Requirement Engineering

Lecture 4: Requirements Elicitation

Part 2

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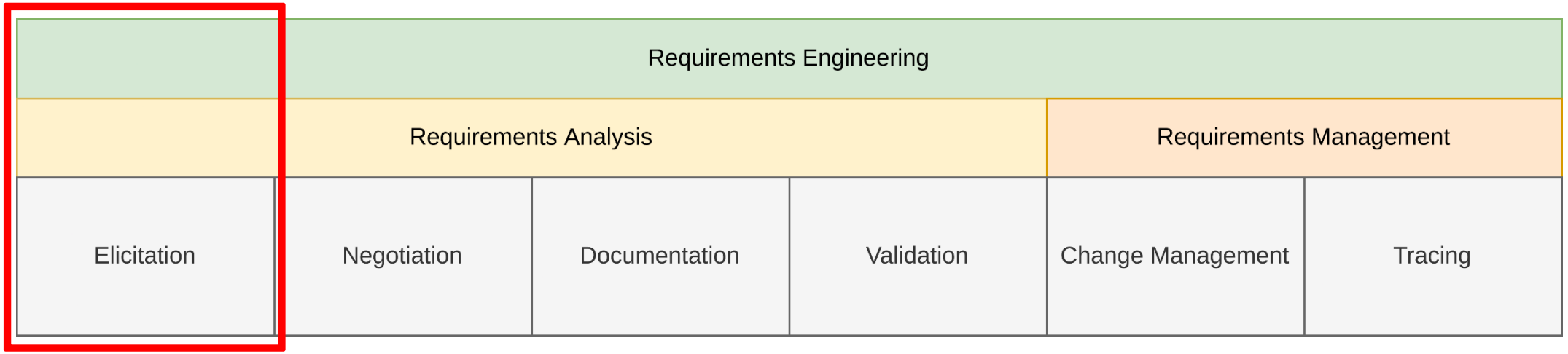
General Requirements Engineering Process

Overview



Lecture 4: Requirements Elicitation

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Elicitation Techniques

Overview

Survey Techniques	Creativity Techniques	Document-centric Techniques	Observation Techniques	Support Techniques
Interviews	Brainstorming	System Archaeology	Field Observation	Mind Mapping
Questionnaires	Brainstorming Paradox	Perspective-based Reading	Apprenticing	Workshops
	Change of Perspective	Reuse		CRC Cards
	Analogy Technique			Audio and Video Recording
				Use Case Modeling
				Prototypes

Elicitation Techniques

Document-centric Techniques

- Reuse of solutions and experiences made with existing systems
- Used when a legacy system is replaced
  - Make sure that the new system covers all important features of the legacy system
- Should be combined with other techniques
  - Validation of the elicited requirements
  - Discovery of new requirements impossible

Elicitation Techniques

Document-centric Techniques

Document analysis is an important part of requirements elicitation

Typical types of documents:

- Development documents (of current or earlier systems)
- Standards & Norms
- Compliance (legal information)

Elicitation Techniques

Document-centric Techniques – System Archaeology

- Extracts information from documentation or implementations of existing systems
  - Legacy systems or competitor’s system
- Can recover lost knowledge about system logic
  - System logic is elicited anew
- Yields large amount of detailed requirements

Elicitation Techniques

Document-centric Techniques – Reuse

- Assumption:
  - Documented requirements are available
  - The requirements have a high quality
- Such requirements do not have to be reelicited
- Instead → just reuse the existing requirements
  - Saves costs and time!

Elicitation Techniques

Document-centric Techniques – Perspective-based Reading

- Analyzes documents from a certain perspective → e.g., implementer or tester
- All aspects not related to the perspective are ignored
- Allows analysis focused on particular aspects
- Can separate technology-related or implementation- related aspects from operational aspects

Elicitation Techniques

Document-centric Techniques – Prepare Perspective-based Reading

- Define goals and expected results
- Define perspectives based on the goals
- Pick documents based on the defined perspectives and goal
- Choose stakeholders matching the perspectives to do the reading

Elicitation Techniques

Document-centric Techniques – Conduct Perspective-based Reading

- The two methods to conduct perspective-based reading are *sequenced reading* and *top-down reading*.

