Course intro, RE Overview, Requirement types

Lecture 1, DAT230, Requirements Engineering
Robert Feldt, 2012-09-04

Who am I?

Who are you?

What is Software Engineering?

How different from Computer Science?

What is a requirement?

What is requirements engineering?

Requirement (Req/Reqs)

"A requirement is
an externally observable characteristic
of a desired system"

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Req 1:The system should
have a red reset button

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Requirements Eng. (RE)

"RE is part of SE concerned with real-world goals for, functions of and constraints on software systems..."

Requirements Eng. (RE)

"RE is part of SE concerned with real-world goals for, functions of and constraints on software systems..."

"...also concerned with relationship of these factors to precise specifications, to their evolution over time and across software families"

Why is RE important?


We need the new airplane model ASAP to beat our competition.
CEO
Shouldn't we stop and get the product requirements first?
There's no time for that! We've been building planes for years; just get the new version out the door before the competition does!
CEO
Later...
Um, ... how do we get in?
?!

Top SW Project Problem Factors

1. Insufficient feedback from users
2. Requirements and specs incomplete
3. Requirements and expectations change
4. Insufficient support from management
...

Top SW Project Success Factors

1. Users are involved
2. Support in upper management
3. Clearly defined requirements
4. Effective planning
5. Realistic expectations
6. Small milestones for whole project
...

What you will learn?

Overview graph:
RE vs Math
(Messiness vs Depth)

Overview:
What is a Master of Science?
How different from Bachelor?
How relates to “reality”?

Course Content

- Stakeholder Identification and Management
- Requirements Elicitation
- Writing Requirements & Requirements Specifications
- Quality Assurance of Requirements
- Prioritizing Requirements
- Connections: RE and other SE activities
- RE in Project- vs. Market-driven Development
- RE in Agile and Iterative/Incremental Development

How will this course work?

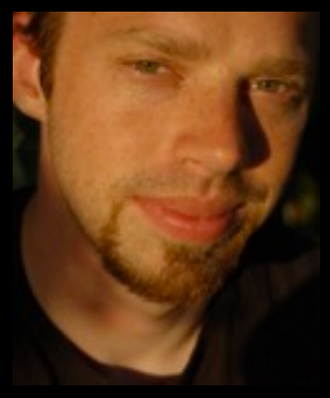
Course Structure

- Lectures
  - Elicitation, Specification, Agile RE, QA, Management, MDRE, ...
- Individual assignments
- Group assignment
  - Elicit, document/specify and prioritize requirements
  - Groups of 4-7 people, 2 customer interviews
- Written exam

Course Team

Robert

Examiner,
Lecturer



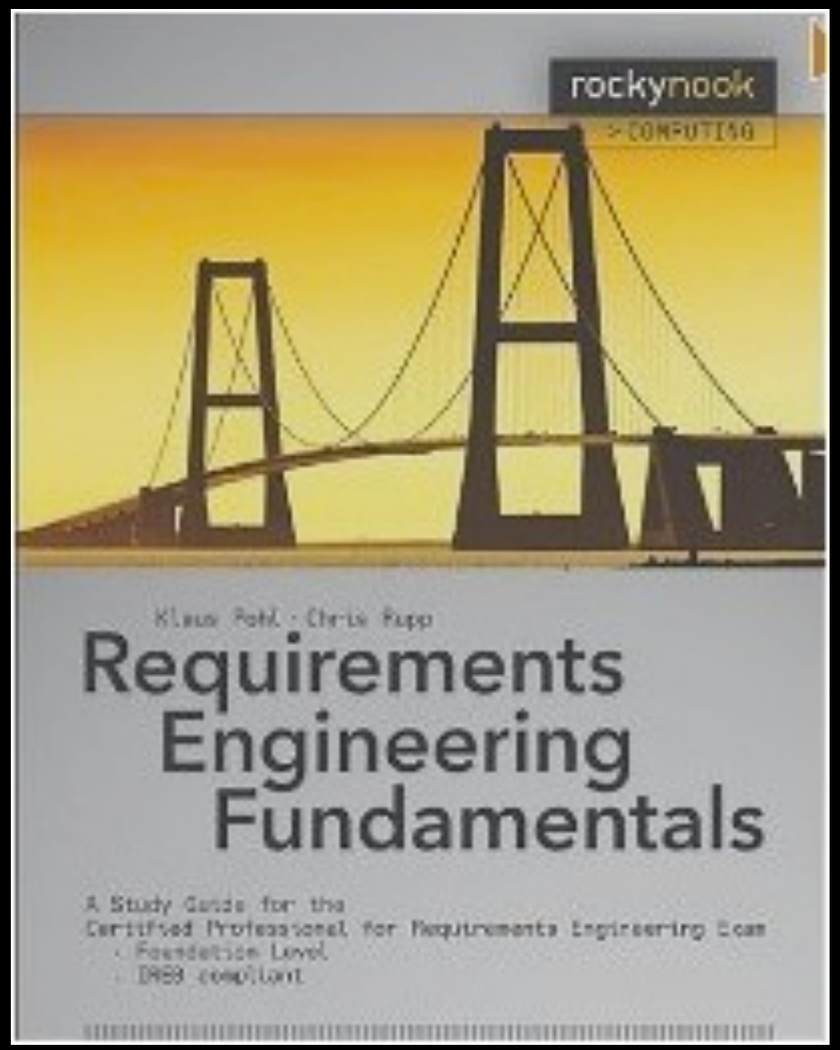
Emil

Assistant

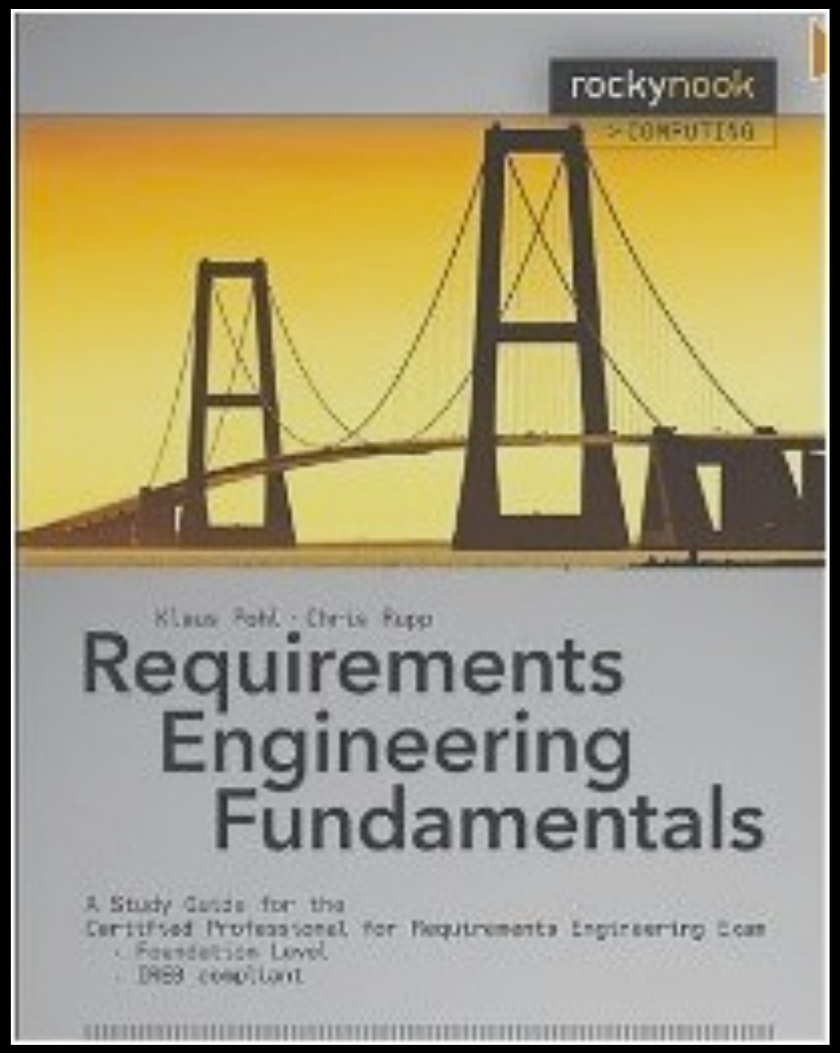
Pariya

Assistant

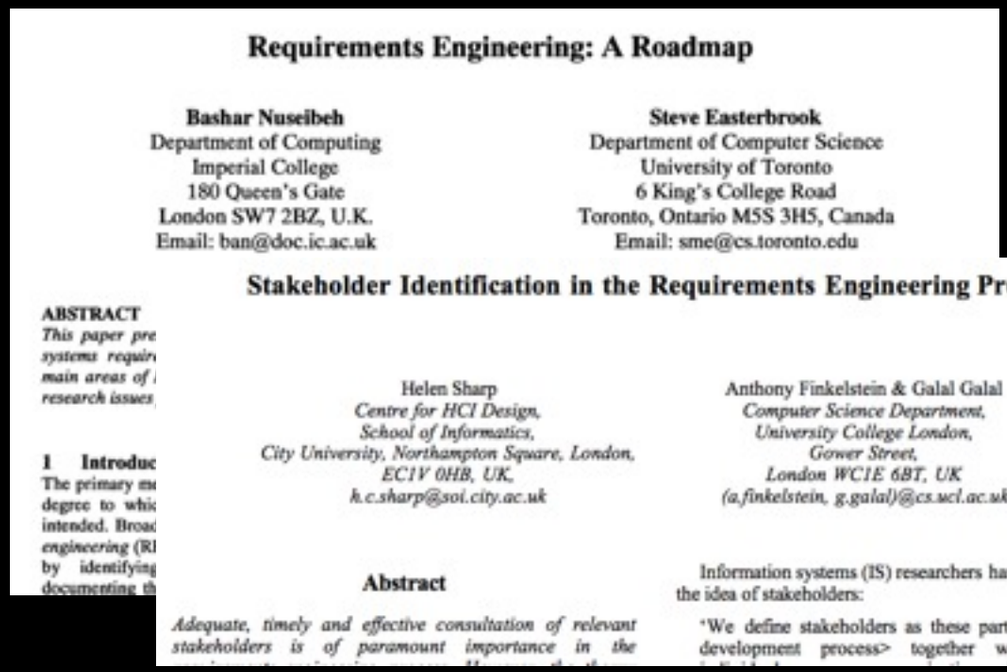
Material


rockynook
Klaus Pohl · Chris Rupp
Requirements Engineering Fundamentals
A Study Guide for the
Certified Professional for Requirements Engineering Exam
· Foundation Level
· IREB compliant

Material



+ research articles



Requirements Engineering: A Roadmap

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Stakeholder Identification in the Requirements Engineering Process

