
Requirements Engineering in Software Development

CSc3350

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Requirements Engineering

- The process of establishing the services that a customer requires from a system and the constraints under which it operates and is developed.
- 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
 - Statements in natural language plus diagrams of the services the system provides and its operational constraints. Written for customers.
- System requirements
 - A structured document setting out detailed descriptions of the system's functions, services and operational constraints. Defines what should be implemented so written for developers and may be part of a contract between client and contractor.

Functional and Non-Functional Requirements

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- Functional requirements
 - Statements of services the system should provide, how the system should react to particular inputs and how the system should behave in particular situations.
 - May state what the system should not do.
- Non-functional requirements
 - Constraints on the services or functions offered by the system such as timing constraints, constraints on the development process, standards, etc.
 - Often apply to the system as a whole rather than individual features or services.
- Domain requirements
 - Constraints on the system from the domain of operation

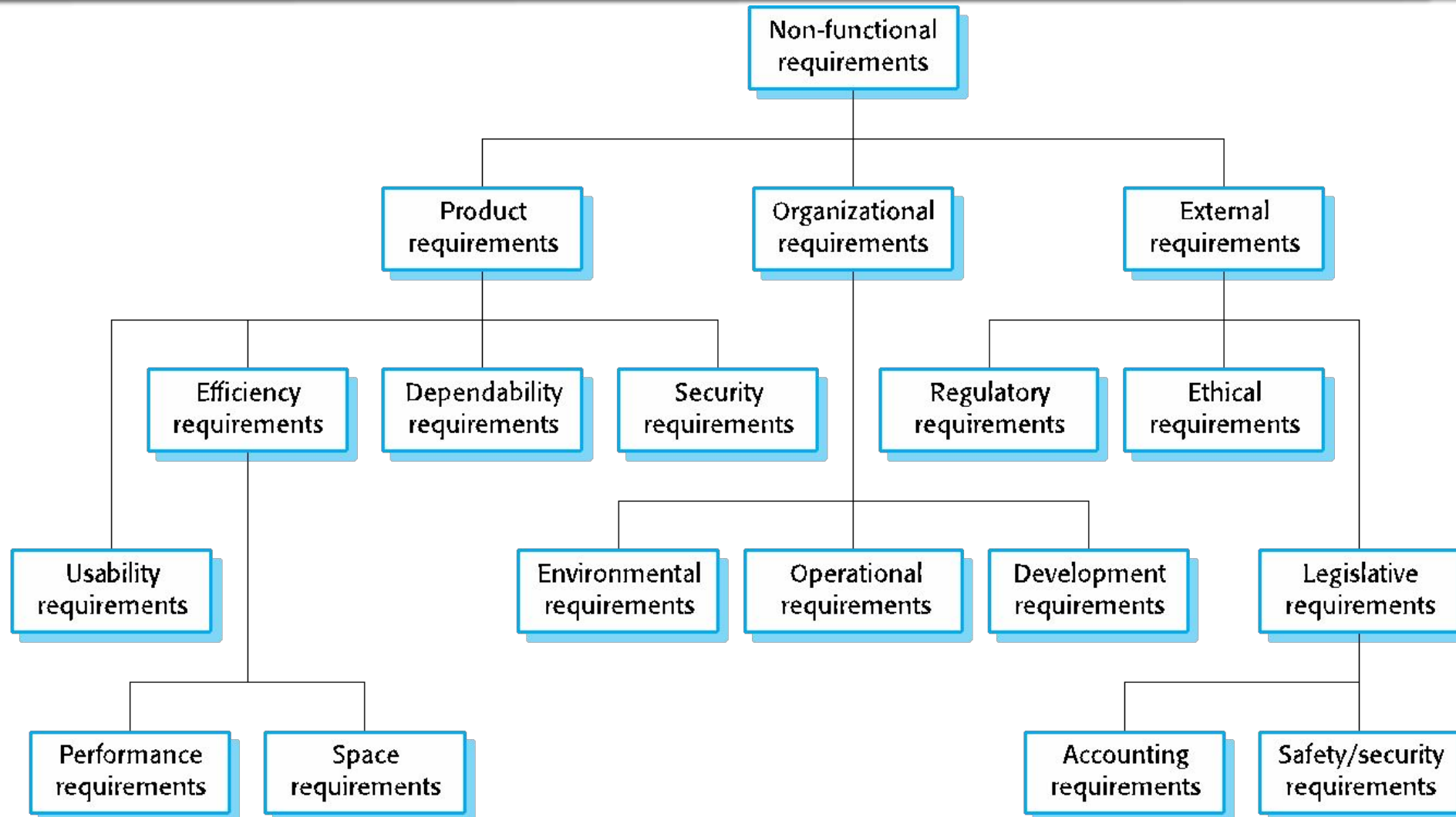
Functional Requirements

- Describe functionality or system services.
- Depend on the type of software, expected users and the type of system where the software is used.
- Functional user requirements may be high-level statements of what the system should do.
- Functional system requirements should describe the system services in detail.

Non-Functional Requirements

- These define system properties and constraints e.g. reliability, response time and storage requirements. Constraints are I/O device capability, system representations, etc.
- Process requirements may also be specified mandating a particular IDE, programming language or development method.
- Non-functional requirements may be more critical than functional requirements. If these are not met, the system may be useless.

Types of Non-Functional Requirements



Requirements for Non-Functional

A milk carton must have the “ability to contain fluid without leaking”

Product/Usability & Dependability
Organizational/Environmental
External/Regulatory, External/Legislative/Safety-security

A hard hat “must not break under pressure of less than 10,000 PSI”

Product/Usability & Dependability
Organizational/Operational
External/Regulatory, External/Legislative/Safety-security

A user login page must have the “ability to encrypt the storage of passwords”

Product/Security
Organizational/Operational
External/Regulatory, External/Legislative/Safety-security

A user credit card data must “be safely stored and high levels of encryption applied to avoid misuses and theft”

Product/Security
External/Regulatory, External/Legislative/Safety-security

Stories and Scenarios

- Scenarios and story boards are real-life examples of how a system can be used.
- Story boards and scenarios are a description of how a system may be used for a particular task.
- Because they are based on a practical situation, stakeholders can relate to them and can comment on their situation with respect to them.

Scenarios

- A structured form of Story board
- Scenarios should include
 - A description of the starting situation
 - A description of the normal flow of events
 - A description of what can go wrong
 - Information about other concurrent activities
 - A description of the state when the scenario finishes

Guidelines for Writing Requirements Specifications

- Invent a standard format and use it for all requirements.
- Use language in a consistent way. Use ***shall*** for mandatory requirements, ***should*** for desirable requirements.
- Use text highlighting to identify key parts of the requirement.
- Avoid the use of computer jargon.
- Include an explanation (rationale) of why a requirement is necessary.

The Software Requirements Specification (SRS) Document

- The software 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 be a set of items describing WHAT rather than HOW to do it.

Requirements

1. System vs user
2. Functional
3. Non-Functional

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End.
