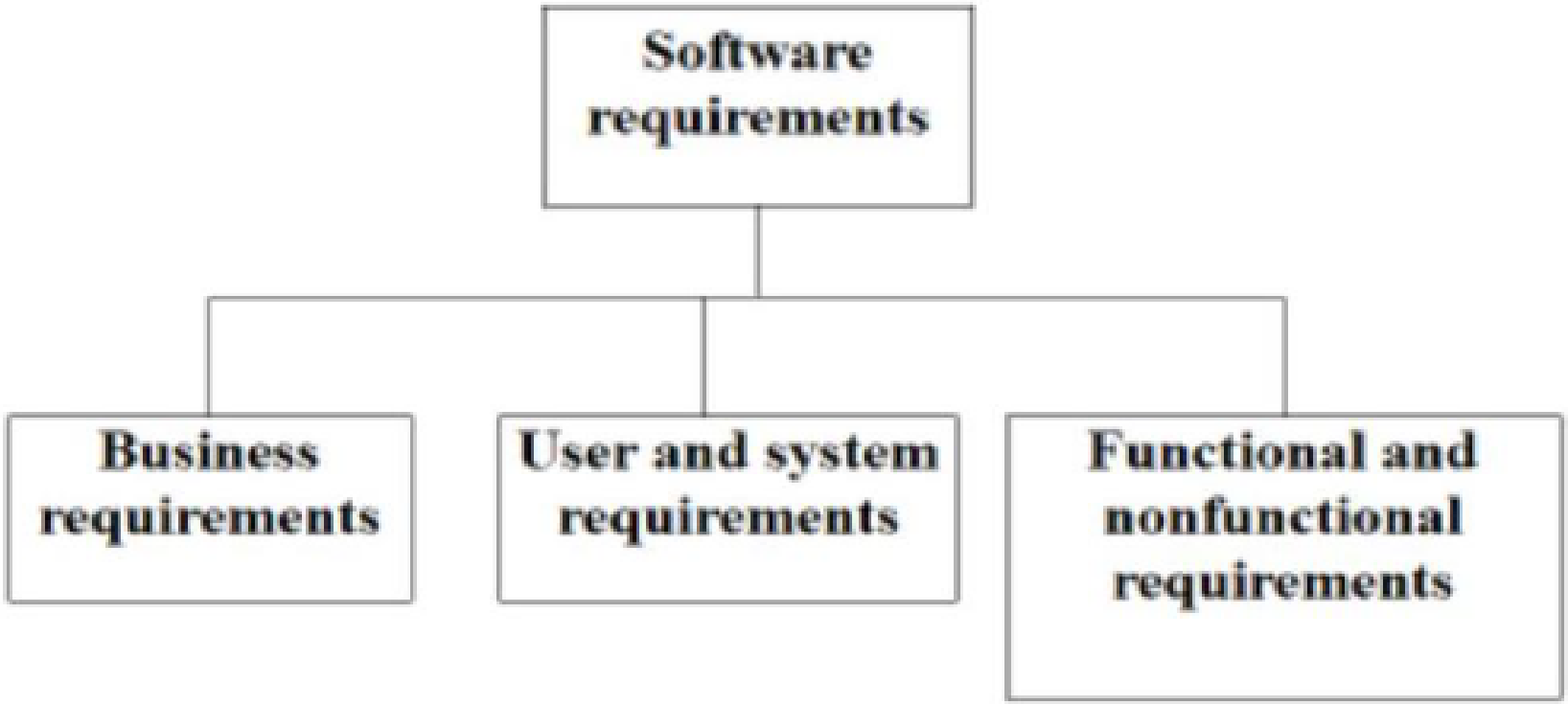

Figure: 1 - Software requirement

Business Requirements

i) Understanding the business rules or the processes of organization is vital to software development.

ii) Business requirements define the project goal and the expected business benefits for doing the project.

iii) The enterprise mission, values, priorities, and strategies must be known to understand the business requirements that cover higher level data models and scope of the models.

The Users' Requirements

i) User requirements are the high-level abstract statements supplied by the customer, end users, or other stakeholders.

ii) These requirements are translated into system requirements keeping in mind user's views.

iii) These requirements are generally represented in some natural language with pictorial representations or tables to understand the requirements.

iv) There may be composite requirements with several complexities and confusions.

v) In an ATM machine, user requirements allow users to withdraw and deposit cash.