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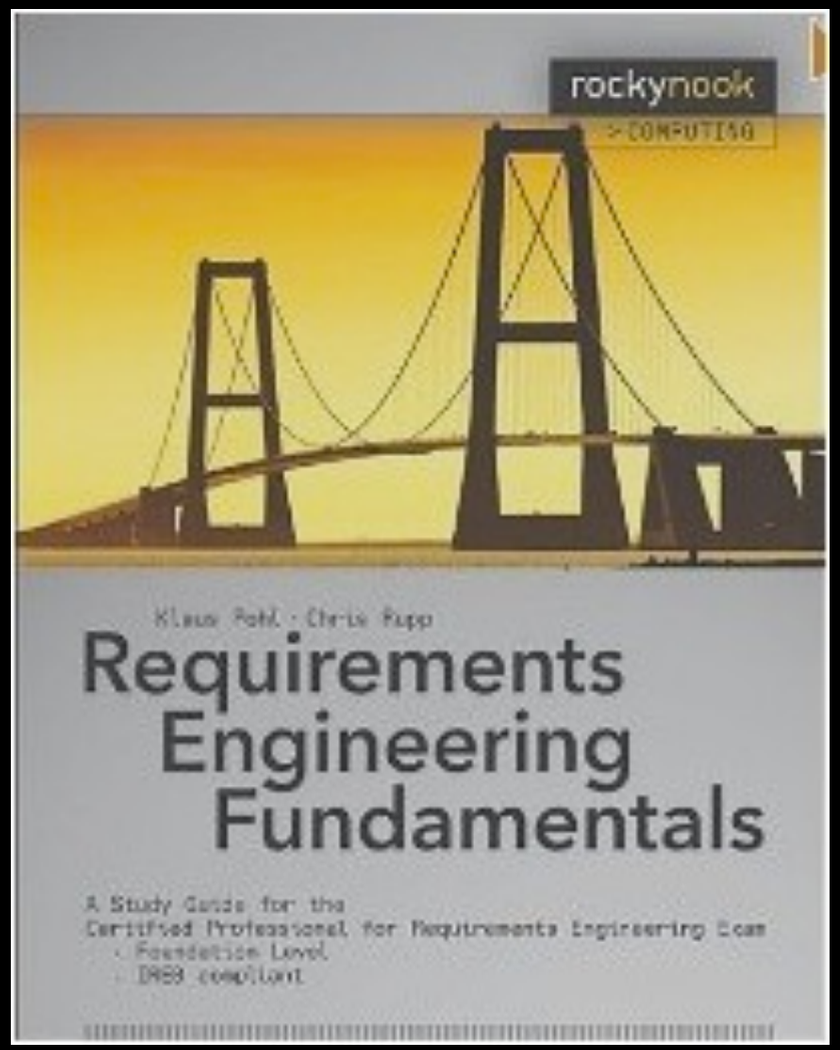
Abstract

Adequate, timely and effective consultation of relevant stakeholders is of paramount importance in the

Information systems (IS) researchers have also taken up the idea of stakeholders:

'We define stakeholders as these participants <in the development process> together with any other

Material



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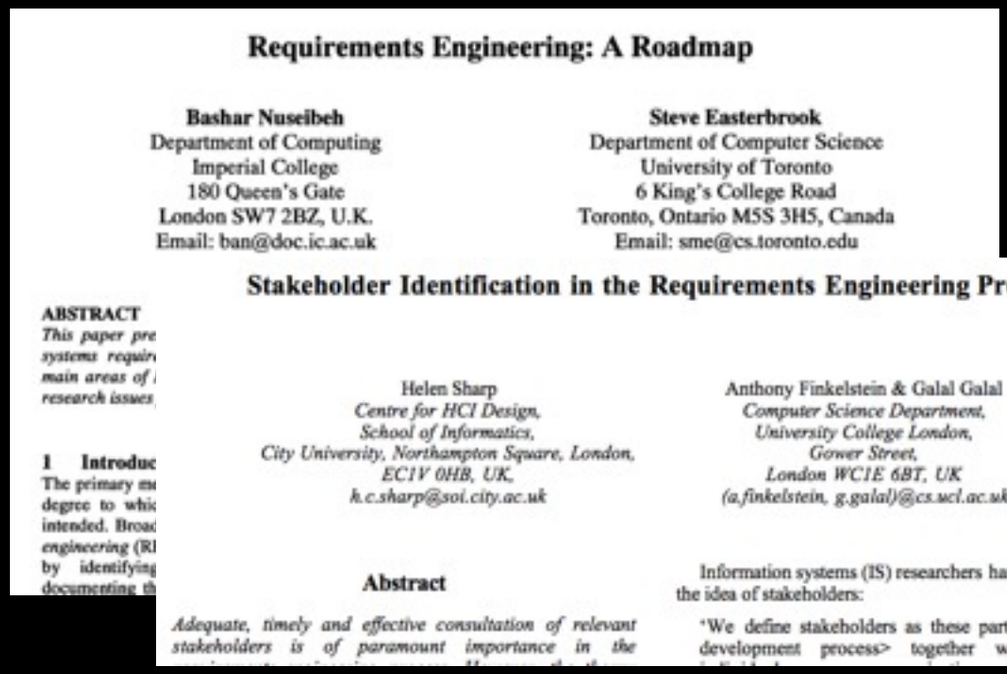

+ videos

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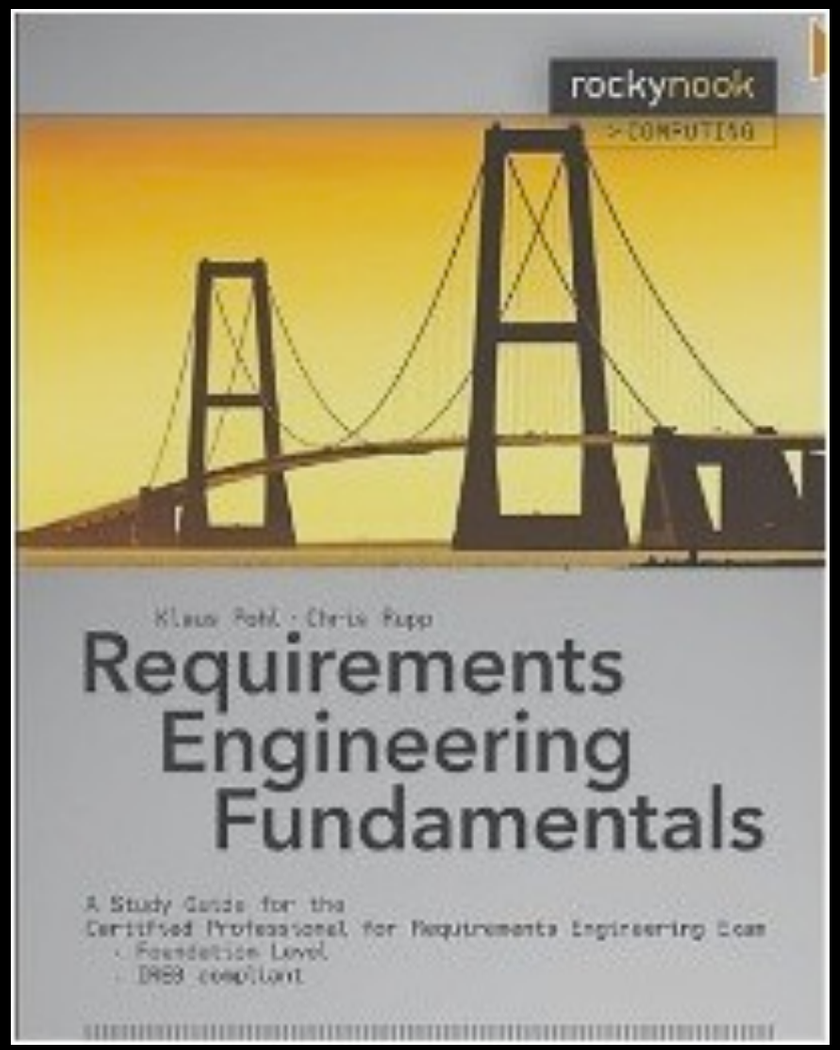

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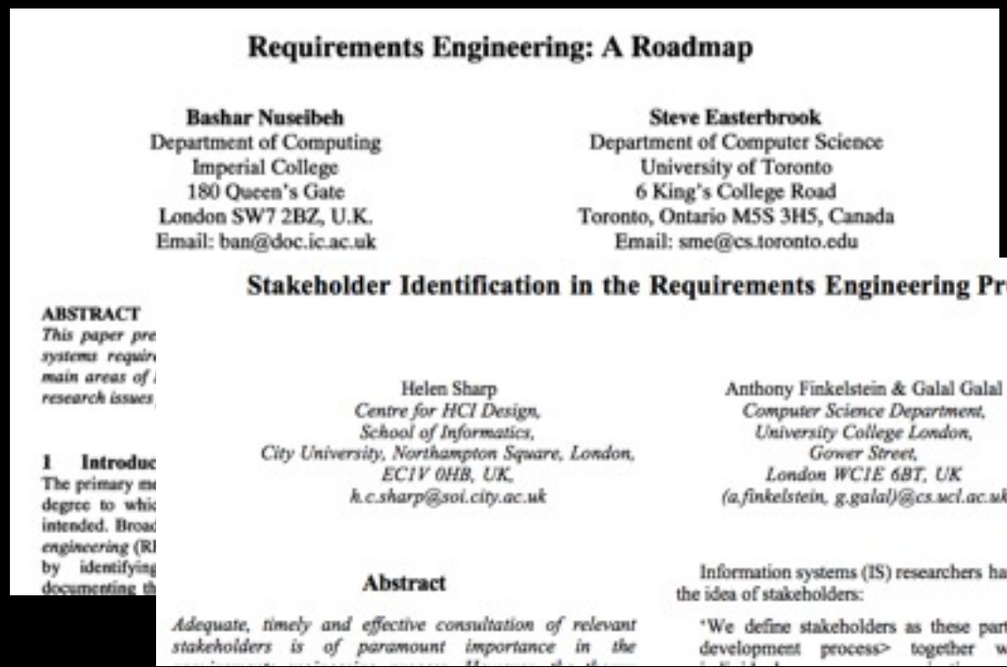
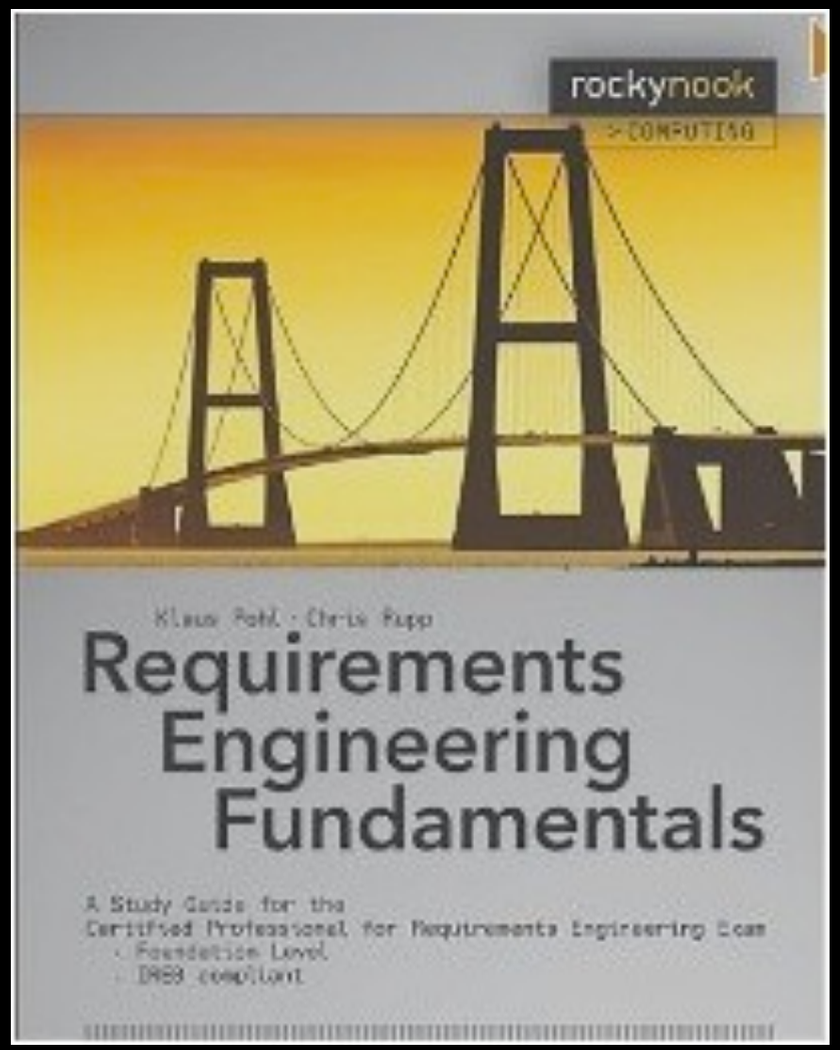


