

SE463

Software Requirements Specification & Analysis

Elicitation

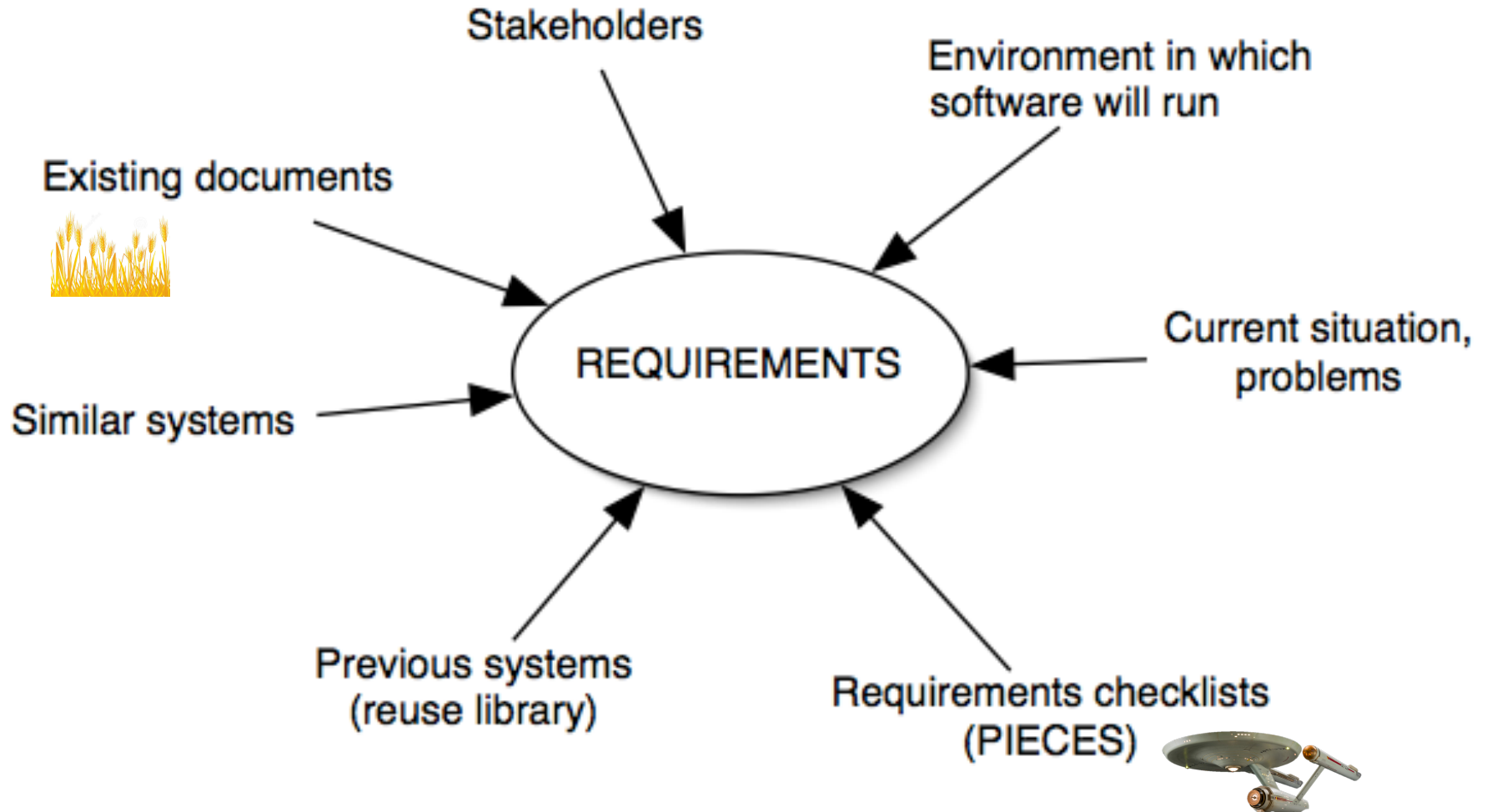


Readings:

Karl E. Wieggers and Joy Beatty. *Software Requirements*, 3ed.
Microsoft Press, 2013.