- Sequenced reading
  - The whole documents are read with the defined perspectives

- Top-down reading
  - The documents must have structuring means (table of contents, index, list of figures etc.)
  - Only relevant text passages found with the structuring means and the perspective are read

Elicitation Techniques

Document-centric Techniques – Post-process Perspective-based Reading

- Documenting the requirements
  - Document the gained requirements
  - Ensure the traceability between the requirements and the text passages

Elicitation Techniques

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Elicitation Techniques

Observation Techniques

- Observation of stakeholders during their work
  - Instead of a stakeholder or domain expert describing their work
  - Active demonstration or passive observation both possible
- Requirements engineer documents all steps
  - Elicits the business process
  - Observes mistakes, risks, and open questions
  - Question the existing process in order to determine how the process should look like
    - Avoids documenting an outdated or suboptimal process
- Well-suited to obtain dissatisfiers
- Not well-suited for the development of new requirements

Elicitation Techniques

Observation Techniques – Field Observation

- Requirements engineer is on location
- Observes and documents processes
  - May be supported by video and audio recordings
- Well-suited for requirements and processes that are difficult to describe verbally
  - Instead, they are simply shown

Elicitation Techniques

Observation Techniques – Field Observation / Preparation

- Purpose
  - Decide on the purpose of the observation
- Object
  - Decide on the object of the observation
- Work results
  - Define the planed work results

Elicitation Techniques

Observation Techniques – Field Observation / Conducting

- Guideline for an observation
  - Gain the trust of the observed stakeholders
  - Pay attention to details
  - Write down your expressions immediately
  - Check the objectivity of your documentation
  - Check the authenticity of the observed activities

- Forms of documentation
  - Writing
  - Audio recording
  - Video recording

Elicitation Techniques

Observation Techniques – Field Observation / Conducting

Observation of stakeholders in their environment:

- Can be done by observer, camera or computer monitoring

- Objectives are:
  - Identify fundamental knowledge, that nobody is going to mention (implicit knowledge)
  - Find hidden requirements / causes
  - Get a better understanding for the real situation on the side of the requirements engineers

- Disadvantages:
  - Large amounts of irrelevant data
  - Time consuming
  - Rare events may be eventually disregarded

Elicitation Techniques

Observation Techniques – Field Observation / Post-processing

- Post process the records
- Link the records of your observation with the gained requirements
- Adjust your results together with the participating stakeholders (for example with an interview or a workshop)

Elicitation Techniques

Observation Techniques – Apprenticing

- The requirements engineer actively learns and performs the procedures of the stakeholders
  - Like an apprentice
  - Encouraged to question unclear and complex procedures
- Allows the elicitation of requirements the stakeholders take for granted
- Reverses the balance of power between the requirements engineer and the domain specialist

ASSISTANCE / SUPPORT TECHNIQUES

Elicitation Techniques

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Assistance / Support Techniques