+ videos

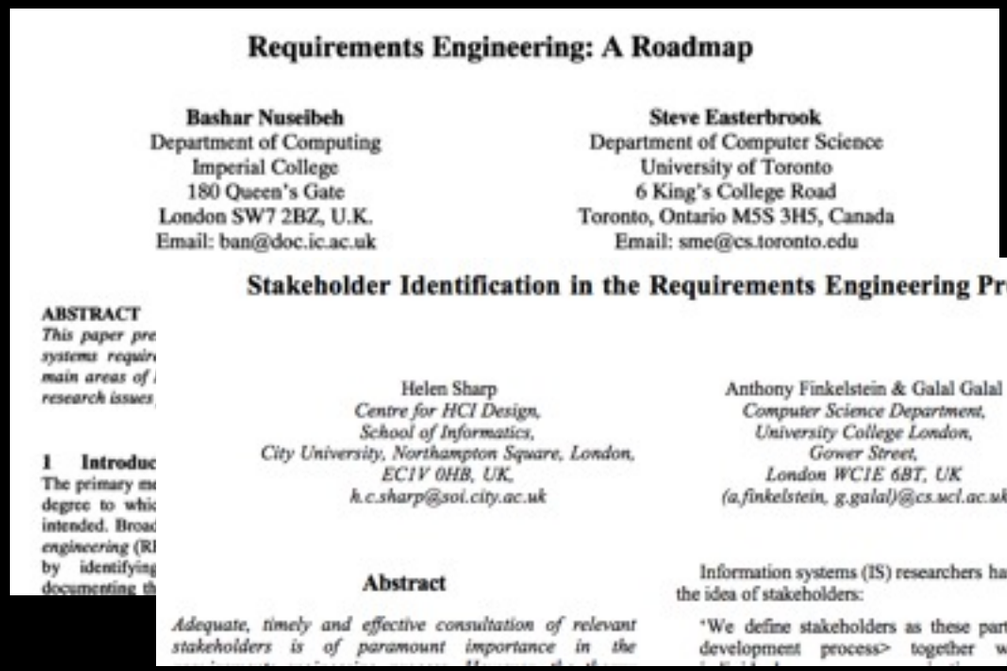
+ assignment experience

Material



IREB

+ research articles



+ videos

+ assignment experience

Group Assignment

- A. Elicitation
  - 2 Customer meeting(s)
- B. Write Req Specifications
  - Different formats: Natural Language/IEEE, Use cases, User stories, P language
  - Compare approaches, Post mortem with detailed discussion of the whole experience
- C. Prioritization

Groups

- Groups of 4-7 people
- No choice in group assignment; we will assign groups
  - Don’t bother asking for “special treatment”
- Groups announced in week 3
- We need your assignment 0 answers for group assingment and eval (your background + personality)

Individual Assignments

- 0. Your background
  - Fill in background & personality questionnaires online
- 1. Write requirements
  - Introduced tomorrow 31/8 in workshop
  - Deadline: 14/9 18:00 (ALL DEADLINES ARE FIRM!)
- 2. Secret for now
  - Start after deadline for assignment 1
  - Deadline: 20/9 18:00 (ALL DEADLINES ARE FIRM!)

All Assignments

- All reports and hand-ins for assignments should be in IEEE conference proceedings format
  - Info linked on home page
  - Proper and complete references to all supporting books/ papers/info!
  - Proper format!
- Handed in as PDF files on Fire system
- All info stated in assignment paper on home page! Introduced in coming workshops/lectures...
- Group assignment: Use template format!

Examination

- Written exam, individual, 4 credits
- Assignments, group + individual, 3.5 credits
  - Group assignment, 100 points max, 50 needed to Pass, floor((group_points-50)/10) bonus on written exam (higher grade only, not for PASS!)
  - Individual assignments, Pass/Fail only
- Grades:
  - Chalmers: [0-49%] => Fail, [50-64%] => 3, [65-79%] => 4, [80-100%] => 5
  - GU: [0-49%] => Fail, [50-79%] => G, [80-100%] => VG

Key Dates & Deadlines

- 6/9 18:00: Assignment 0 and Fire account deadline
- 7/9: W1 Intro to assignment 1&2
- 14/9 18:00: Assignment 1 deadline
- 18/9: W2 Prep for assignment 3 (interviews)
- 20/9 18:00: Assignment 2 deadline
- 25/9 10:15: Guest Lecture from Inceptive AB
- 26/9: W1 Intro to assignment 1&2
- 28/9 & 4/10: Customer interviews/meetings
- 18/10 15:00: Deadline assignment 3
- 19/10: Project presentations & discussion
- 25/10 14:00: Written exam in Campus Lindholmen

Additional notes

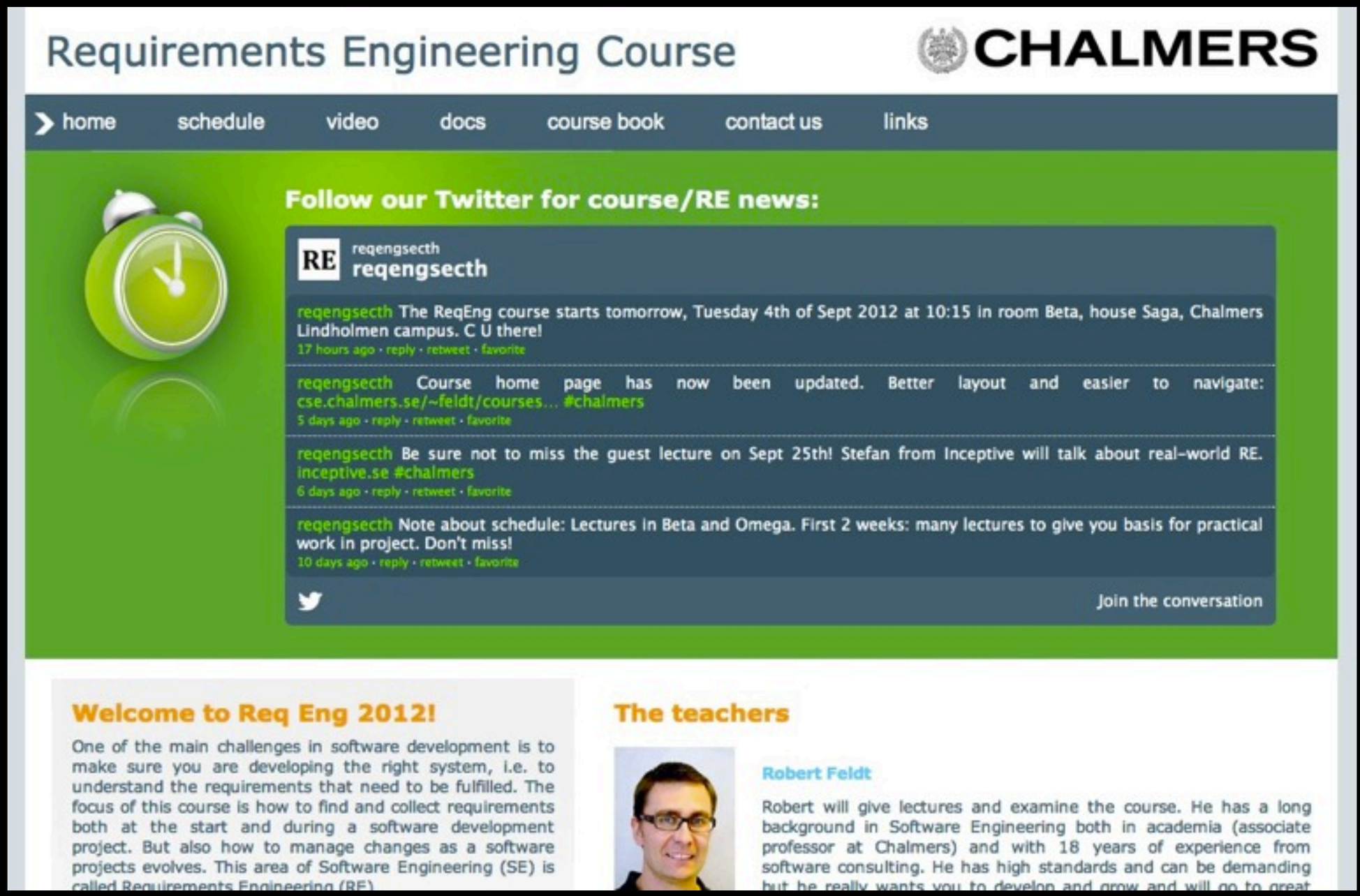
- How much should you write in reports?
  - Stated in assignment spec as MAX limit
  - Expected to perform each assignment in as many or as few pages as is necessary to convince us you sufficiently understand the topic of the assignment
- Plagiarism will
  - yield an immediate FAIL on course
  - be reported to university disciplinary board
  - be meaningless; why not buy a master degree online directly instead? ;)