- Chapter 7: “Requirements elicitation”

Sources of Requirements



Elicitation techniques

Artifact-based

- Document studies
- Similar companies
- Norms
- Domain analysis
- Requirements taxonomies
- Modelling
- Analysis patterns
- Mockups & prototyping
- Pilot experiments

Model-based

Stakeholder-based

- Stakeholder analysis
- Questionnaires
- Interviews
- Observation
- Task Demo
- Ask suppliers
- Domain workshop
- Personas
- Systemic Thinking
- Brainstorm
- Creativity workshop
- Constraint relaxation

Creativity-based

Artifact-based elicitation



Idea: learn as much as we can by studying documentation, systems, artifacts, etc. before asking for stakeholders' time

- *Document studies*
- *Similar companies*
- *Norms* *Artifact-based*
- *Domain analysis*
- *Requirements taxonomies*

- You are familiarized with the topic.
- You show respect for stakeholder.
- You focus your questions and don't waste stakeholders' time

Documents



- System documentation
 - e.g., existing requirements specifications, design documents, bug reports, change requests user manuals, work procedures, usage statistics, marketing data, performance figures
- Environment documentation
 - e.g., organization charts, business plans, policy manuals, financial reports, minutes of important meetings
- Domain analysis
 - e.g., textbooks, surveys, standards, regulations, the Web

Norms

Build a better X.



Example: Build a better messaging app that runs on Linux and supports multiple messaging protocols and photos.

Requirements taxonomies

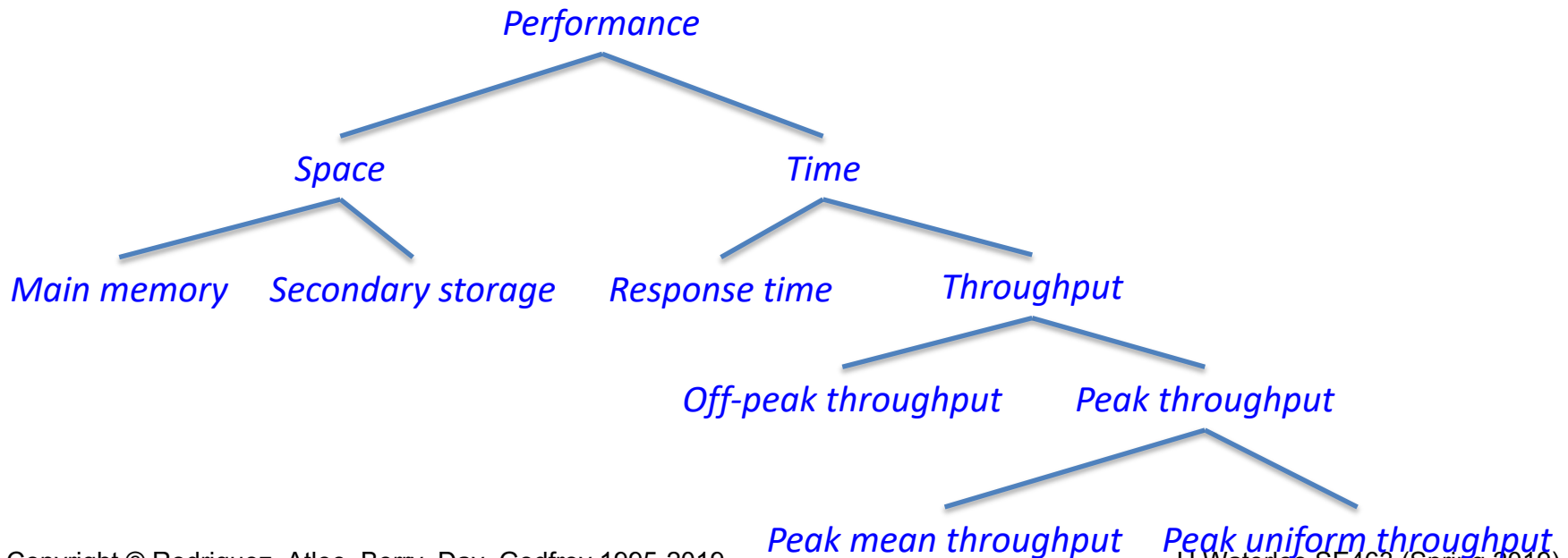


Requirements taxonomy — classification of requirements; the classification can act as a checklist of details to be elicited.

