Course intro, RE Overview, Requirement types

Lecture 1, DAT230, Requirements Engineering
Robert Feldt, 2010-08-31

What is a requirement?

What is requirements engineering?

Requirement (Req/Reqs)

“A requirement is
an externally observable characteristic
of a desired system”

Requirement (Req/Reqs)

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

Req 1:The system should have a red reset button

Requirement (Req/Reqs)

“A requirement is
an externally observable characteristic
of a desired system”

Req 1:The system should have a red reset button

Requirements Eng. (RE)

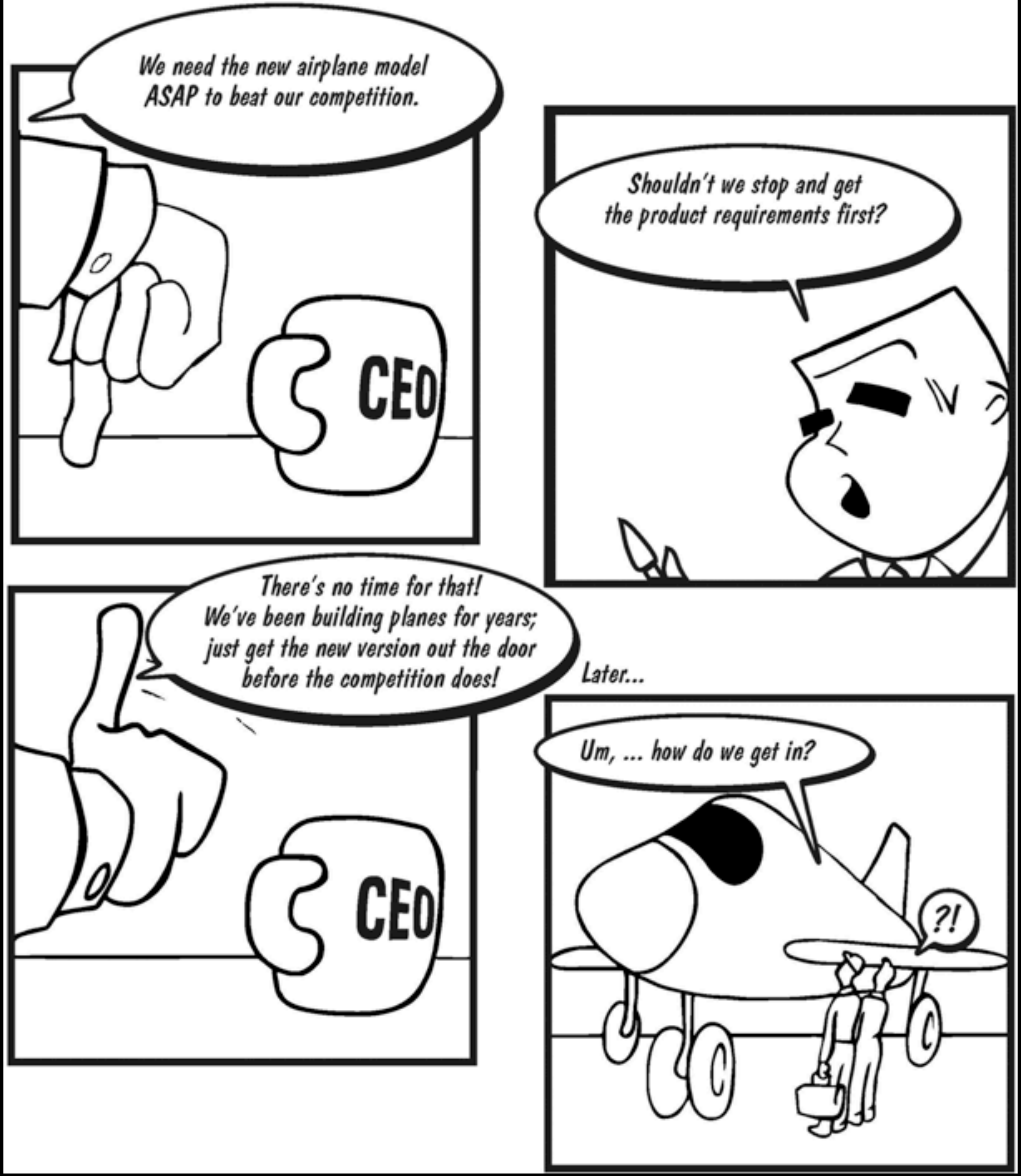
“RE is part of SE concerned with real-world goals for, functions of and constraints on software systems...”

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?

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 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, ...
- Group assignment
  - Elicit, document/specify and prioritize requirements
  - Groups of 6-8 people, 2 customer interviews, 2 req formats
- Individual assignments
- Written exam