Additional notes

- Student participation
  - You are expected to take responsibility
  - Lectures and assignments focus on what book DOES NOT cover
    - Read book early and beforehand
- Active participation; we will evaluate level of participation
- Discuss
- Individual work
- Reflect and relate to experience

Home page

- Check at least twice per week!
- http://www.cse.chalmers.se/~feldt/courses/reqeng/



Home page

Twitter: @reqengsecth

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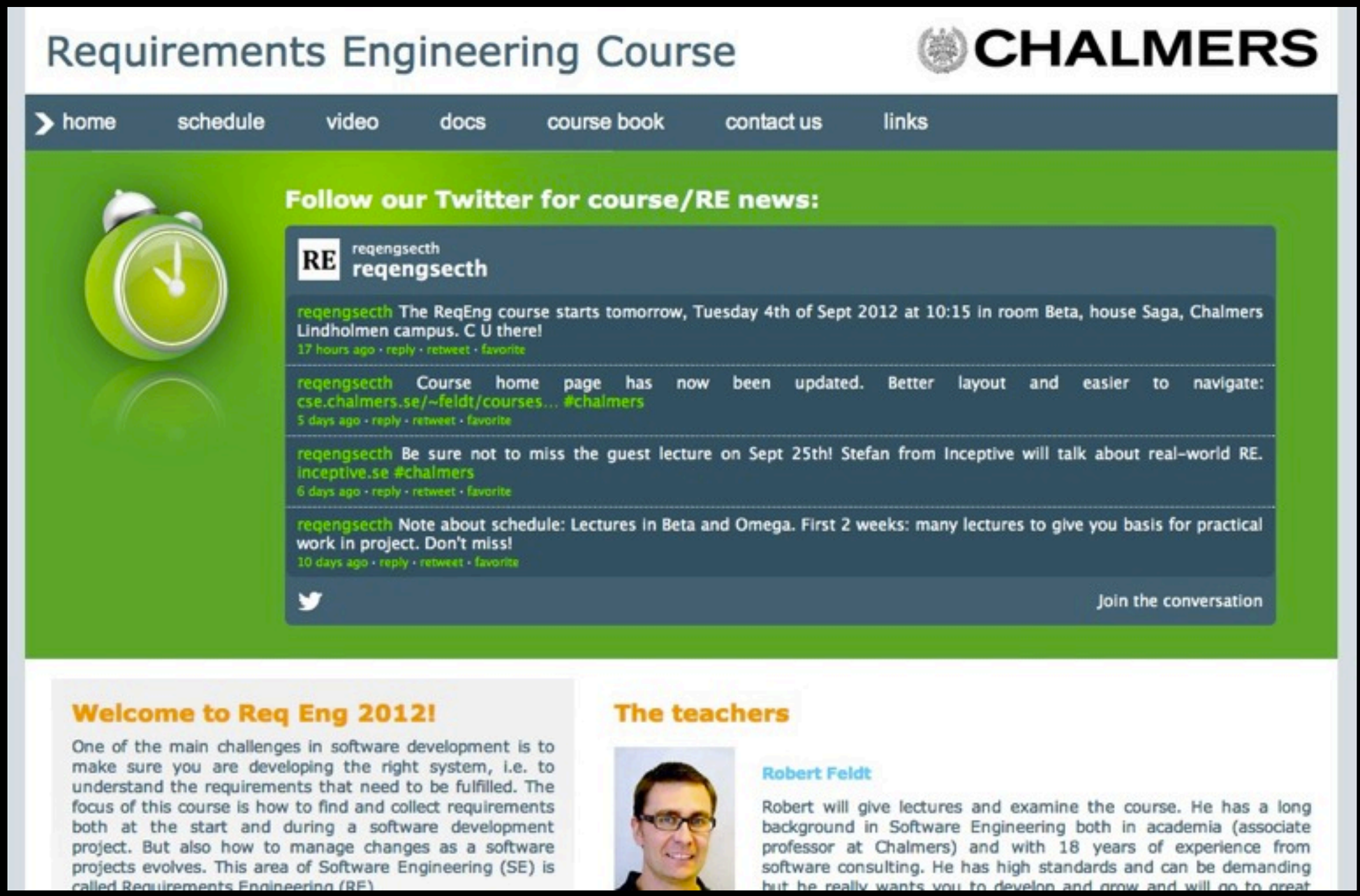


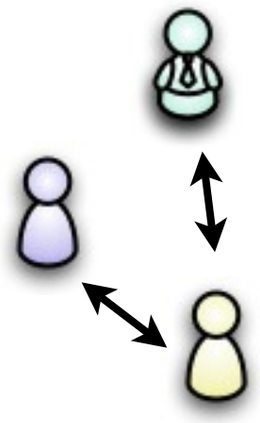
Until Guest Lecture

- Prepare questions for Stefan Eekenulv
- 5 general on SE
- 5 specific on RE

Overview of RE

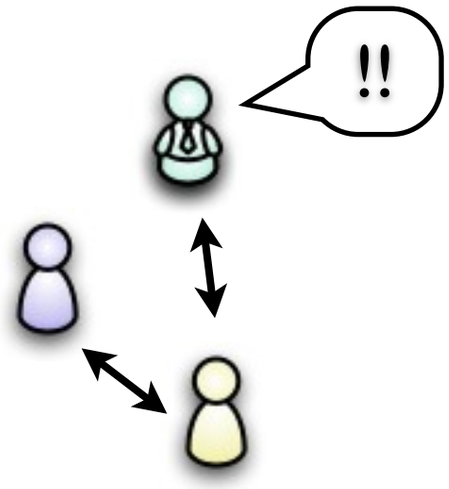
Document

Stakeholders



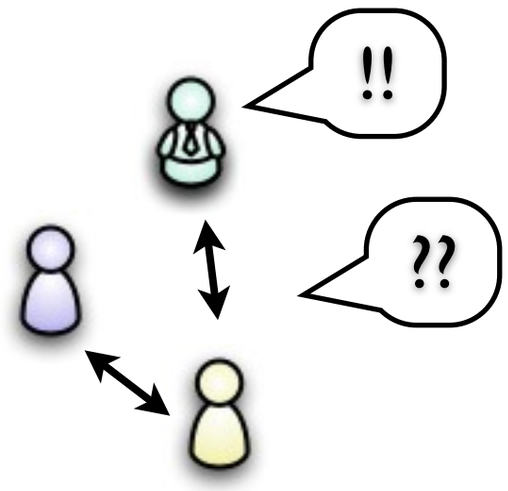
Relations

Say

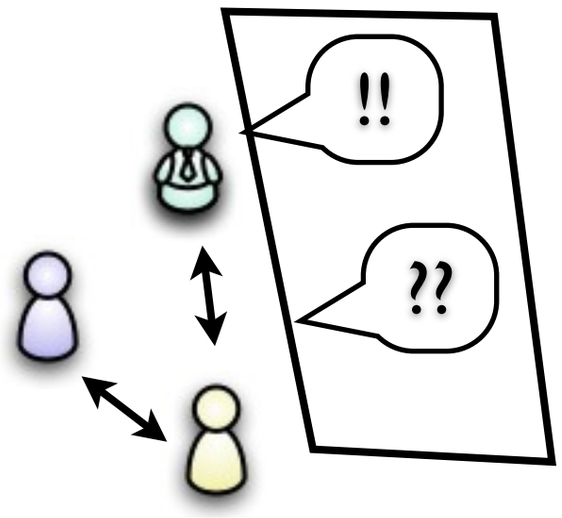


Need!

