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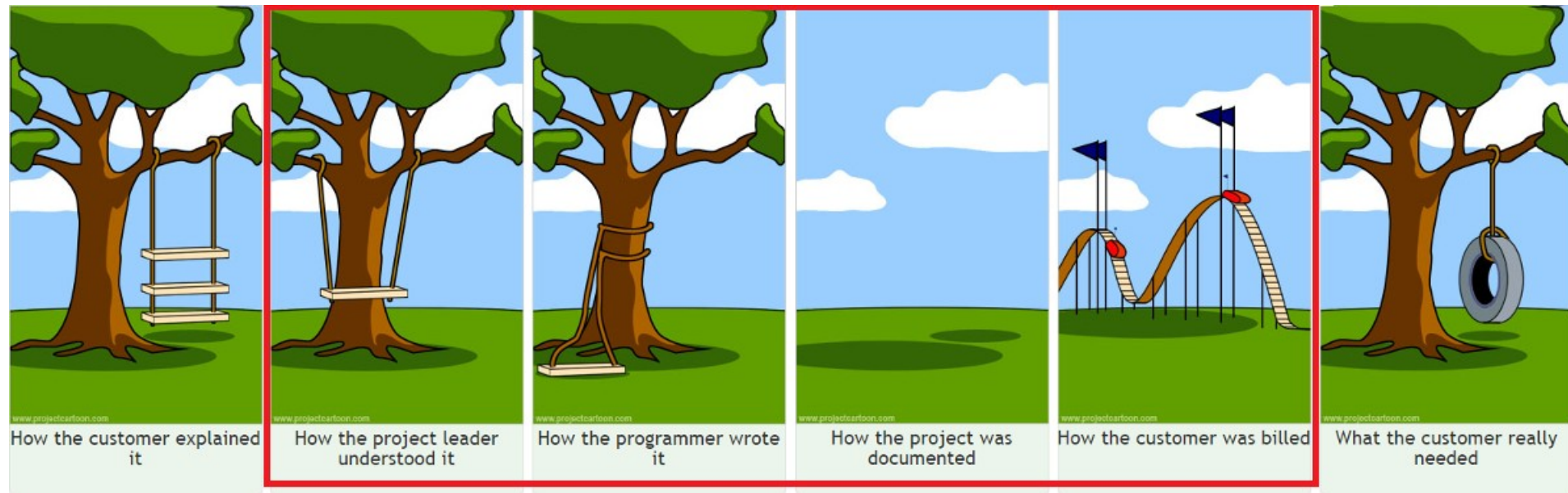
Chapter Two

Requirements Process



Topics to be covered

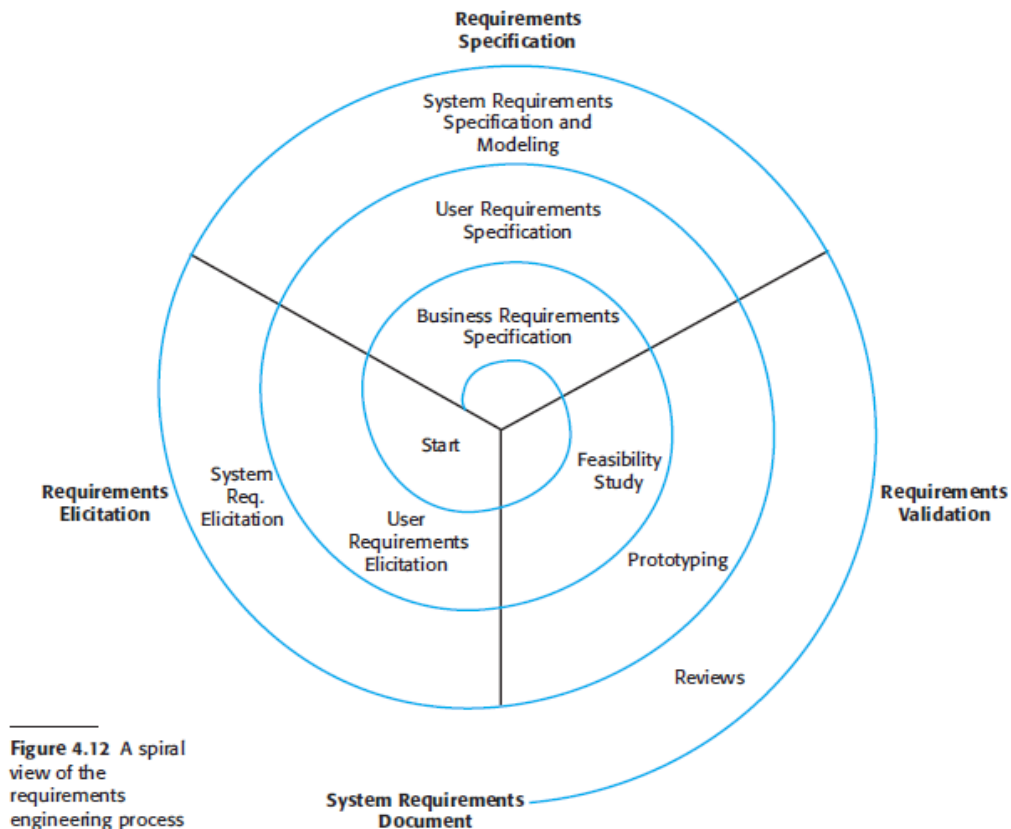
- Process Models
- Process Actors
- Process Support and Management
- Process Quality and Improvement