Course Team

Robert

Examiner,
Lecturer

Ali

Assistant

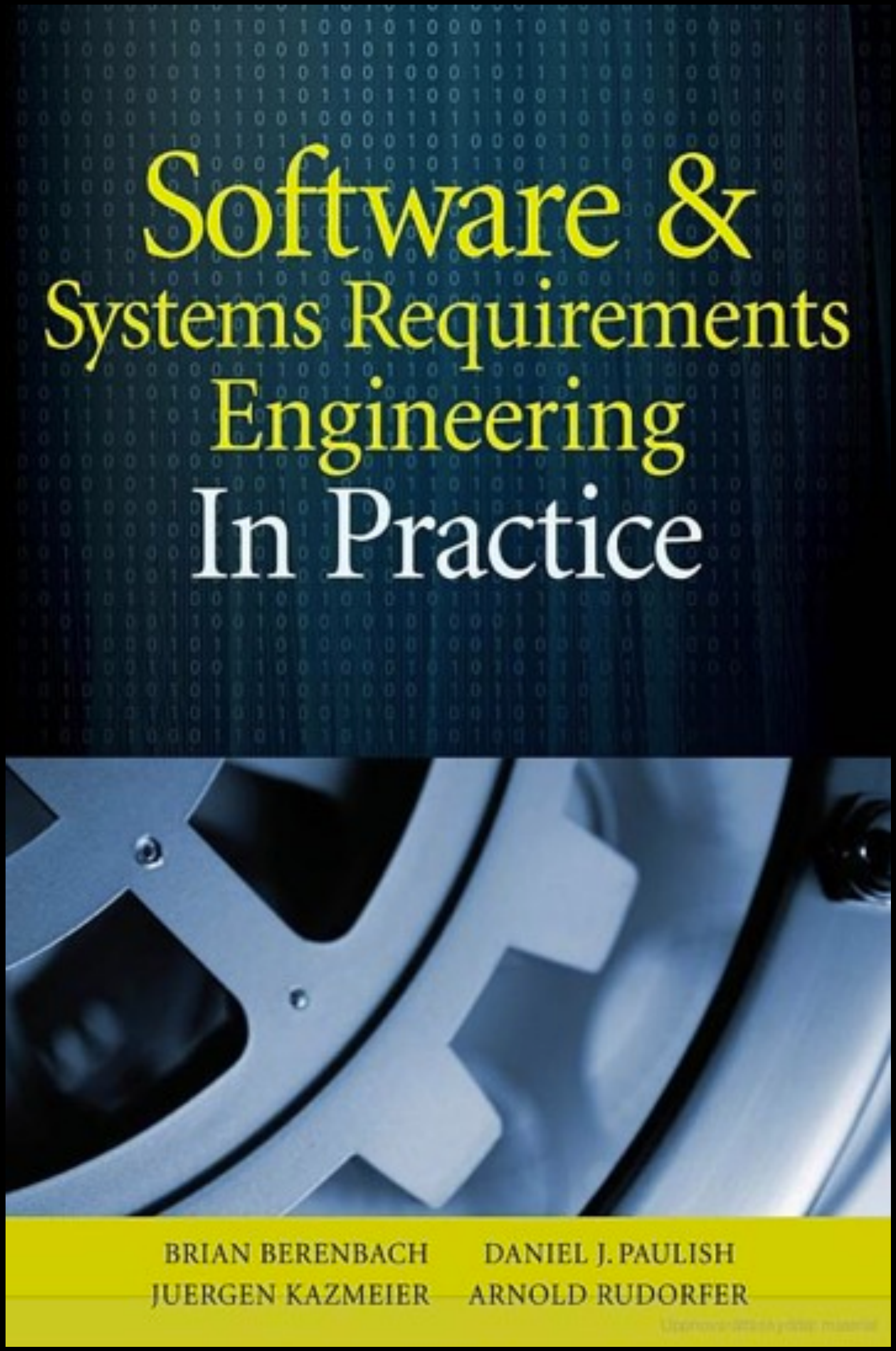
Ana

Assistant

Emil

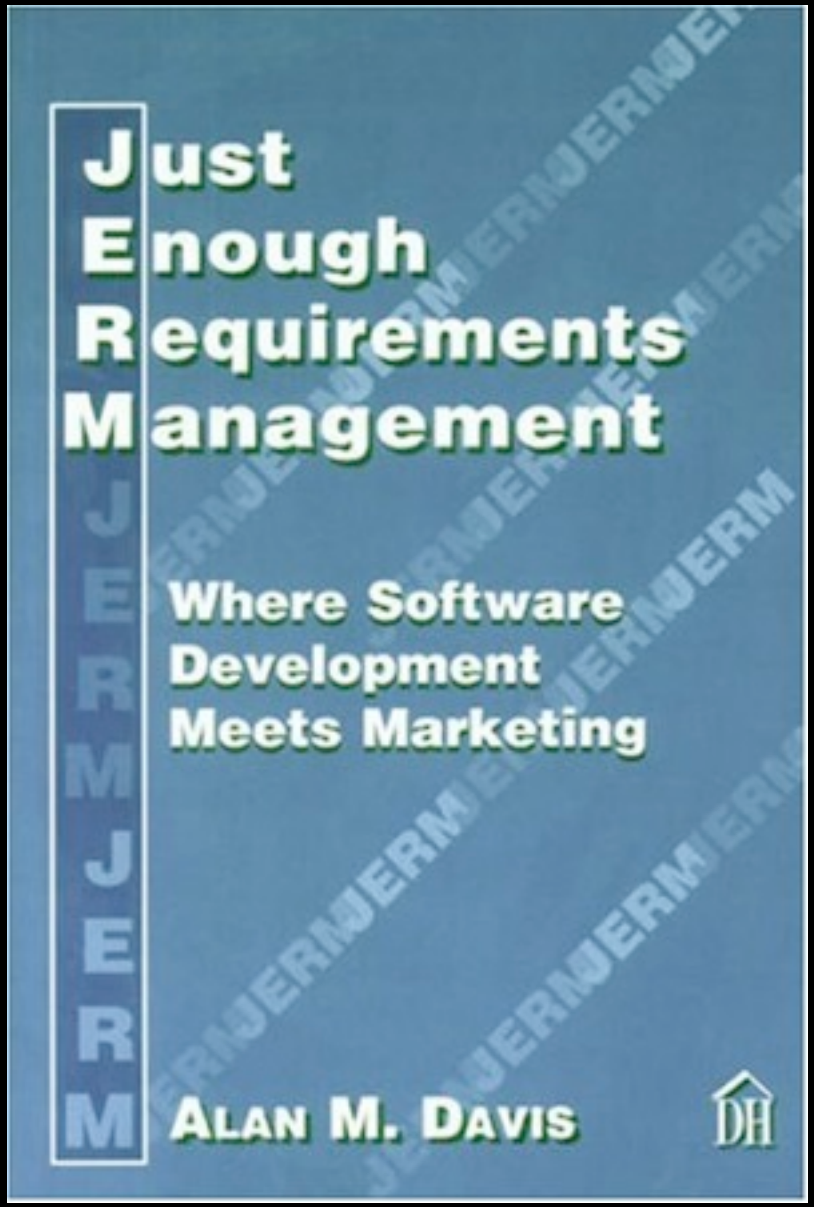
Assistant

Material



Software &
Systems Requirements
Engineering
In Practice

BRIAN BERENBACH DANIEL J. PAULISH
JUERGEN KAZMEIER ARNOLD RUDORFER

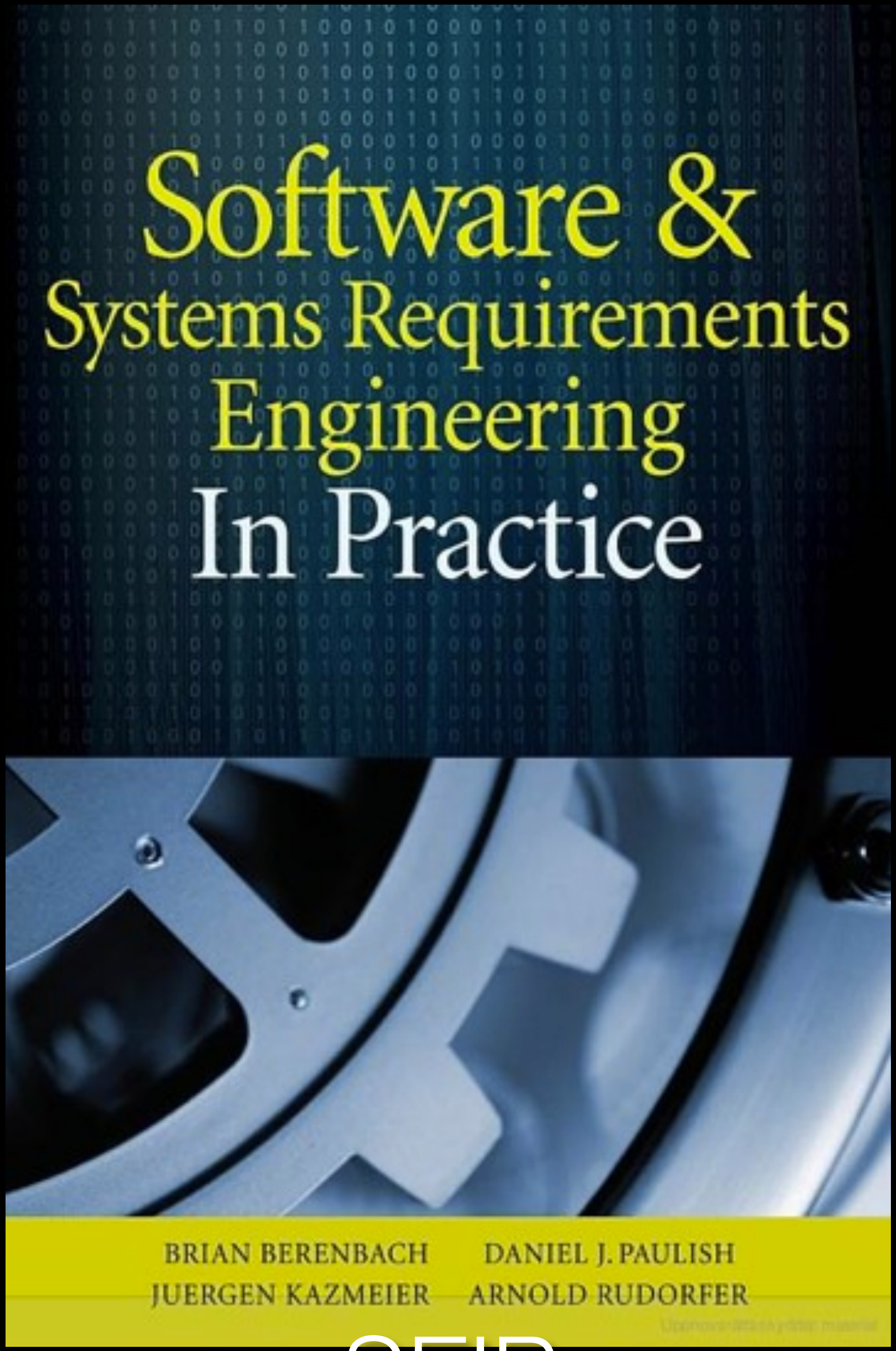


Just
Enough
Requirements
Management

Where Software
Development
Meets Marketing

ALAN M. DAVIS

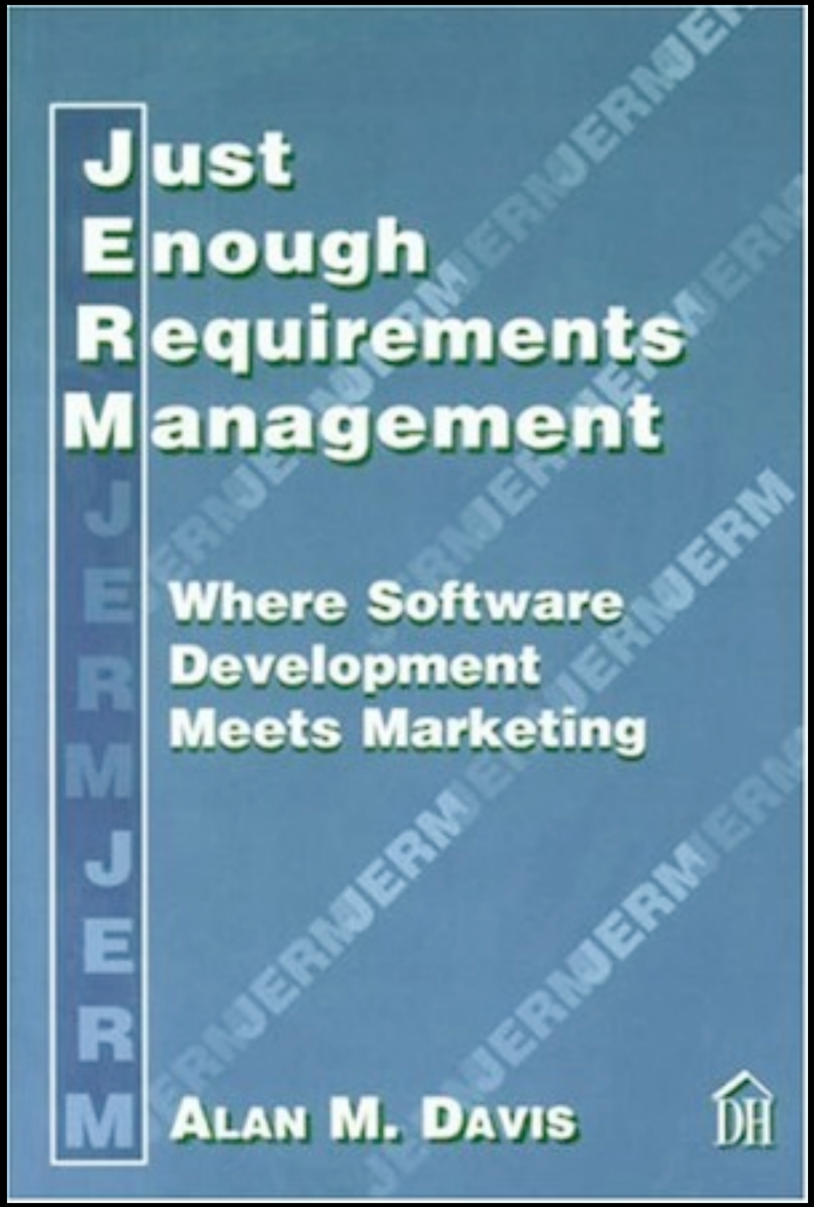
Material



Software & Systems Requirements Engineering In Practice

BRIAN BERENBACH DANIEL J. PAULISH
JUERGEN KAZMEIER ARNOLD RUDORFER

SEIP



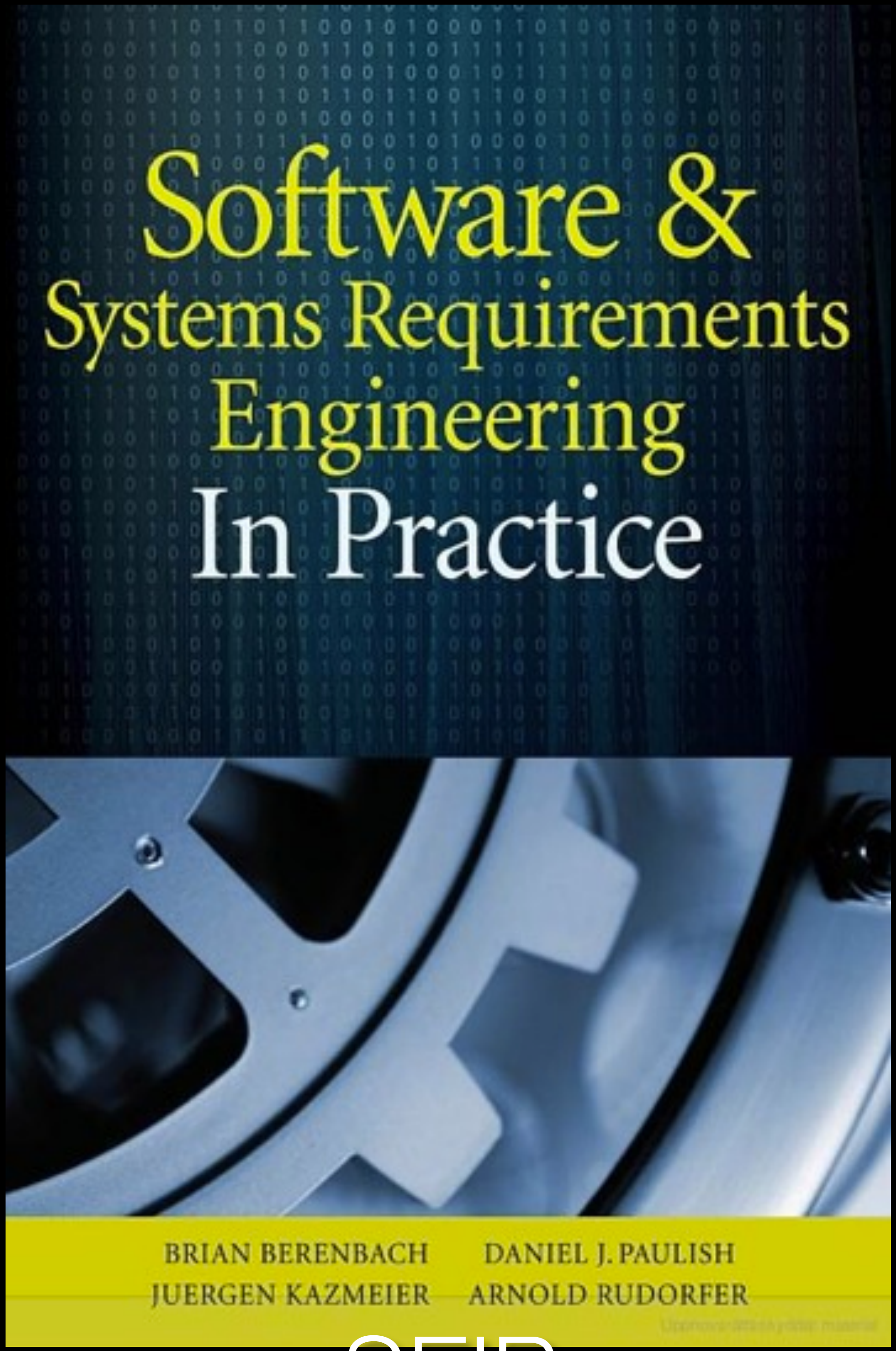
Just Enough Requirements Management

Where Software Development Meets Marketing

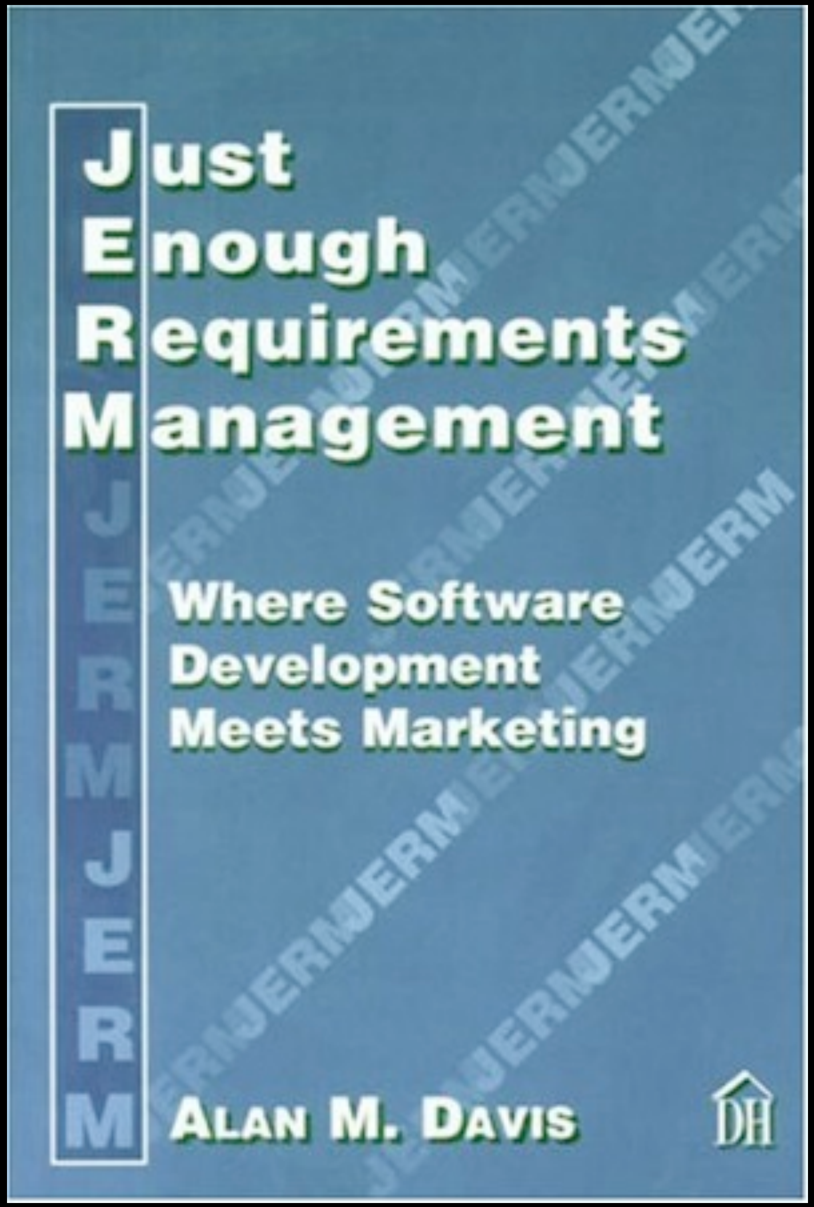
ALAN M. DAVIS

DH

Material

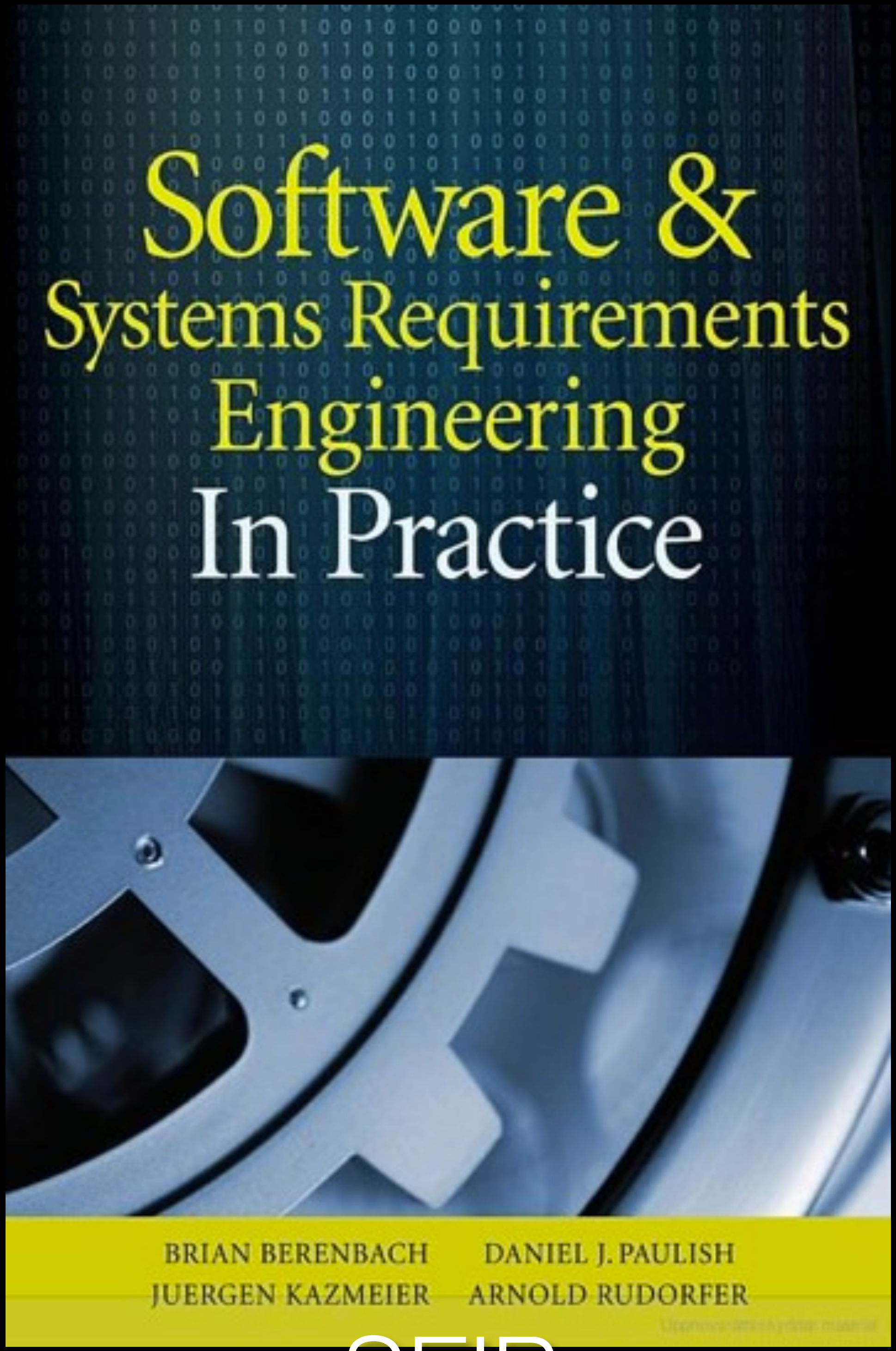


SEIP

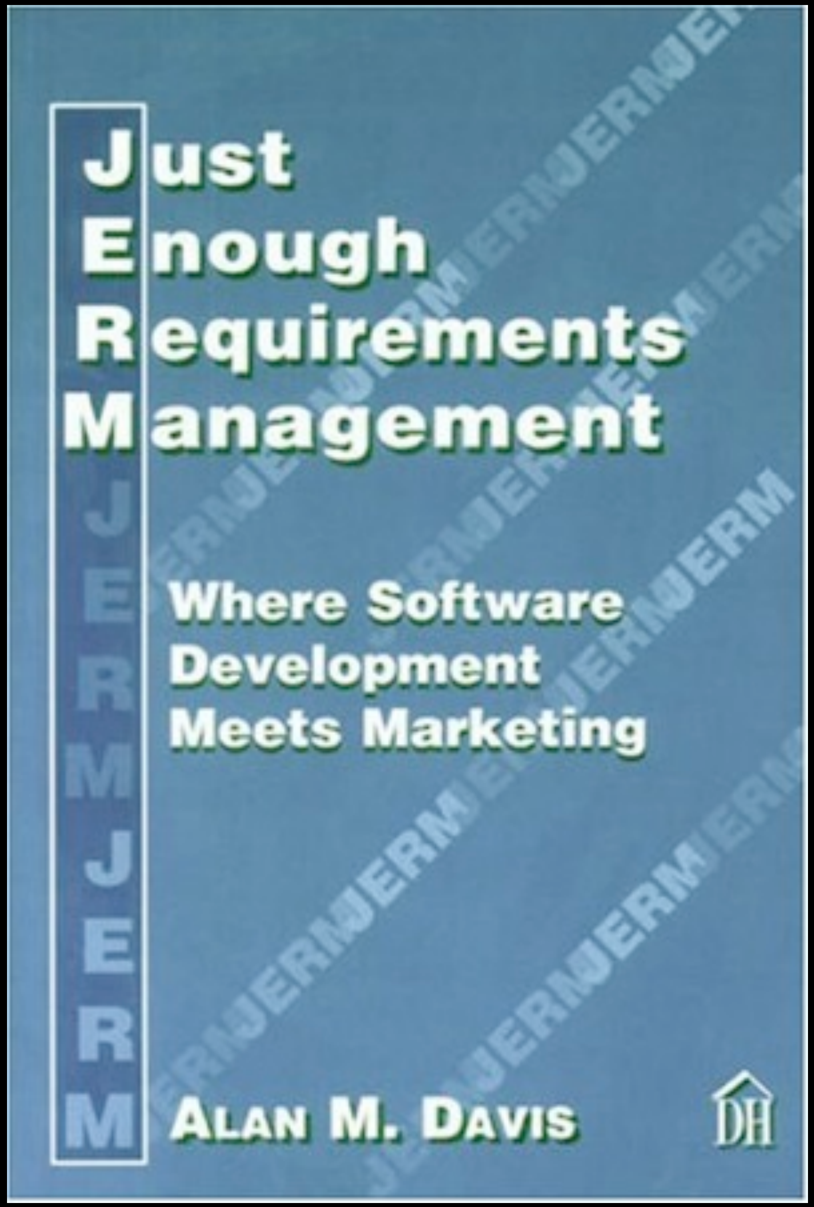


JERM

Material



SEIP



JERM

+ research articles

Requirements Engineering: A Roadmap

Bashar Nuseibeh
Department of Computing
Imperial College