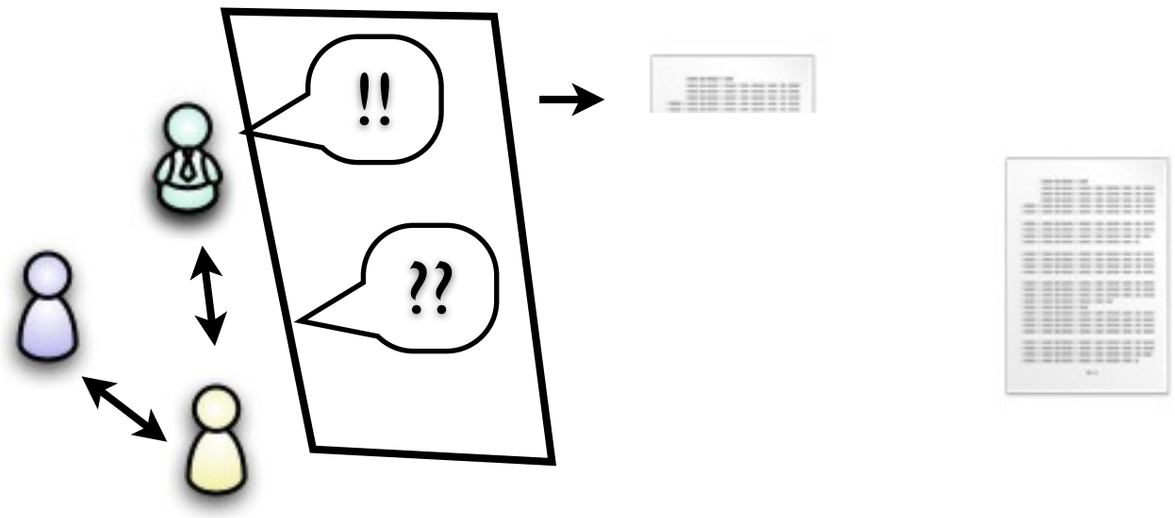
Say Think



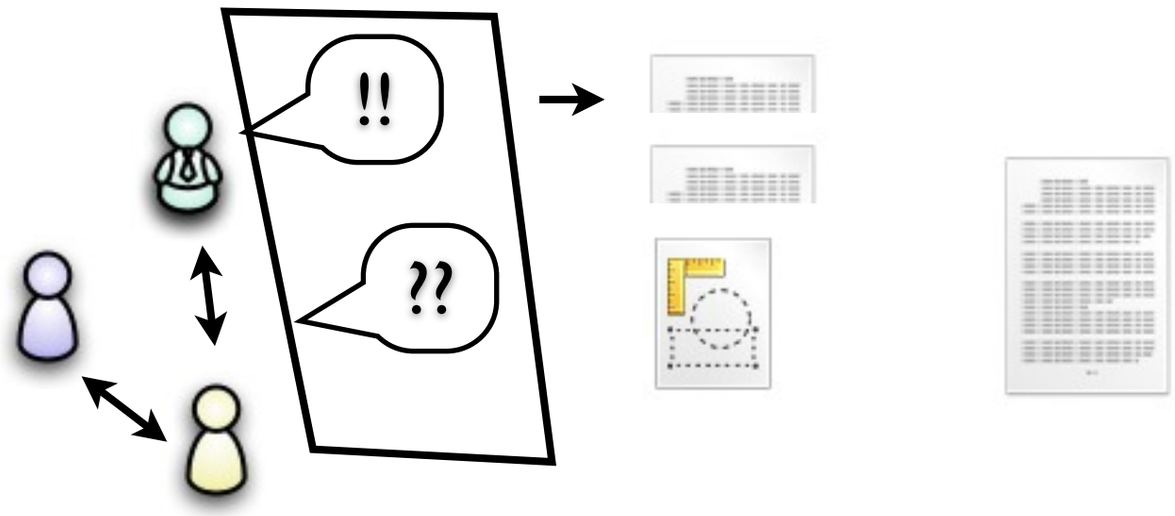
Capture

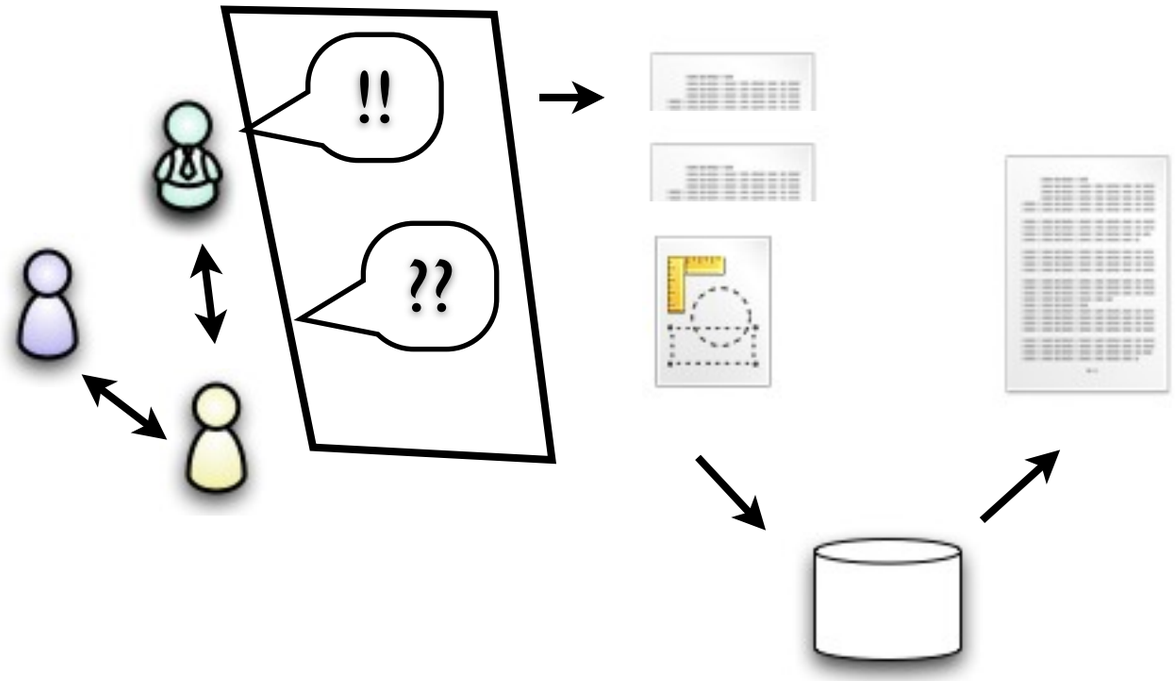


Transform



Specify

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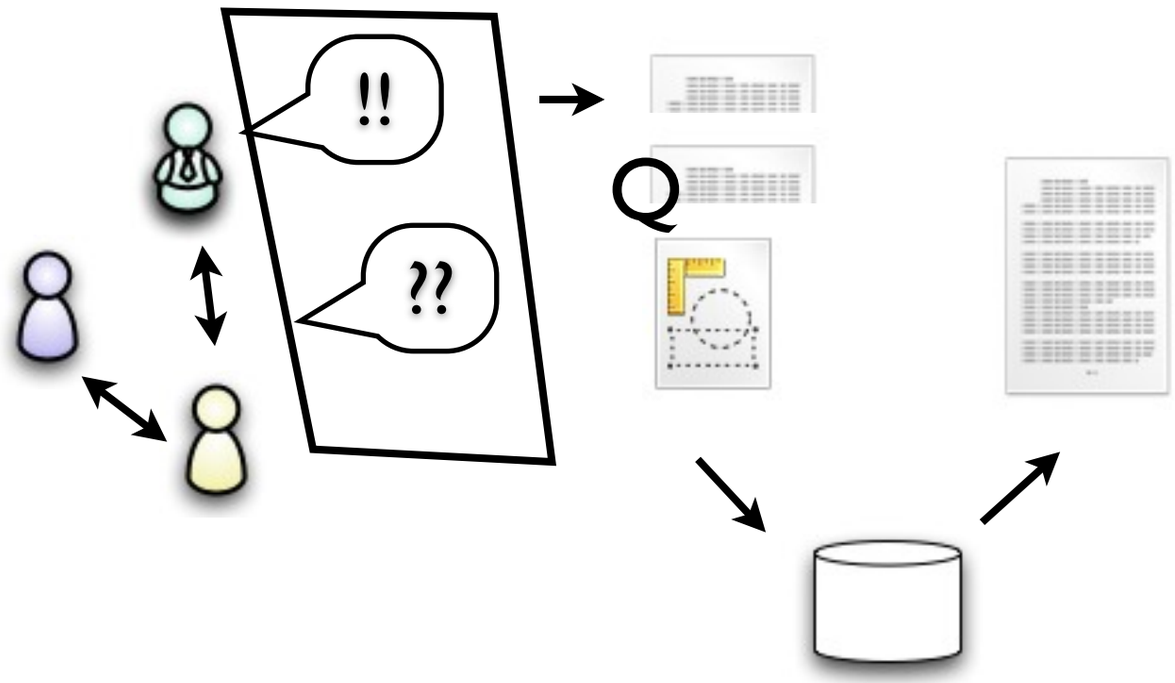
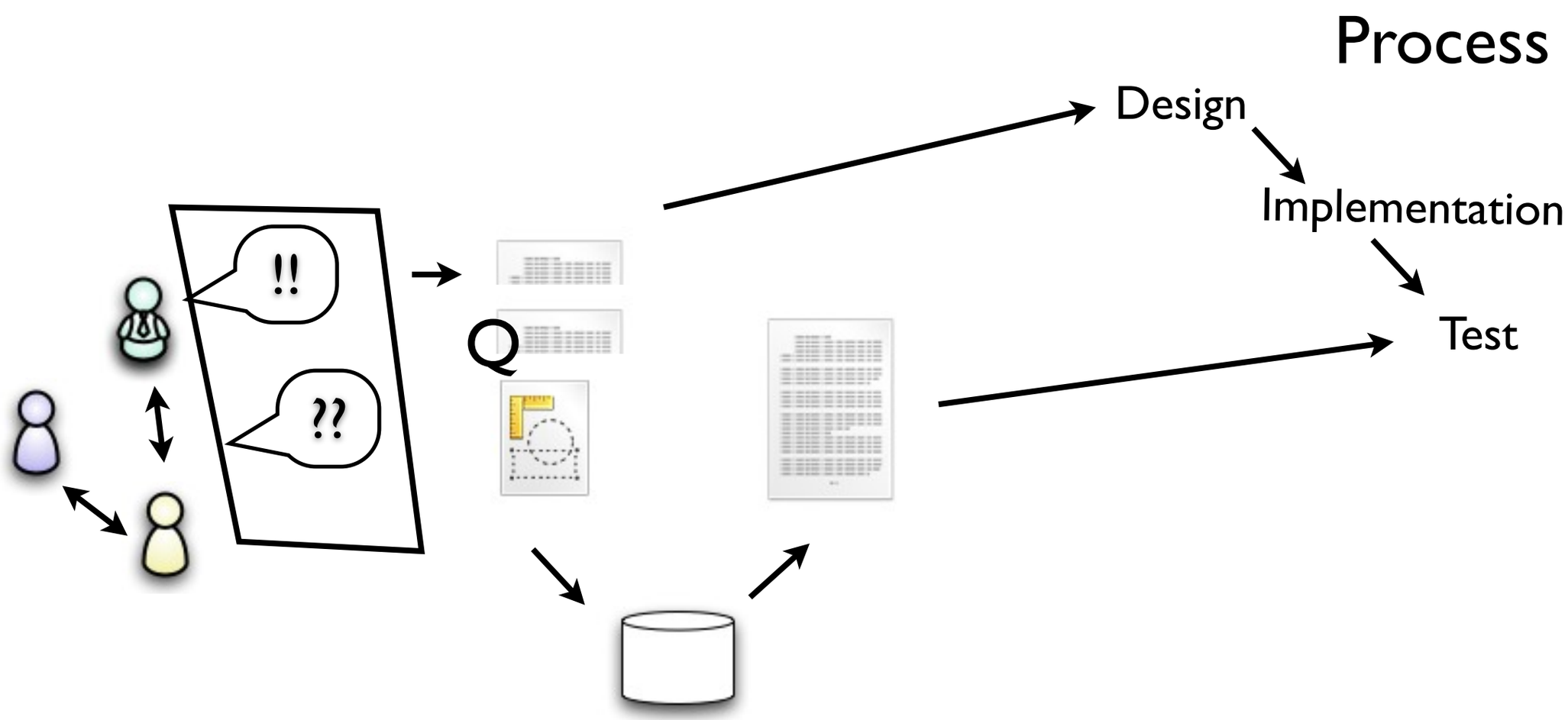
Store