Example: Domain-*dependent* taxonomy for information systems:

PIECES ≡ **P**erformance, **I**nformation and data, **E**conomy, **C**ontrol, **E**fficiency, and **S**ervices

Example: Domain-*independent* taxonomy for performance-related NFRs



Stakeholder-based elicitation

Idea: Acquire detailed information about the system-to-be that is problem specific or stakeholder specific.



- *Stakeholder analysis*
- *Questionnaires*
- *Interviews*
- *Observation*
- *Task Demo* *Stakeholder-based*
- *Ask suppliers*
- *Domain workshop*
- *Personas*

- You learn what is used, what is not or what is missing.
- You can rank stakeholders' needs.
- You need to communicate.

Interviews

Interviews are useful for learning

- Elicit stakeholder-specific problems
- Elicit details that only the stakeholder can answer
- Useful for isolating and identifying conflicts

Want to phrase questions as open questions, to elicit more details from the stakeholder

- who, what, when, where, **why**

Good listening skills means focusing on what the stakeholder is actually saying; giving the stakeholder some time to articulate an answer

Questions on User's Problems

- Why would you use the new product?
- What goals might this product help you accomplish?
- What problems do you expect this product to solve for you?
- What external events are associated with the product?
- Are there any constraints or rules to which the product must conform?
- How is the product you envision similar to the way you do business now? How should it be different?
- What is most important to you about the product?

Group Interviews

Standard procedure is to interview stakeholders in collaborative sessions

- Diversity of views
- Group responses are richer than the sum of individual responses because of synergy
- Can reveal conflicts among stakeholders; the larger the group, the more conflict will occur
- Reduces the spotlight on individuals

Common interviewing mistakes

- Not interviewing all of the right people
- Asking direct questions too early
- Interviewing one-at-a-time instead of in small groups
- Letting one person dominate a group discussion
- Assuming that stated needs are exactly correct
 - Over-specification

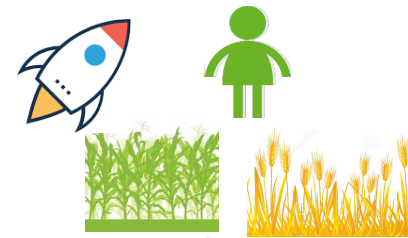
Questionnaires

Questionnaires are useful when information has to be gathered from a large number of people, particularly users.

- Closed questions (to gather opinions)
- Open questions (to gather suggestions)

Not prevalently used. Questions to be asked need to be fairly concrete, so can use to gather data, but not insights.

Ethnographic analysis



Ethnographic analysis is direct, first-hand observation of user behaviour

- An attempt to discover the social/human factors in a system.
- Studies have shown that work is often richer and more complex than suggested by simple system models derived by interviews alone.
- Can identify the used and critical existing features
- But focuses on existing solutions



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Apprenticeship



- **Apprenticing** is based on the idea of masters and apprentices
- The apprentice sits with the master craftsman (the user) to learn the job
 - By observation, asking questions, doing some of the job under the master's supervision.
- While working that the user can:
 - describe the task precisely
 - explain why the task is done this way
 - list the exceptions that can occur



© 1940 Walt Disney

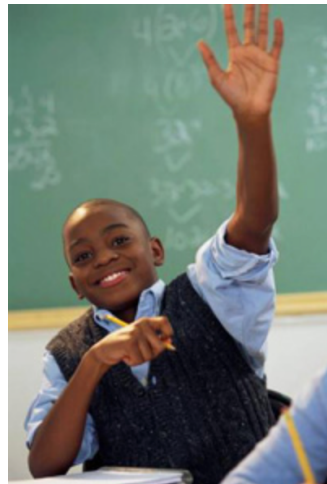
Personas



Personas are useful when real users are not available or are too numerous to interview them all.