180 Queen's Gate
London SW7 2BZ, U.K.
Email: ban@doc.ic.ac.uk

Steve Easterbrook
Department of Computer Science
University of Toronto
6 King's College Road
Toronto, Ontario M5S 3H5, Canada
Email: sme@cs.toronto.edu

ABSTRACT
This paper presents an overview of the field of software systems requirements engineering (RE). It describes the main areas of RE practice, and highlights some key open research issues for the future.

- eliciting requirements,
- modelling and analysing requirements,
- communicating requirements,
- agreeing requirements, and
- evolving requirements.

Section 2 discusses how these different activities may be

Stakeholder Identification in the Requirements Engineering Process

Helen Sharp
*Centre for HCI Design,
School of Informatics,
City University, Northampton Square, London,
EC1V 0HB, UK.
h.c.sharp@soi.city.ac.uk*

Anthony Finkelstein & Galal Galal
*Computer Science Department,
University College London,
Gower Street,
London WC1E 6BT, UK
(a.finkelstein, g.galal)@cs.ucl.ac.uk*

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 those participants <in the development process> together with any other

...

Group Assignment

- 1. Elicitation
  - 2 Customer meeting(s)
- 2. Write Req Specifications
  - Different formats: Natural Language/IEEE, Goal-driven/I*, Behavior-Driven Development (BDD)
  - Compare approaches
- 3. Prioritization
- 4. Workshop - Presentation and Opposition
  - Two groups compete for contract; winning team gets +3 for higher grades on written exam

Groups

- Groups of 5-8 people
- No choice in group assignment; we will assign groups
  - Don’t bother asking for “special treatment”
- Groups announced in week 2

Individual Assignments

- 1. Your background
  - Fill in background & personality questionnaires
- 2. Discussion of SEMAT
  - Based on MANDATORY guest lecture 10/9
  - Discuss/criticize SEMAT initiative
- 3. Review & Tool
  - Review 20 highest priority reqs from your group assignment based on req checklist
  - Enter same reqs into req tool; compare tool to prev formats

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 lectures...