Validation




Process
Design
Implementation
Test
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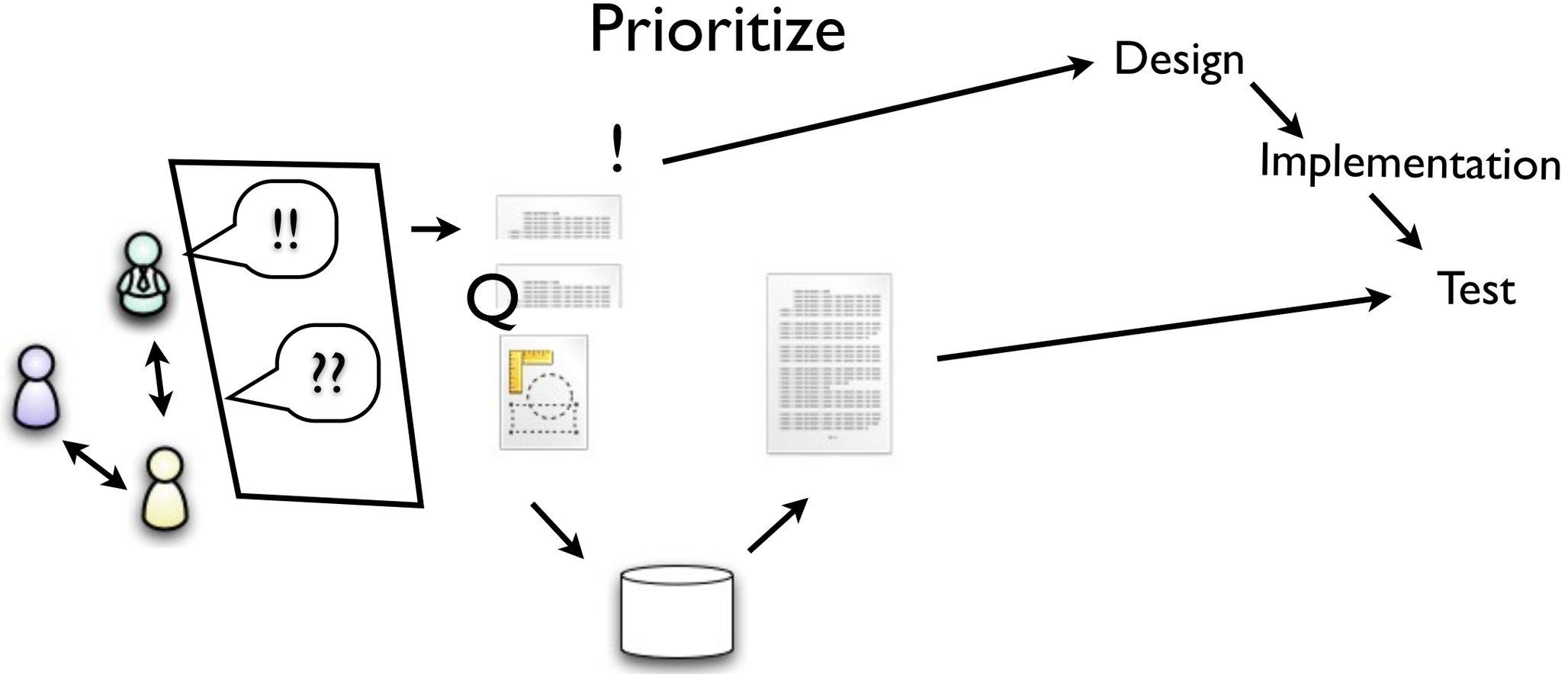
??
Q