- Important class of user, with unique needs and characteristics
- Include enough details (including a name!) to make the persona seem real to the team

Ken
(the keener)



Dudley
(the distracted)



Model-based elicitation



Idea: To re-express the requirements in a different language, which can raise new questions.

- *Modelling* *Model-based*
- *Analysis patterns*
- *Mockups & prototyping*
- *Pilot experiments*

- Can help us check our understanding
- Can help to uncover problems, especially omissions
- Can provide a measure of progress

Requirements Models

Model: a simplified version of something complex used in analyzing and solving problems or making predictions

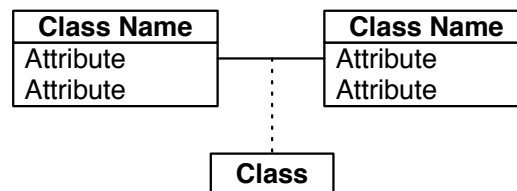
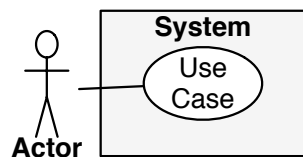
Model as helpful abstraction:

- that represents the original
- that is smaller than the original
- that is usable in place of the original

Requirements Models

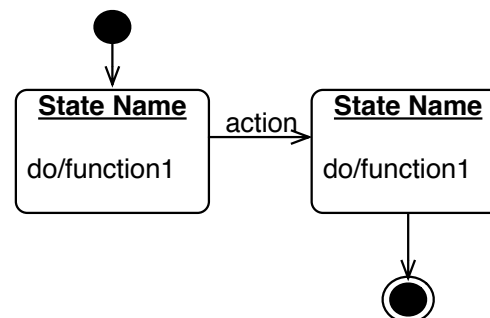
The act of re-expressing the owner's work or requirements as **models** in different languages often reveals “holes” in our understanding

- Ideally, models are simple enough that stakeholders are encouraged to modify them
- Models are useful in requirements documentation



context Membership inv
self.transactions->collect(points)->sum = self.points

Display Available Numbers	ID: O12	Importance: D
Overview: Display all of the available phone numbers		
Inputs: requestor:Administrator		
Preconditions: requestor has authenticated, there is no data lock on phones (set of Phone)		
Modifies: none		
Postconditions: returns all num of phones.phoneNumber; numbers are displayed in numerical order		
Exceptions: There is a data lock on phones, and error code "operation failed" is returned		
References: Meeting #3: R7		



Effective Models

Restrict the amount of **detail** we include in our models of the current system—there is no point modeling every tiny facet of something we are about to replace.