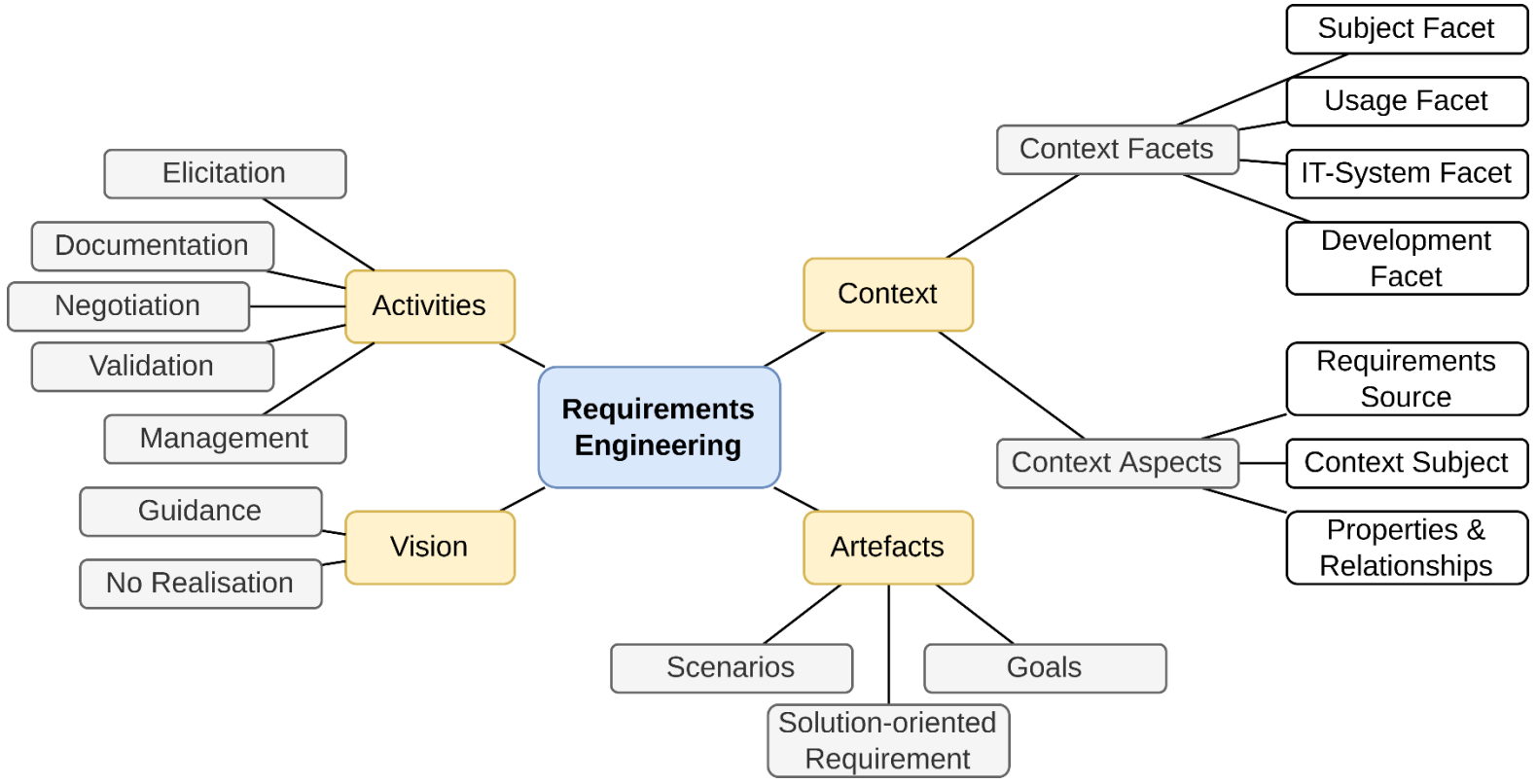
Support Techniques

- Support the previously presented elicitation techniques
- General techniques not only related to requirements
- Not every support technique is suitable for every elicitation technique
  - Should improve the efficiency, balance out weakness, or prevent pitfalls of a technique

Assistance / Support Techniques

Support Techniques – Mind Mapping

- Graphical representation
  - Shows relationships and interdependencies between terms



Based on K. Pohl (2010) – Requirements Engineering – Fundamentals, Principles and Techniques

Assistance / Support Techniques

Support Techniques – Workshop

- Joint meeting of requirements engineer and stakeholders
- Use meeting to elaborate on goals
  - May also go into details
- Example:
  - Use a workshop to design the user interfaces