Prioritize
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Design
Implementation
Test
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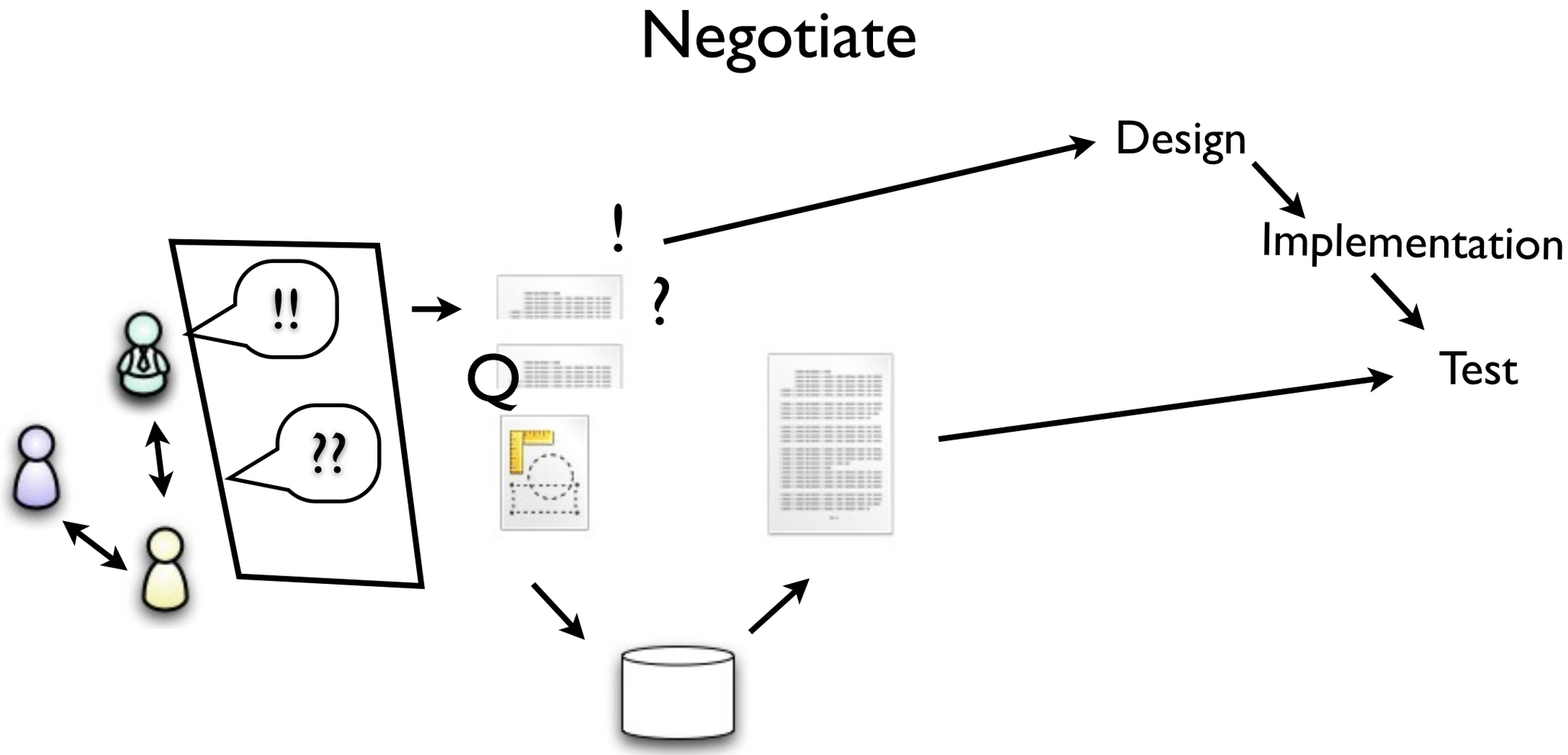
Negotiate
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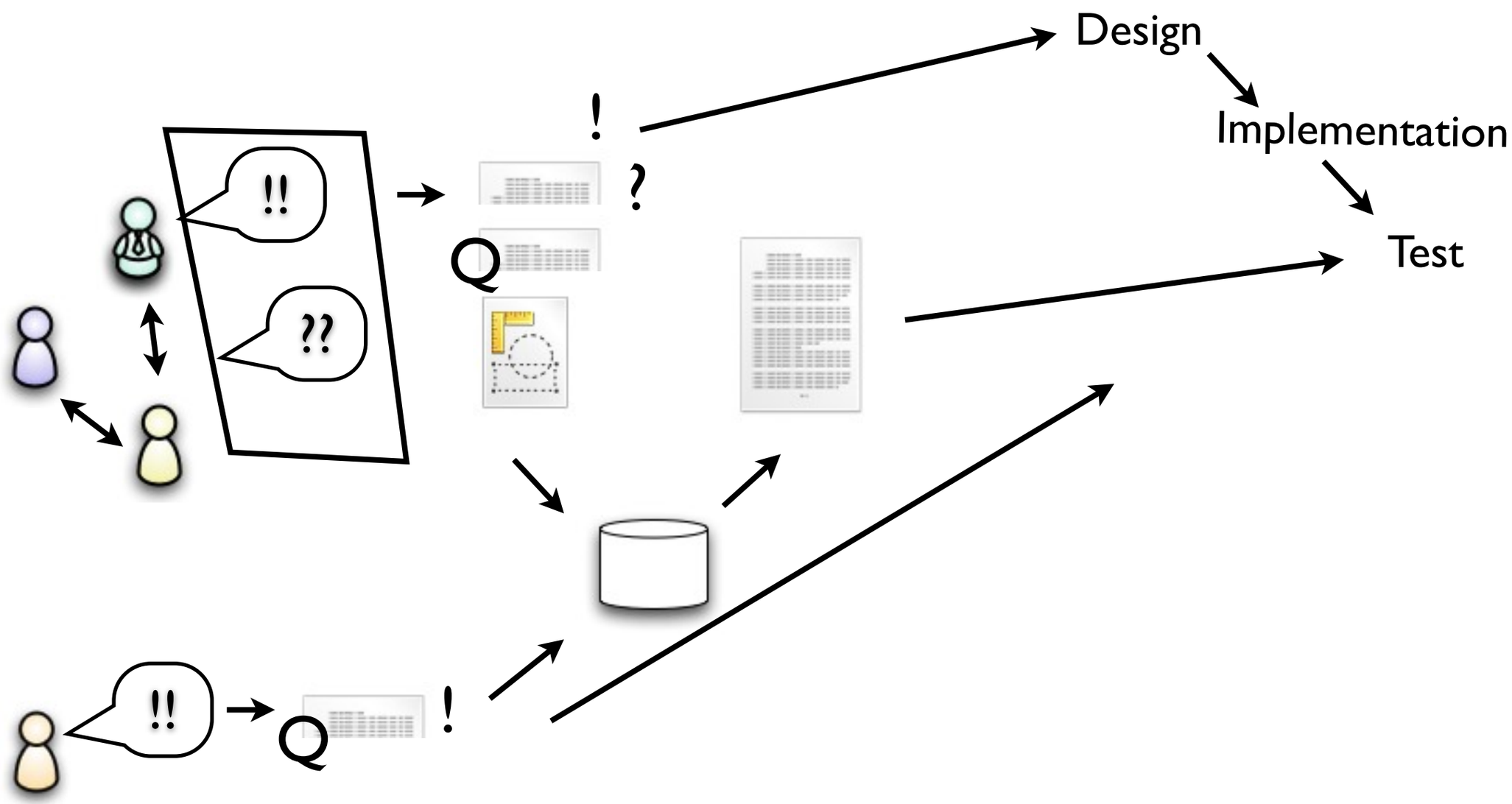
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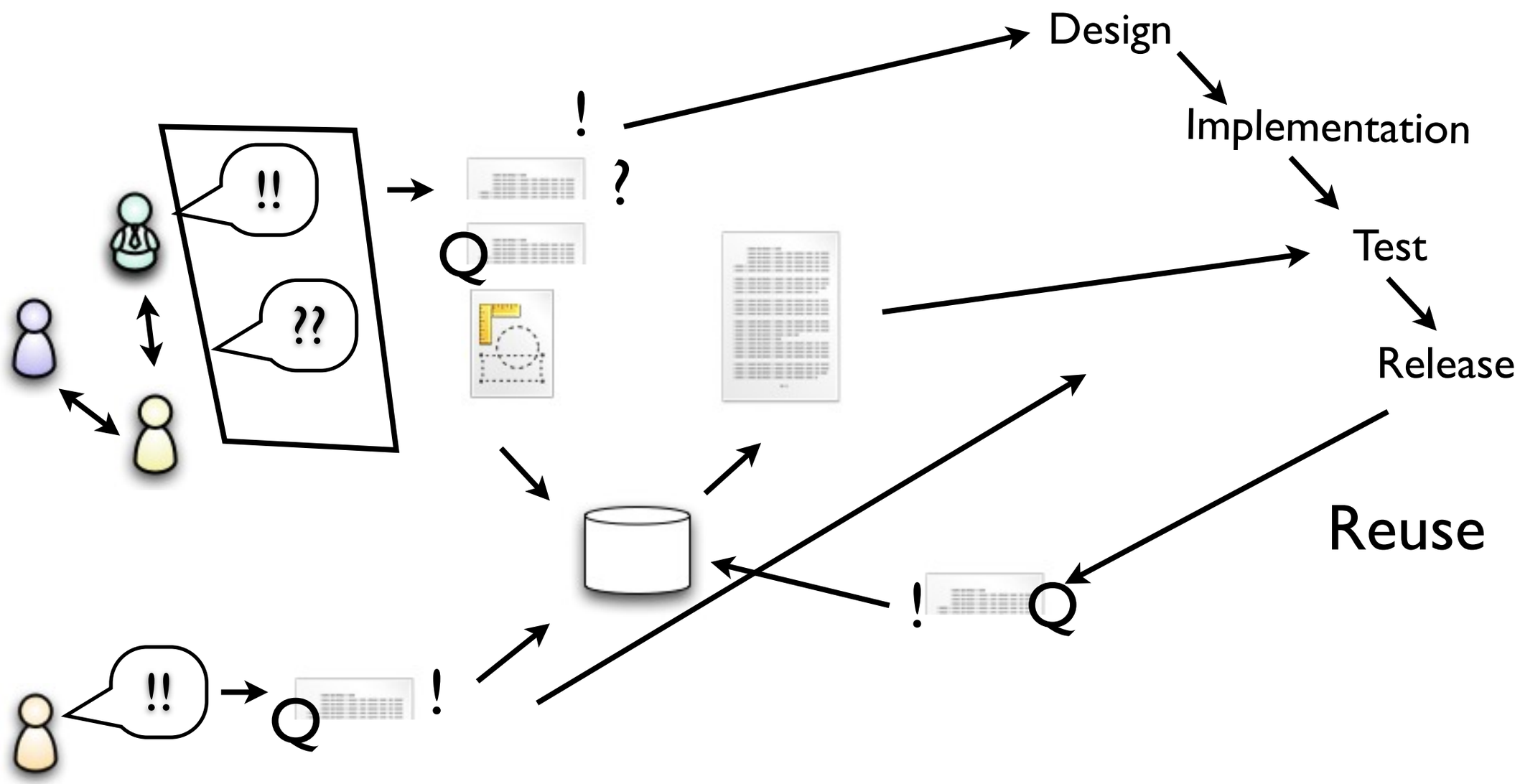
Change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Reuse
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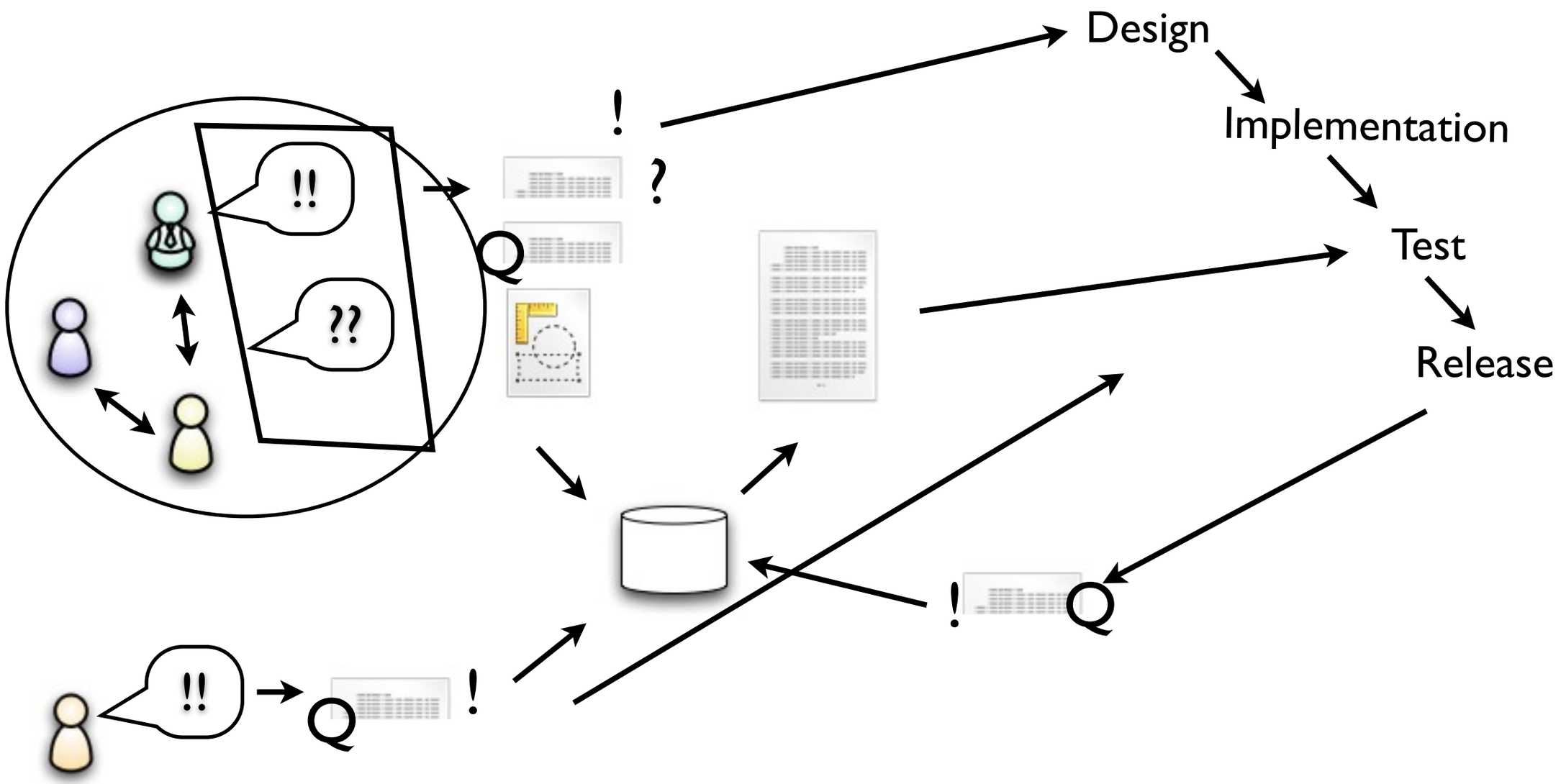
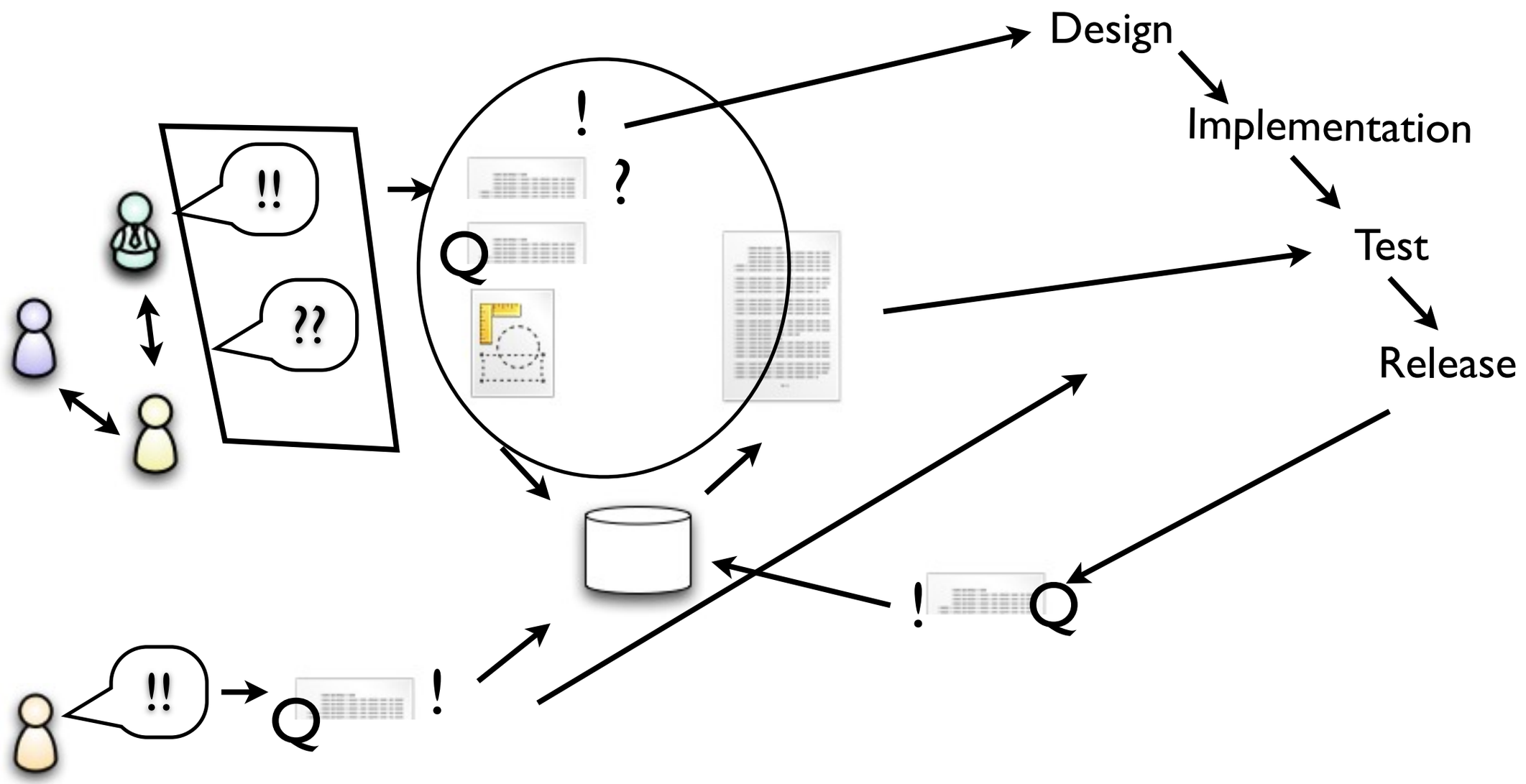
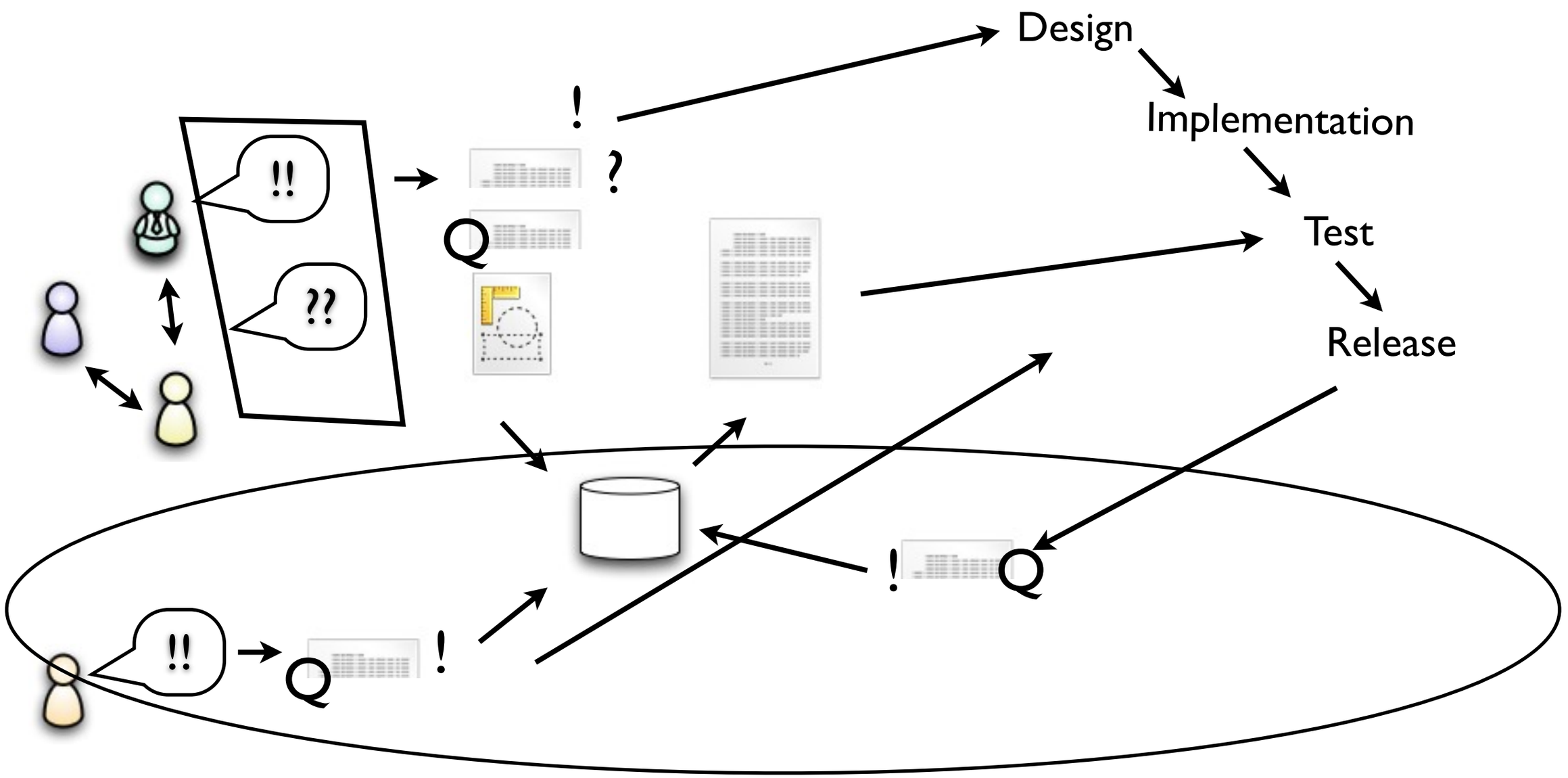
Q