Examination

- Written exam, individual, 4 credits
- Assignments, group + individual, 3.5 credits
  - Group assignment, 2.5 credits
  - Individual assignments, 1 credits, mandatory, ungraded
- Grades:
  - Chalmers: [0-49%] => Fail, [50-64%] => 3, [65-79%] => 4, [80-100%] => 5
  - GU: [0-49%] => Fail, [50-79%] => G, [80-100%] => MVG

Key Dates & Deadlines

- 7/9 14:00, IA1 - Your background
- 16/9 14:00, IA2 - SEMAT
- 24/9 17:00, GA1 - Elicitation interview 1
- 30/9 17:00, GA1 - Elicitation interview 2 (if needed)
- 7/10 14:00, GA2&3 - Req specification report
- 11/10 8-17, GA4 - Workshop
- 14/10 14:00, IA3 - Review & Tool
- 19/10 14:00, Written Exam

Additional notes

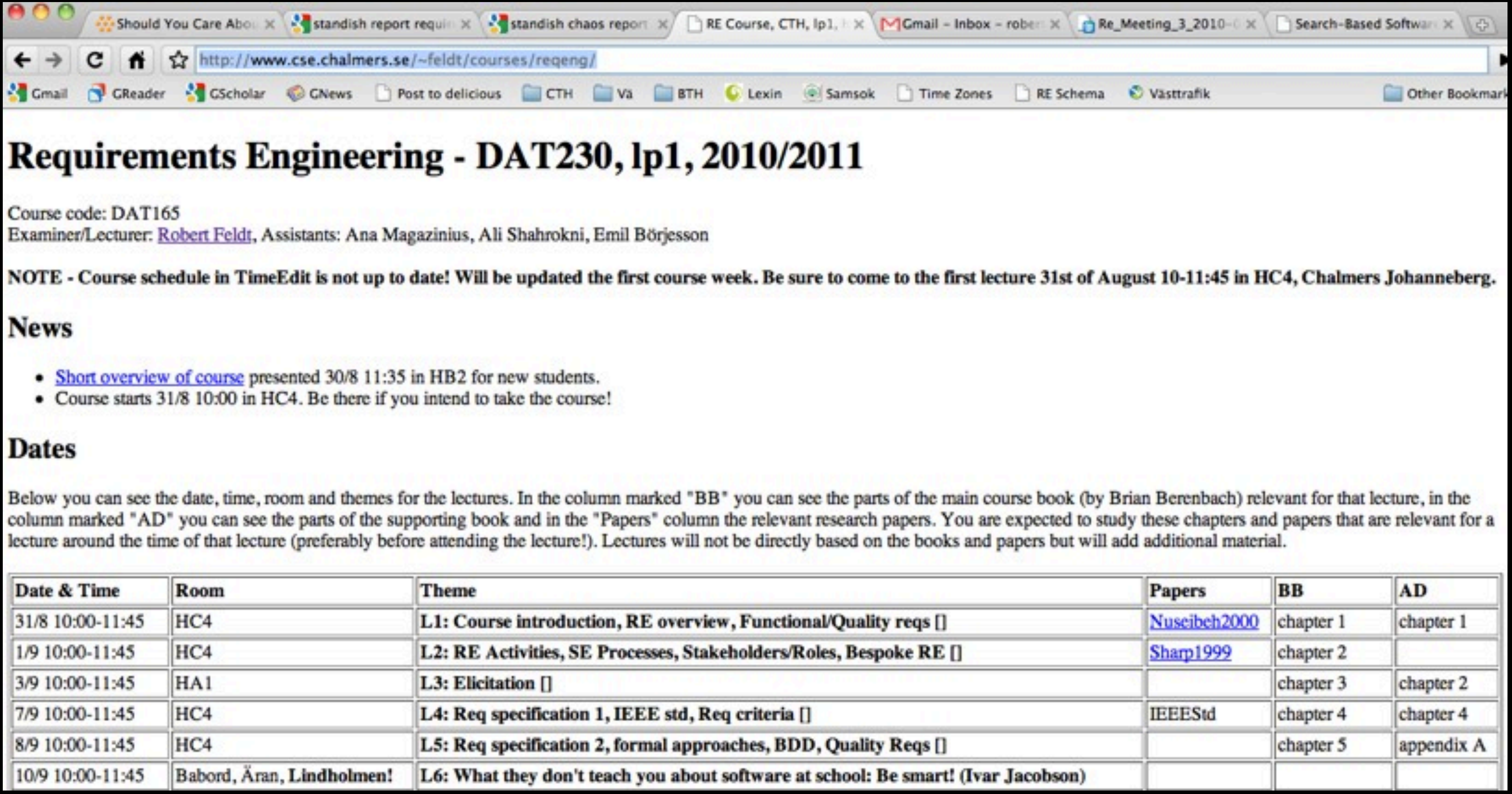
- How much should you write in reports?
  - Stated in assignment spec as MAX limit
  - Expected to perform each assignment in as many or as few pages as is necessary to convince us you sufficiently understand the topic of the assignment
- Plagiarism will
  - yield an immediate FAIL on course
  - be reported 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/



Requirements Engineering - DAT230, lp1, 2010/2011

Course code: DAT165
Examiner/Lecturer: Robert Feldt, Assistants: Ana Magazinius, Ali Shahrokni, Emil Börjesson

NOTE - Course schedule in TimeEdit is not up to date! Will be updated the first course week. Be sure to come to the first lecture 31st of August 10-11:45 in HC4, Chalmers Johanneberg.

News

- Short overview of course presented 30/8 11:35 in HB2 for new students.
- Course starts 31/8 10:00 in HC4. Be there if you intend to take the course!

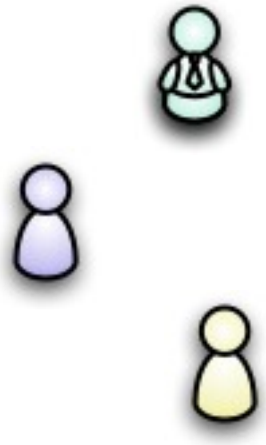
Dates

Below you can see the date, time, room and themes for the lectures. In the column marked "BB" you can see the parts of the main course book (by Brian Berenbach) relevant for that lecture, in the column marked "AD" you can see the parts of the supporting book and in the "Papers" column the relevant research papers. You are expected to study these chapters and papers that are relevant for a lecture around the time of that lecture (preferably before attending the lecture!). Lectures will not be directly based on the books and papers but will add additional material.

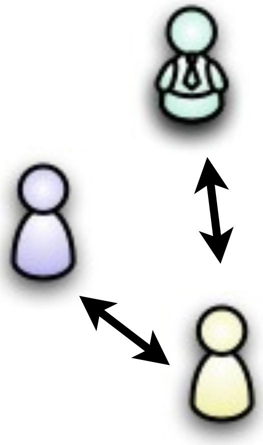
Date & Time	Room	Theme	Papers	BB	AD
31/8 10:00-11:45	HC4	**L1: Course introduction, RE overview, Functional/Quality reqs []**	Nuseibeh2000	chapter 1	chapter 1
1/9 10:00-11:45	HC4	**L2: RE Activities, SE Processes, Stakeholders/Roles, Bespoke RE []**	Sharp1999	chapter 2	
3/9 10:00-11:45	HA1	**L3: Elicitation []**		chapter 3	chapter 2
7/9 10:00-11:45	HC4	**L4: Req specification 1, IEEE std, Req criteria []**	IEEEStd	chapter 4	chapter 4
8/9 10:00-11:45	HC4	**L5: Req specification 2, formal approaches, BDD, Quality Reqs []**		chapter 5	appendix A
10/9 10:00-11:45	Babord, Äran, **Lindholmen!**	**L6: What they don't teach you about software at school: Be smart! (Ivar Jacobson)**			

Overview of RE

Document

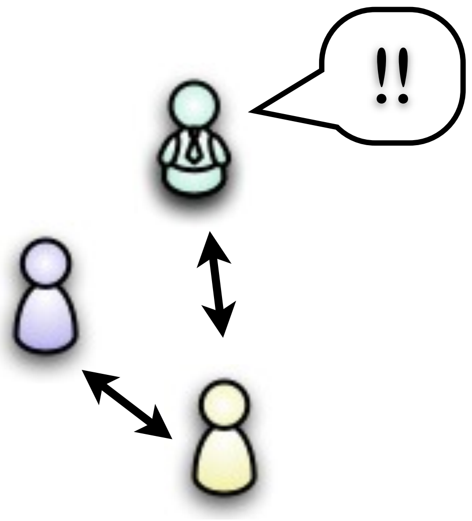


Stakeholders



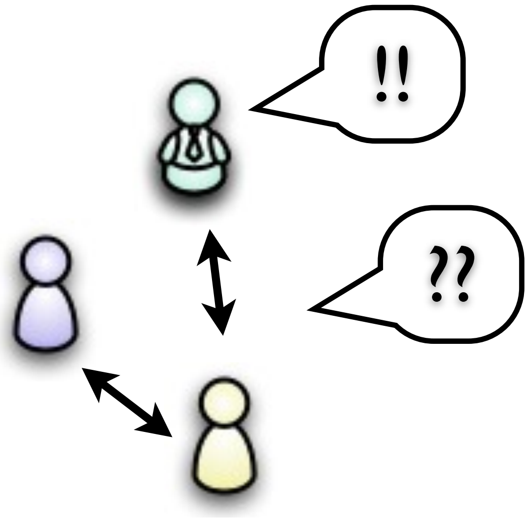
Relations

Say

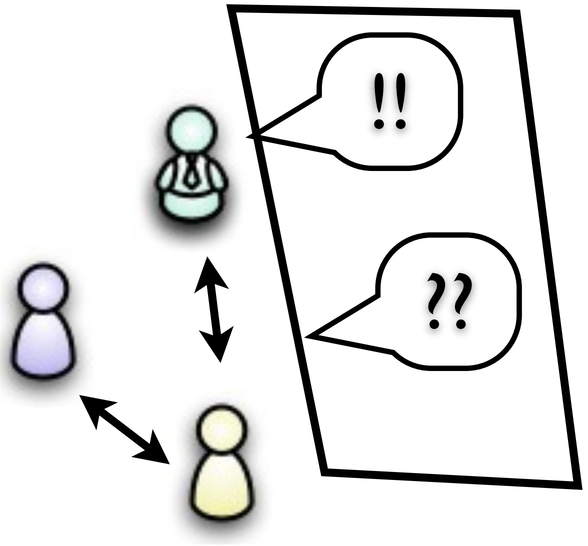


Need!