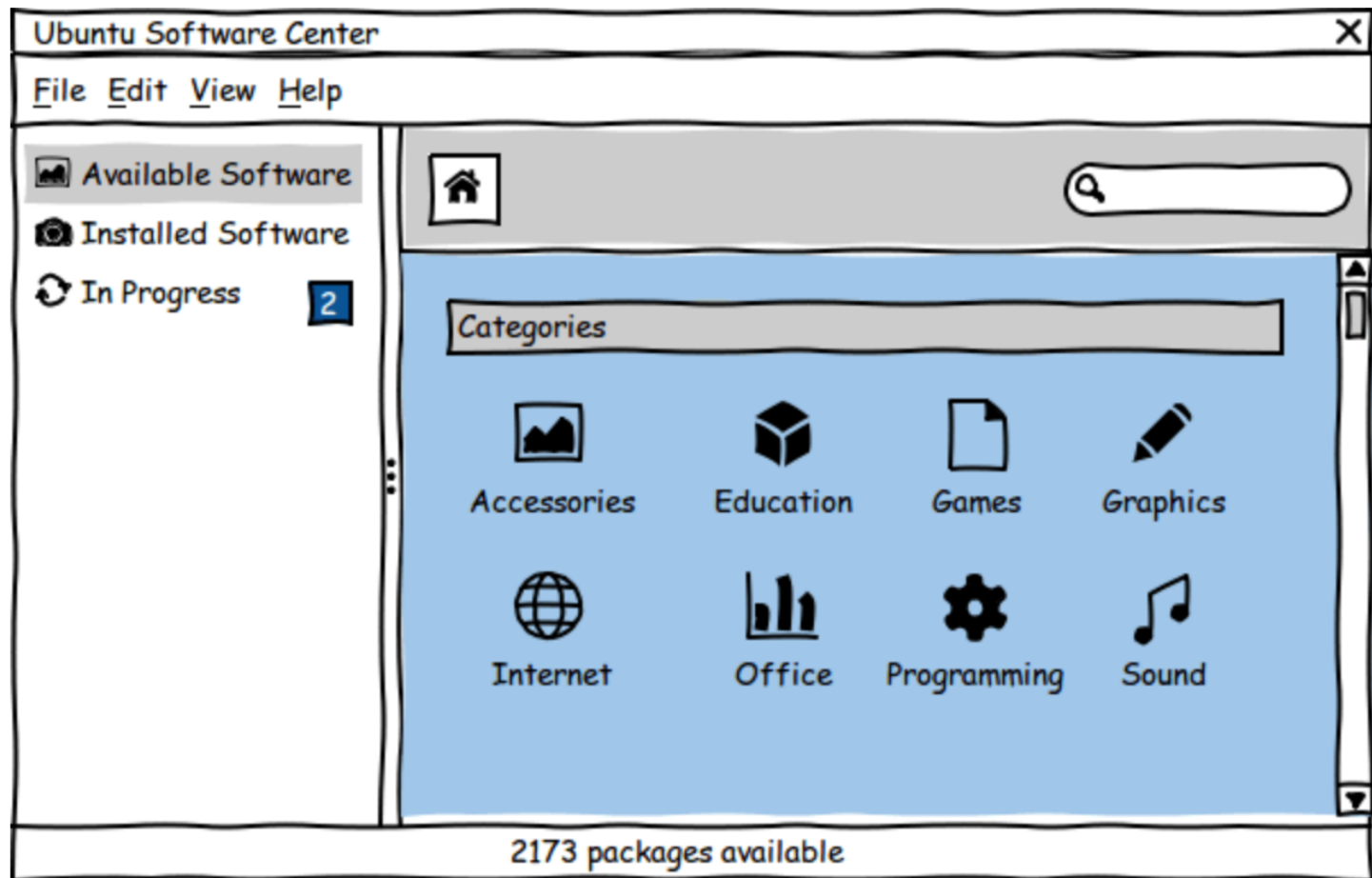
- scenarios
- activity diagrams
- process models
- business rules

Do not restrict the **scope** of the work being modelled – the more of the work we study, the more opportunities for improvement that will emerge.

Mockups and Prototypes



Sketch the essence of a solution, and use to bait stakeholders into providing new requirements details



Creativity-based elicitation



Idea: To **invent** undreamed-of requirements that bring about innovative change and gives competitive advantage.

- *Systemic Thinking*
- *Brainstorm* *Creativity-based*
- *Creativity workshop*
- *Constraint relaxation*

- What stakeholders want in a future system.
- Ideas that turn into novel requirements and products.

Brainstorming

Brainstorming is a group creativity technique designed to generate a large number of **new** ideas

Goals:

- Want to hear ideas from everyone, especially unconventional ideas.
- Creativity to be encouraged

Part I — Idea Generation

- Goal is to generate as many ideas as possible.
 - **Quantity**, not quality, is goal at this stage
 - Look to combine or vary ideas already suggested
- Scribe writes down all ideas so that all can see them
e.g., whiteboard, paper taped to wall