Process models

- ▶ Requirements engineering processes may include four high-level activities.
 1. Assessing if the system is useful to the business (**feasibility study**),
 2. Discovering requirements (**elicitation and analysis**),
 3. Converting these requirements into some standard form (**specification**), and
 4. Checking that the requirements actually define the system that the customer wants (**validation**).

Cont'd...



- ▶ However, in practice these activities are **interwoven, incremental, and iterative.**

Requirements feasibility study

- ▶ A feasibility study decides **whether or not the proposed system is worthwhile.**
- ▶ A short focused study that checks
 - ▶ If the system contributes to organizational objectives;
 - ▶ If the system can be implemented using current technology, within given cost and schedule constraints;
 - ▶ If the system can be integrated with other systems that are already in place.

Feasibility study implementation

- Feasibility study involves **information assessment (what is required)**, information collection and report writing.
- Questions for people in the organization for information assessment and collection:
 - *What if the system wasn't implemented?*
 - *What are current process problems?*
 - *How will the proposed system help?*
 - *What will be the integration problems?*
 - *Is new technology needed? What skills?*
 - *What facilities must be supported by the proposed system?*
 - *Feasibility study report should make a recommendation about the development to continue or not.*

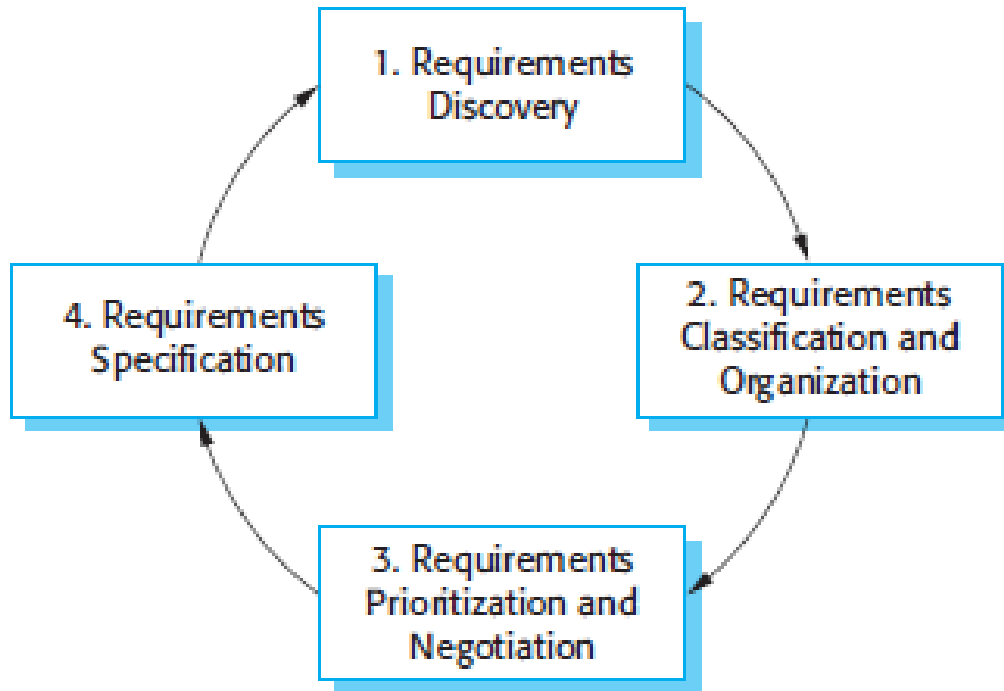
Requirements Elicitation and Analysis

- ▶ In this activity, software engineers work with **customers** and **system end-users** to find out about:-
 - *The application domain,*
 - *What services the system should provide,*
 - *The required performance of the system, and*
 - *Hardware constraints, and so on.*
- ▶ May involve end-users, managers, engineer involved in maintenance, domain experts, etc. These are called **stakeholders**.

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- ▶ Eliciting & understanding stakeholder requirement is difficult due to the following reasons:
 1. **Stakeholders don't know what they really want except in most general.**
 2. **Stakeholders express requirements in their own terms.**
 3. **Different stakeholders may have different requirements.**
 4. **Organizational and political factors may influence the system requirements.**
 5. **The requirements change during the analysis process. New stakeholders may emerge and the business environment change.**

Elicitation and analysis process



Cont'd...

► **Requirements discovery**

- Interacting with stakeholders to discover their requirements. **Domain requirements** are also discovered at this stage.