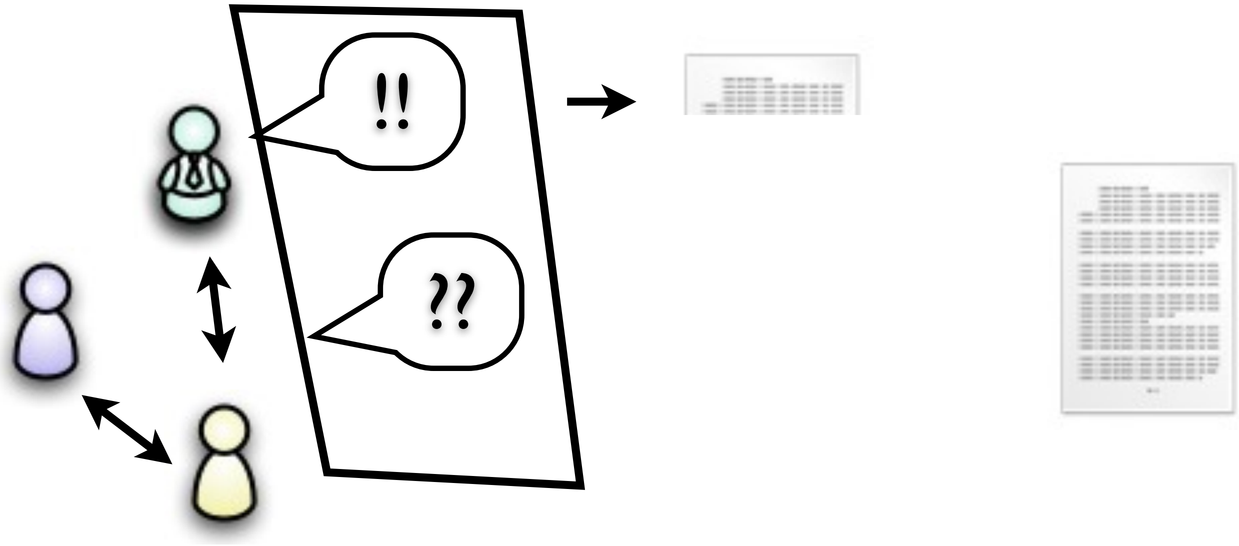
Say Think



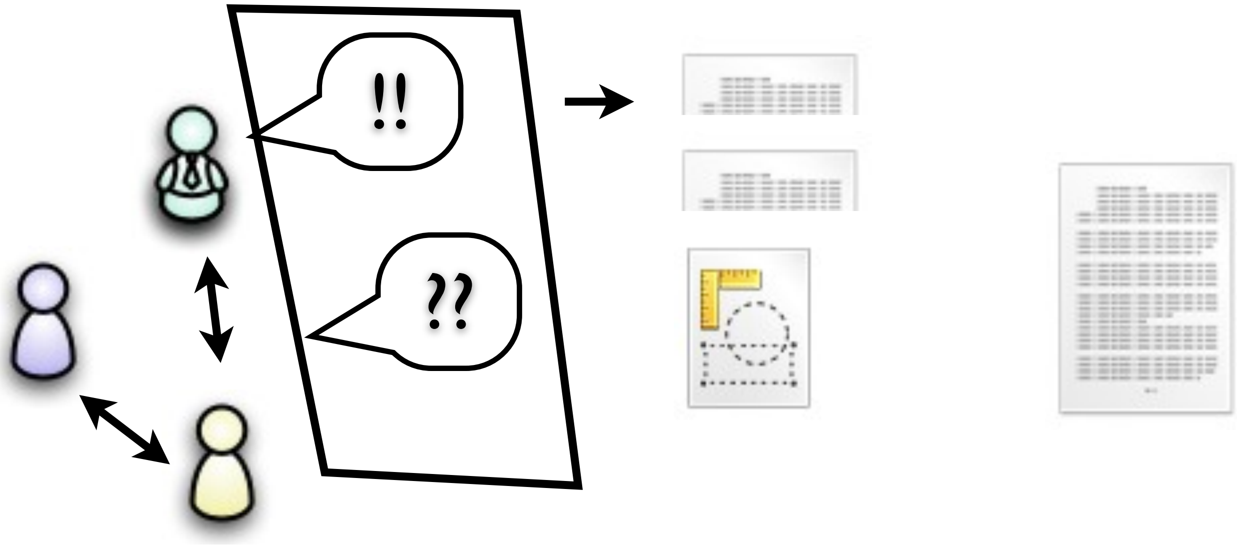
Capture

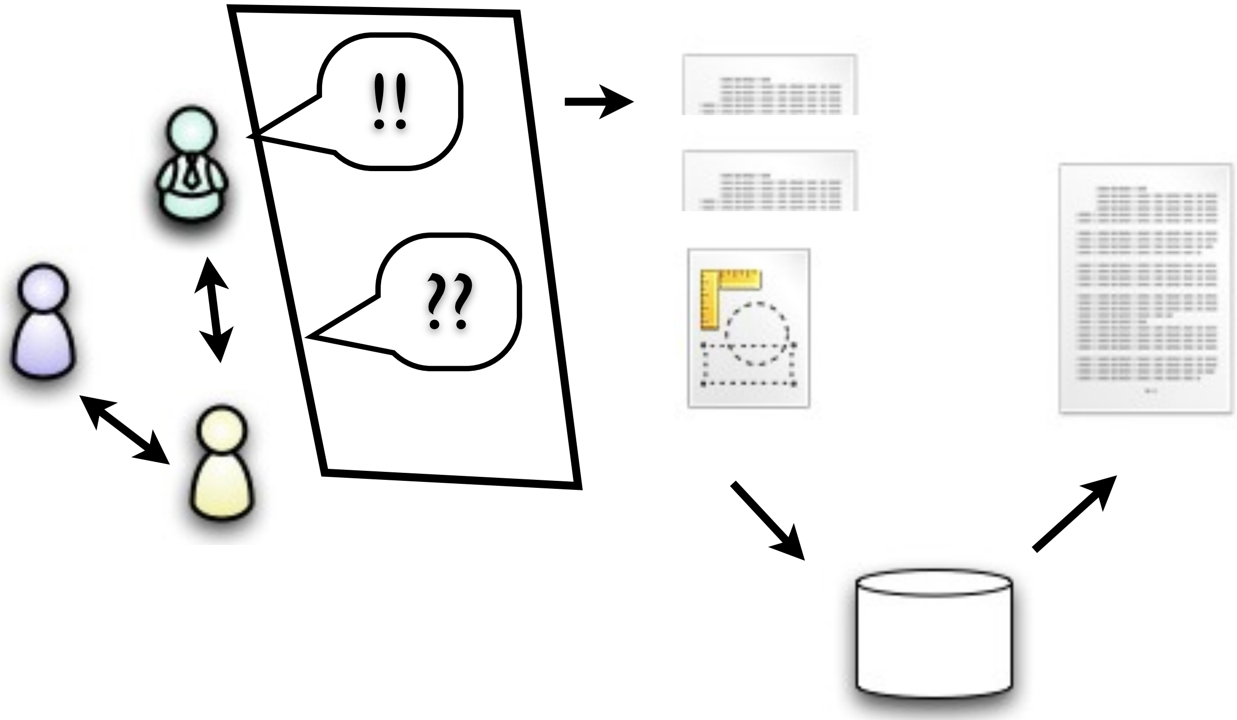


Transform



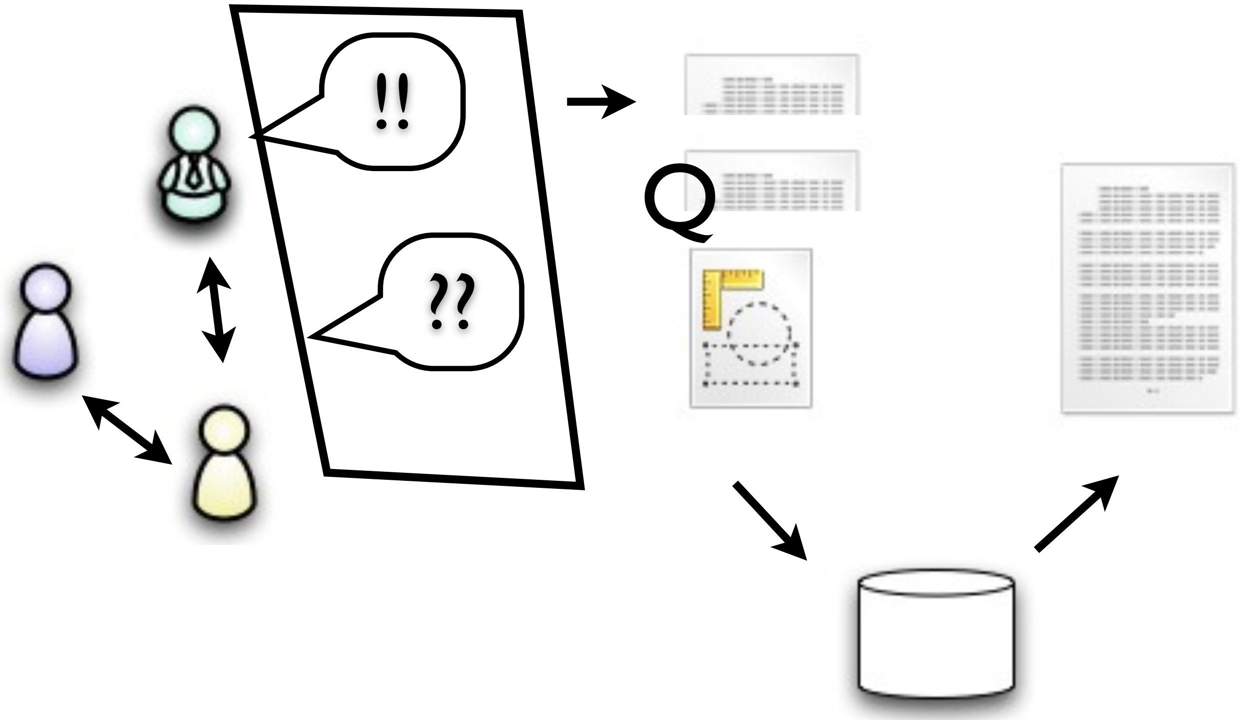