Assistance / Support Techniques

Support Techniques – Prepare Workshop

- Objective
  - Define the objective of the workshop explicitly

- Work results and procedure
  - Decide the work results explicitly
  - Define the procedure to gain and develop the work results
  - Combine them to an agenda
  - Plan regular breaks

Assistance / Support Techniques

Support Techniques – Prepare Workshop

- Participants
  - Choose the participants based on the work results
  - Make sure your selection of participants is representative
  - Invite the participants early enough
  - Agree with the participants upon the work results

Assistance / Support Techniques

Support Techniques – Prepare Workshop

- Location
  - Ensure the location has enough room for the participants
  - Provide the proper atmosphere
  - Organize technical equipment (whiteboard, projector etc.)

- Moderator and transcript writer
  - Invite an external moderator and an external transcript writer

Assistance / Support Techniques

Support Techniques – Conduct Workshop

- Introduction
  - Present the workshops object and work results
  - Give the participants the opportunity to discuss them
  - Explain the procedure
  - Set the discussion rules explicitly
  - Let the participants vote on the application of these rules one by one

- Working part
  - Make sure that the participants adhere to the agenda and the discussion rules
  - Protocol the results
  - Document and identify conflicts and try to solve them
  - Document decisions explicitly

Assistance / Support Techniques

Support Techniques – Conduct Workshop

- Finish
  - Be sure to gather all remaining topics
  - Define the further procedure for each remaining topic
  - Allow your participants to give a feedback about the workshop (participants have the last word)
  - Thank the participants for their attendance

Assistance / Support Techniques

Support Techniques – Post-processing Workshop

- Consolidate the work results
- Ask the participants for their approval of the transcript
- Let each participant approve on the consolidated work results

Assistance / Support Techniques

Support Techniques – Prototypes for Illustrations

- Well-suited to illustrate requirements
- Allows clarification of vague requirements
- Consequences of new or changed requirements can be identified
- Mostly used for user interface prototypes

Assistance / Support Techniques

Support Techniques – Prototypes

Prototypes can be very different:

- Paper prototypes
  - e.g. for graphical user interfaces
- “Wizard of Oz” Prototype
  - Development of a graphical user interface (GUI), but input will be sent directly to an operator, who is simulating the systems behavior and who produces the appropriate output.
- Software prototypes
  - e.g. realized in Visual Basic (throw-away prototypes)

Assistance / Support Techniques

Support Techniques – Focus Group

Special form of workshop (6-10 participants)

- Start with problems
  - e.g. map collection, flipchart
  - Collect reasons
- Then focus on optimal solution
  - But not only opposites of the problems
  - Collect reasons, too
- Then group the issues
  - Should be about 40 issues
- Then priorities
  - e.g. distribute 10 points
  - e.g. in groups according to stakeholder roles
- Finish with a review of the results

Assistance / Support Techniques

Support Techniques – CRC Cards

- CRC = Class Responsibility Collaboration
- Denote context aspects and their attributes on index cards
- Formulate requirements based on the cards

Assistance / Support Techniques

Support Techniques – Audio and Video Recordings

- Recordings as substitute for actual contact with the stakeholders
  - If the stakeholders are not available
  - The budget is tight
  - The system is highly critical
- Especially useful for field observations
- Stakeholders might feel supervised
  - Changes behavior
  - Might refuse to participate