► **Requirements classification and organization**

- Group related requirements and organizes them into coherent clusters.

► **Requirements prioritization and negotiation**

- Prioritizing requirements and finding and **resolving requirements conflicts**.

► **Requirements specification**

- Requirements are **documented** and input into the next round of the spiral.

Requirements Discovery

- ▶ The process of gathering information about the proposed and existing systems and distilling the user and system requirements from this information.
- ▶ Approaches & techniques of requirements discovery are:
 - Questionnaire
 - Interviewing
 - Scenario
 - Ethnography
 - Document analysis
 - Use-cases etc.

Requirements Specification

- ▶ The essence of requirements specification is to document requirements of different types in a consistent, accessible, and reviewable way that is readily understandable by the intended audiences.
- ▶ User requirements typically are represented in the form of use cases or user stories.
- ▶ Detailed software functional and non-functional requirements are recorded in this specification, **software requirements specification (SRS)**.

Requirements Validation

- ▶ Concerned with demonstrating that the requirements **define the system that the customer really wants.**
- ▶ Validation is so important because errors in a requirements document can lead to extensive rework costs. **(when problems are discovered during development or after the system is in service.)**
- ▶ Fixing a requirements error after delivery may cost up to 100 times the cost of fixing an implementation error.

Requirements checking

- ▶ **Validity**: Does the system provide the functions which best support the customer's needs?
- ▶ **Consistency**: Are there any requirements conflicts?
- ▶ **Completeness**: Are all functions required by the customer included?
- ▶ **Realism**: Can the requirements be implemented given available budget and technology?
- ▶ **Verifiability**: Can the requirements be checked?

Requirements validation techniques

- ▶ **Requirements reviews**

- Systematic manual analysis of the requirements.

- ▶ **Prototyping**

- Using an executable model of the system to check requirements.

- ▶ **Test-case generation**

- Developing tests for requirements to check testability.
- If test is difficult or impossible to design for the requirement means it is difficult to implement that requirement.

Process actors

- ▶ The roles of the people who participate in the requirements process.
- ▶ Fundamentally **interdisciplinary**.
- ▶ The **requirements specialist** needs to mediate between the domain of the stakeholder and that of software engineering.

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- ▶ There are often many people involved besides the requirements specialist, each of whom has a stake in the software.
- ▶ The stakeholders will vary across projects, but will always include users/operators and customers.
- ▶ Typical examples of software stakeholders include (but are not restricted to) the following:

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- A. Users:** This group comprises those who will operate the software (often heterogeneous group).
- B. Customers:** This group comprises those who have commissioned the software.
- C. Market analysts:** needed to establish what the market needs and to act as proxy customers.
- D. Regulators:** Many application domains, such as banking and telecom (*Telebirr*), are regulated. Therefore, the software must comply with the regulatory authorities.
- E. Software engineers:** individuals have a legitimate interest in profiting from developing the software.

Process support and management

1. Select an appropriate software development life cycle
 - ▶ Each project manager should select and adapt the life cycle that best suits her project
2. Plan requirements approach
 - ▶ should plan how it will handle its requirements development and management activities.
3. Estimate requirements effort
 - ▶ know how long it's going to take to develop the requirements for a project and what percentage of their total effort should be devoted to requirements development and management.

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4. Base project plans on requirements
 - ▶ Develop plans and schedules for your project iteratively as the scope and detailed requirements become clear.
5. Identify requirements decision makers
 - ▶ Conflicting user inputs must be resolved, commercial package components must be selected, change requests must be evaluated, and on and on.
6. Renegotiate project commitments when requirements change

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7. Analyse, document, and manage requirements-related risks
 - ▶ Identify and document risks related to requirements as part of the project's risk-management activities
8. Track the effort spent on requirements
 - ▶ Monitor the effect that your requirements activities have on the project to help judge the return on your investment in requirements engineering.
9. Review lessons learned regarding requirements on other projects

Process quality and improvement

- ▶ Concerned with the **assessment of the quality and improvement of the requirements process.**
- ▶ Its purpose is to emphasize the key role the requirements process plays in terms of the **cost** and **timeliness** of a software product and of the customer's satisfaction with it.
- ▶ It will help to orient the requirements process with quality standards and process improvement models for software and systems.

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- ▶ Process quality and improvement is closely related to both the software quality & software engineering process and comprising:

- requirements process coverage by process improvement standards and models;
- requirements process measures and benchmarking;
- improvement planning and implementation;
- security/CIA - Confidentiality, Integrity and Availability improvement/planning and implementation

Reading Assignment

Chapter II: Requirement Process	Sommerville - 2011	Wiegiers - 2003
2.1. Process Models	Chapter 4 – section 4	Chapter 3
2.2. Process Actors		Chapter 1, 2, 4 & 6
2.3. Process Support and Management		Chapter 3
2.4. Process Quality and Improvement		Chapter 22 & 23



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END OF CHAPTER TWO