Specify



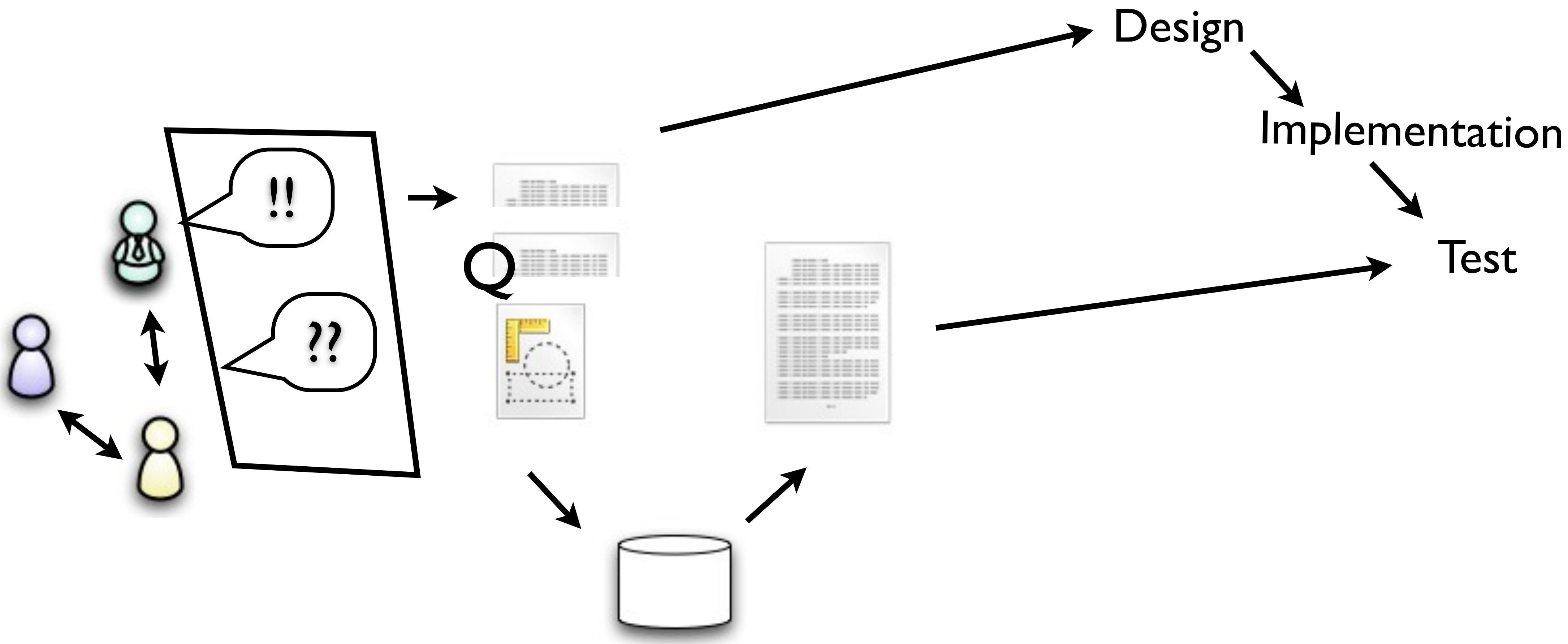


Store

Validation



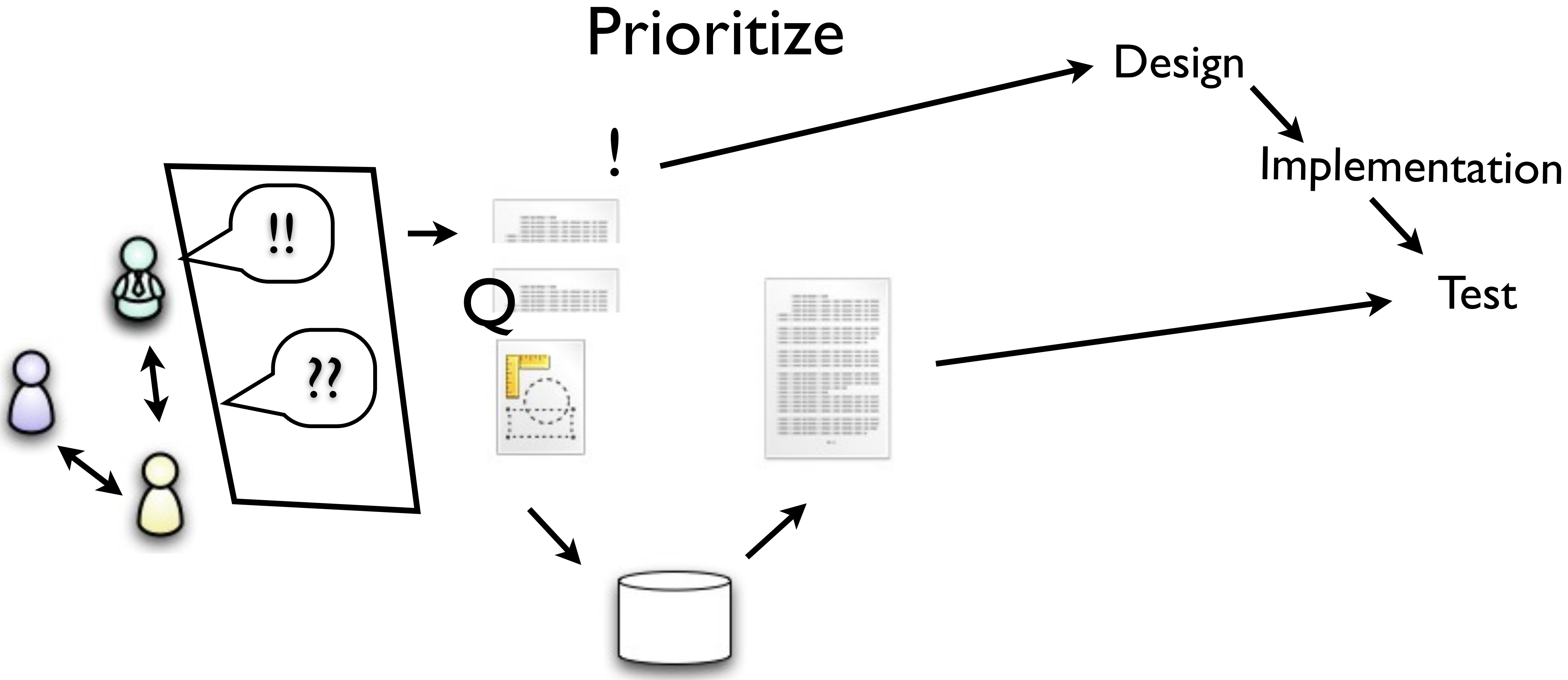
Process



Design

Implementation

Test



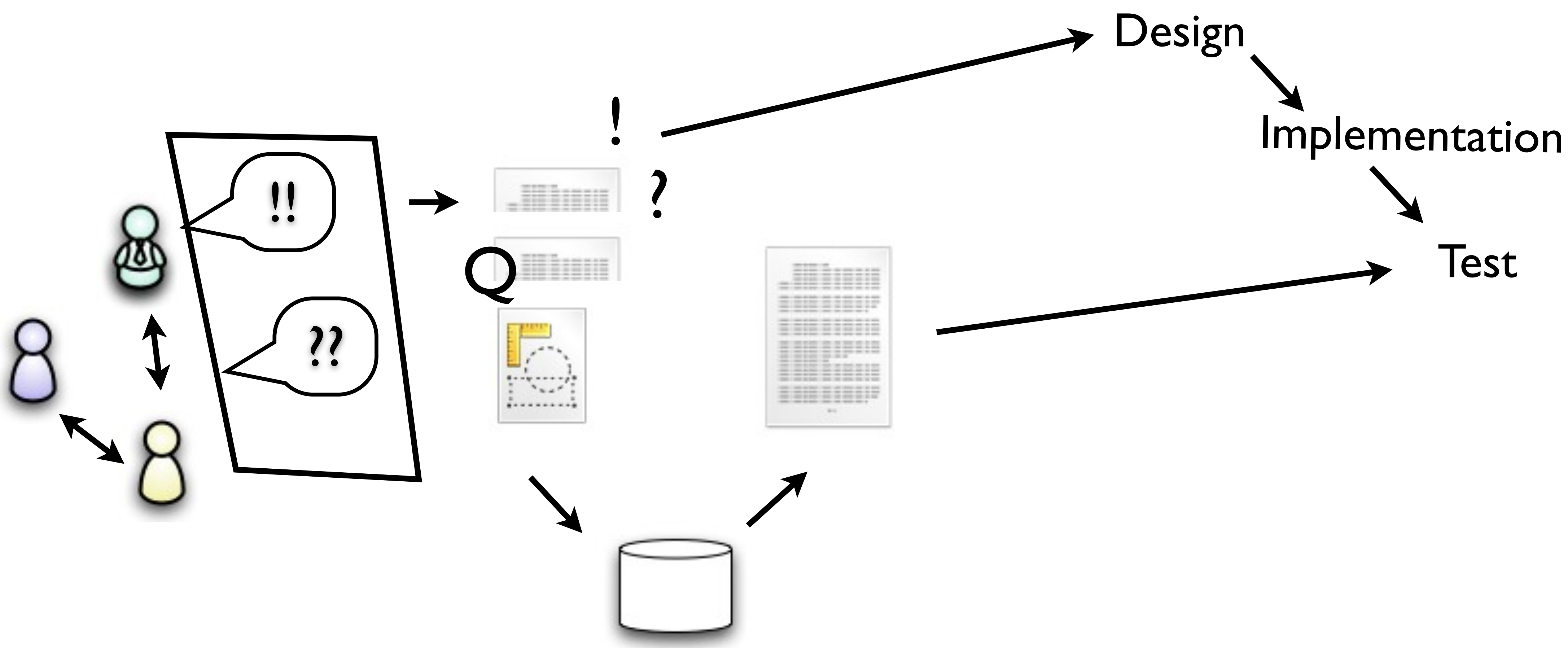