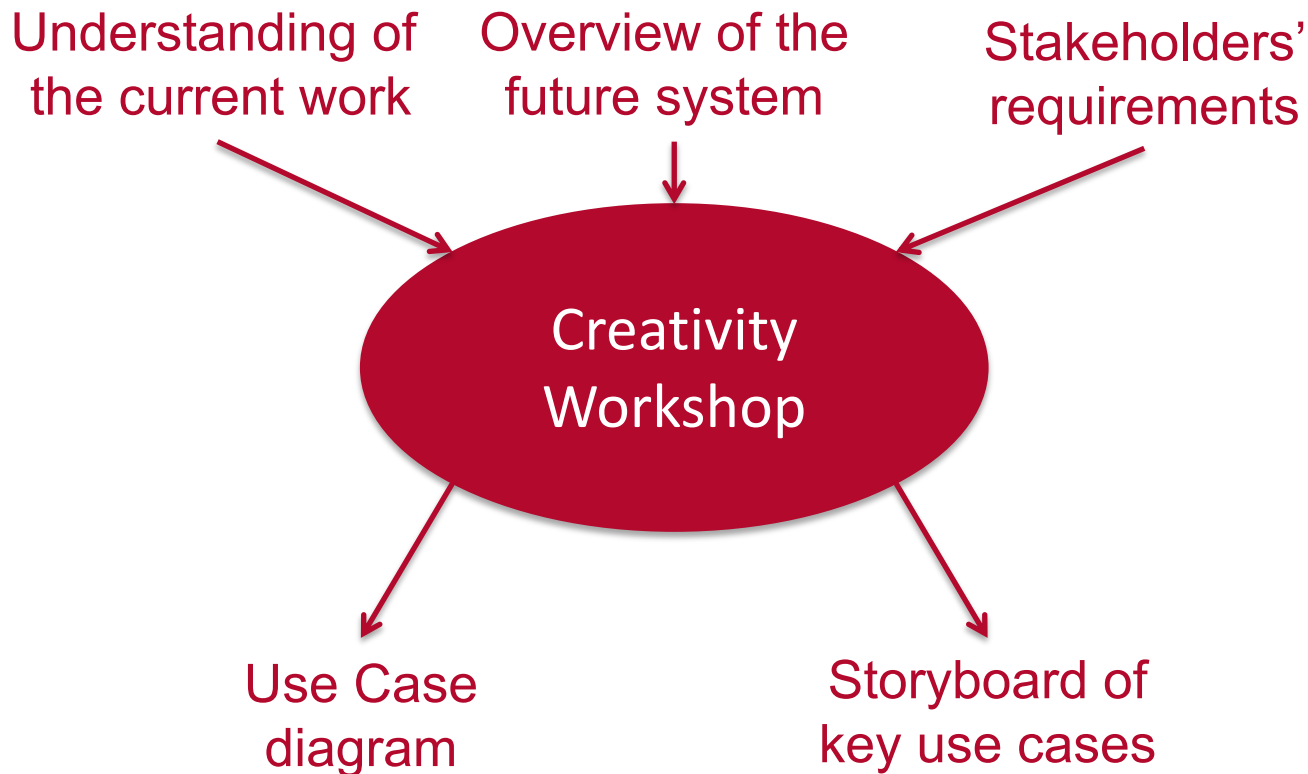
Part II — Assessment

As a separate activity, possibly involving a different set of stakeholders...

- Go over the list and explain ideas more carefully
 - Review, consolidate, combine, clarify, expand.
- Rank ideas and choose winners
- Be careful about time
 - Creative / technical meetings tend to lose focus after 90 min.
 - Take breaks or reconvene later.

Creativity Workshops

A risk-free space for creating and inventing news ideas – over and above the stakeholders' expressed requirements.



Creativity Workshop Strategies

Creativity-based elicitation techniques include

- Open brainstorming
- Constraint relaxation
 - exploring new possibilities that can be considered if a constraint were relaxed
- Analogical reasoning
 - exploring analogies to a related problem
- Combining ideas

	Effort
Document Analysis	low, medium
Questionnaire	low
Interview	high
Group Interview	medium
Ethnographic Analysis	very high (collection and analysis)
Modelling	low (scenarios) high (state machines)
Prototyping	low (mockups) very high (evolutionary prototype)
Brainstorming	low
Creativity Workshop	high