Assistance / Support Techniques

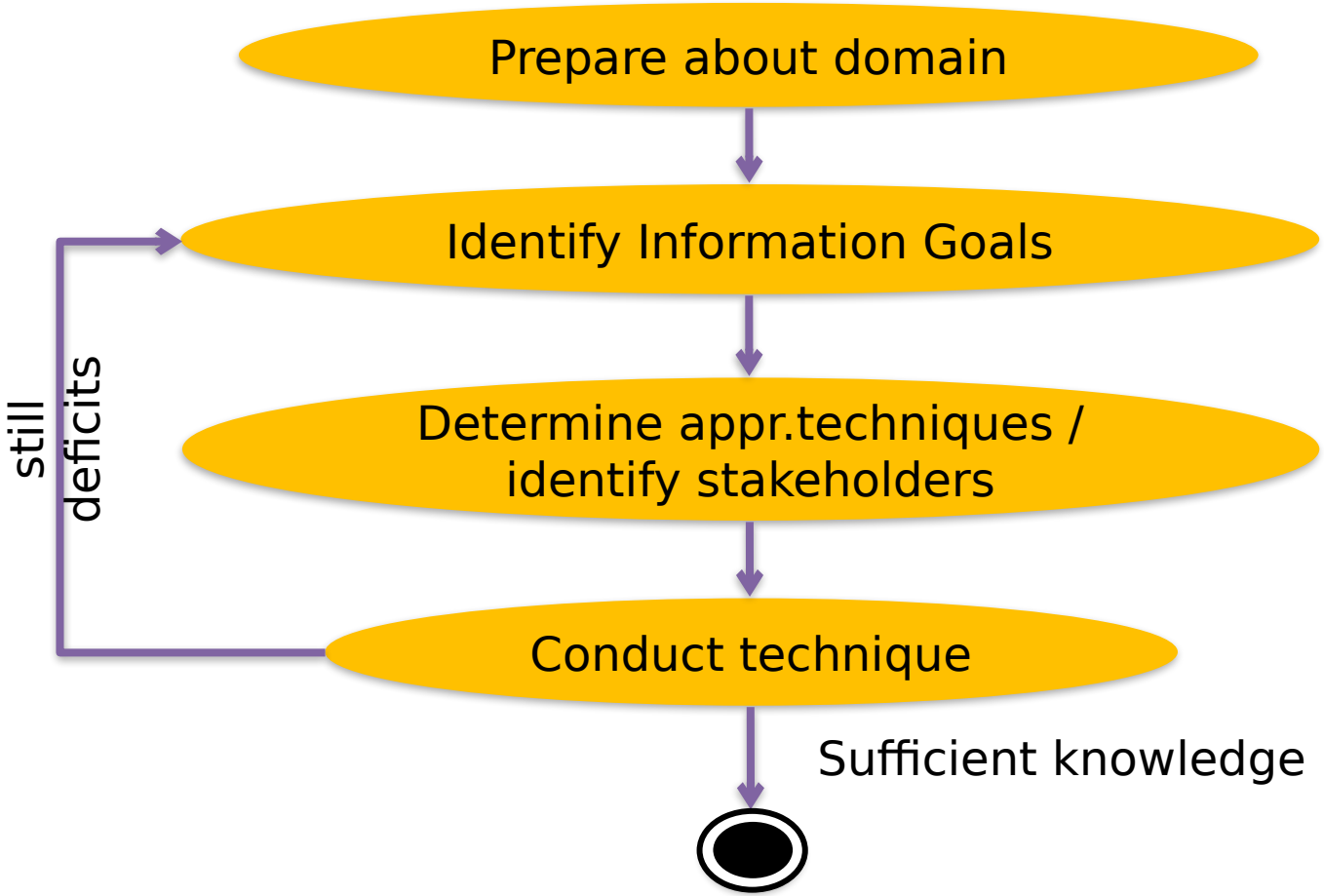
Support Techniques – Modeling Action Sequences

- Use cases are the external view of how the system will be used
  - Have a trigger event
  - Have an expected result
- Describe functionality that the system must support

SUMMARY

Summary

Planning Requirement Elicitation



Not shown:

- Application of analysis techniques
- Often overlapping and parallel activities

Summary

- Elicitation is a core activity of requirements engineering
  - Without good elicitation, requirements will be wrong or missing
- Stakeholders, documents and existing systems as requirements sources
  - Missing a source leads to missing the requirements of the source
- Many techniques for requirements elicitation
  - Not every technique is good in every scenario
  - Select the techniques depending on the project
  - Usually, a combination of multiple techniques yields the best results

Questions?