Elicitation



Specification & Analysis

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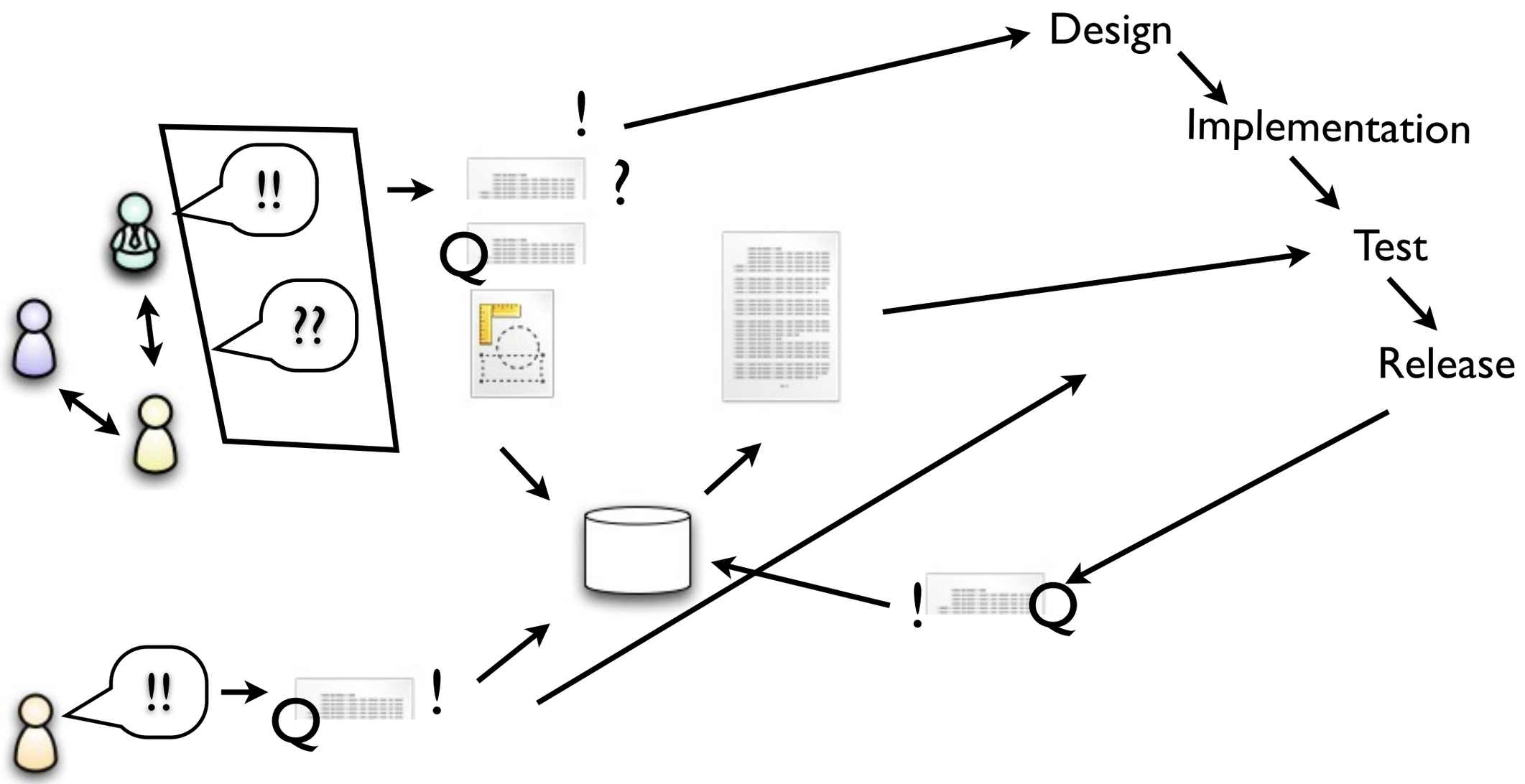
Management


Design
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Q

Why is RE important?

Why RE is important

- Must know what to build
  - before we build it
  - at least: as we build it
- Fail despite good design, code and testing
- Misunderstanding problem domain => high cost
- More and more complex systems faster

Why is RE hard?

Why RE is hard

- Conflict between Problem and Solution domains
- RE is human-centric => requires broader knowledge
- Introducing software changes context => unpredictable effects
- Users often do not know what they really need
- Jobs change often => less deep experience, more “one-off” systems
- Outsourcing changes landscape => specs to less experienced organisations
- More domain-specific software

RE is multi-disciplinary

- SW Technology - of course, but not enough
- Psychology - difficulty describing needs, tacit knowledge, cognitive biases
- Economy - cost of dev & introduction, sales, marketing
- Anthropology - observing humans
- Sociology - group, political and cultural effects
- Linguistics - RE is communication
- Philosophy - epistemology, phenomenology, ontology

Different types of requirements?

Functional Reqs

Quality Reqs

Functional Reqs

Quality Reqs

Features

Functional Reqs

Quality Reqs

Features

Specific functions

Functional Reqs

Quality Reqs

Features

Specific functions

"The system should be able to export graphs to PDF files"

Functional Reqs

Features

Specific functions

Quality Reqs

aka. Non-Functional Reqs

"The system should be able to export graphs to PDF files"

Functional Reqs

Features

Specific functions

Quality Reqs

aka. Non-Functional Reqs

aka. “-ilities”

“The system should be able to export graphs to PDF files”

Functional Reqs

Features

Specific functions

"The system should be able to export graphs to PDF files"

Quality Reqs

aka. Non-Functional Reqs

aka. "-ilities"

Usability Reliability

Availability Dependability

Security Peformance

Safety ...

Functional Reqs

Features

Specific functions

"The system should be able to export graphs to PDF files"

Quality Reqs

aka. Non-Functional Reqs

aka. "-ilities"

Usability Reliability

Availability Dependability

Security Peformance

Safety ...

"The response time should be less than 0.6 seconds"

Development Constraints

Development Constraints

"The system should be easily portable to the Mac platform"

Development Constraints

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"The system must be implemented in Java using the Hibernate library for database access"

Development Constraints

"The system should be easily portable to the Mac platform"

"The system must be implemented in Java using the Hibernate library for database access"

"Development should follow the IEEE XYZ Process standard and the quality assurance adhere to the DOD-278 standard"