Prioritize

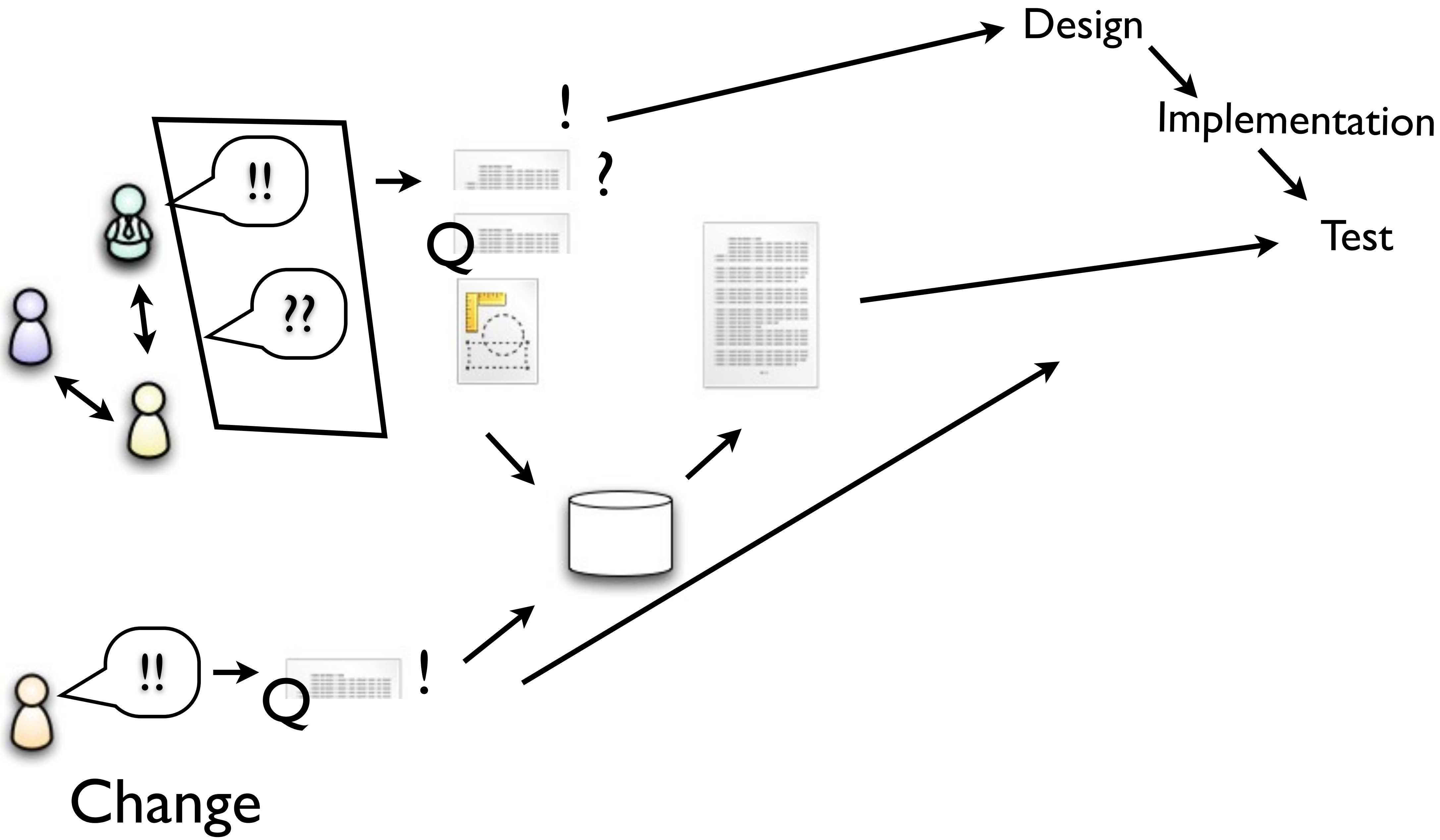
Design

Implementation

Test

Negotiate



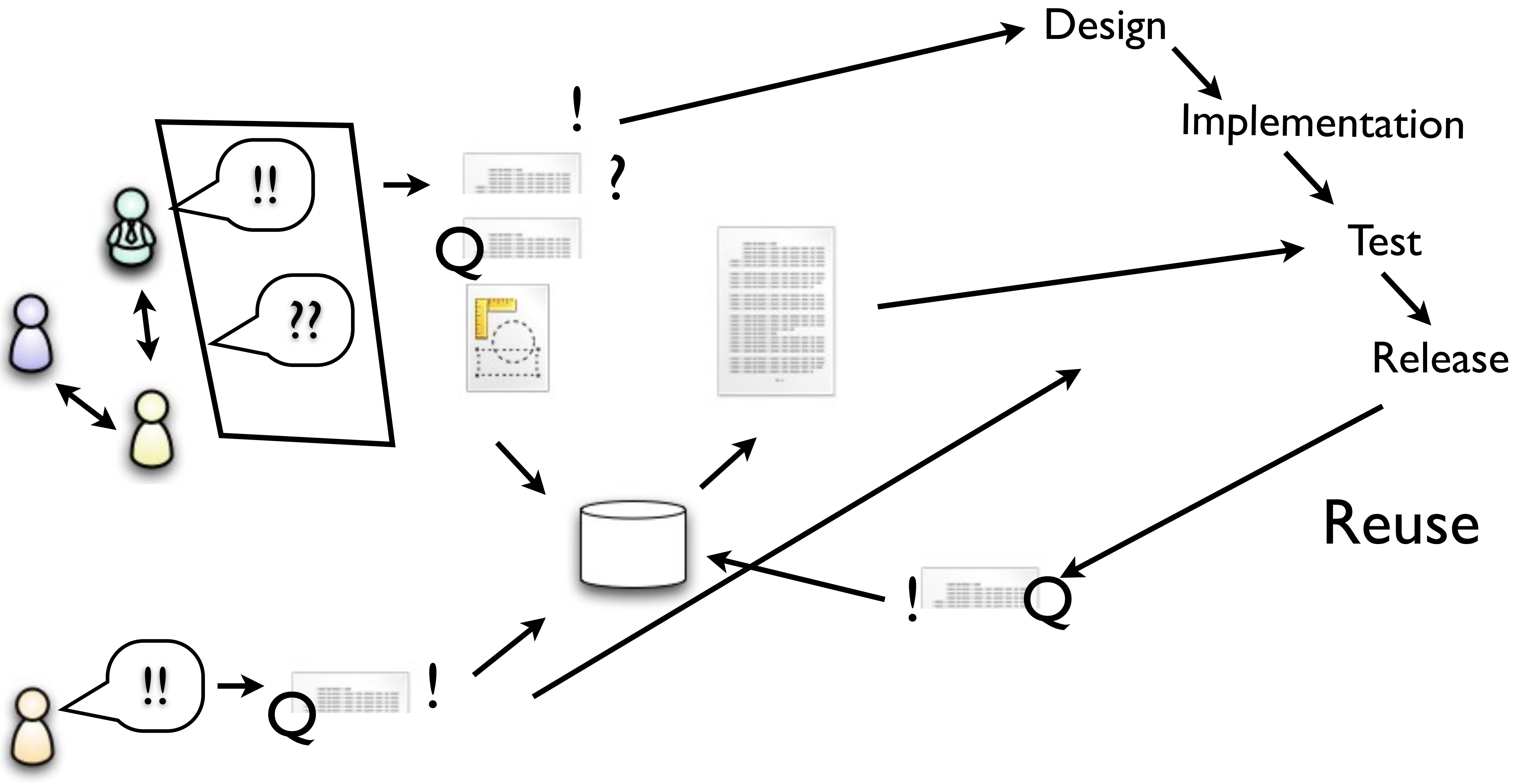


Design

Implementation

Test

Change



Design

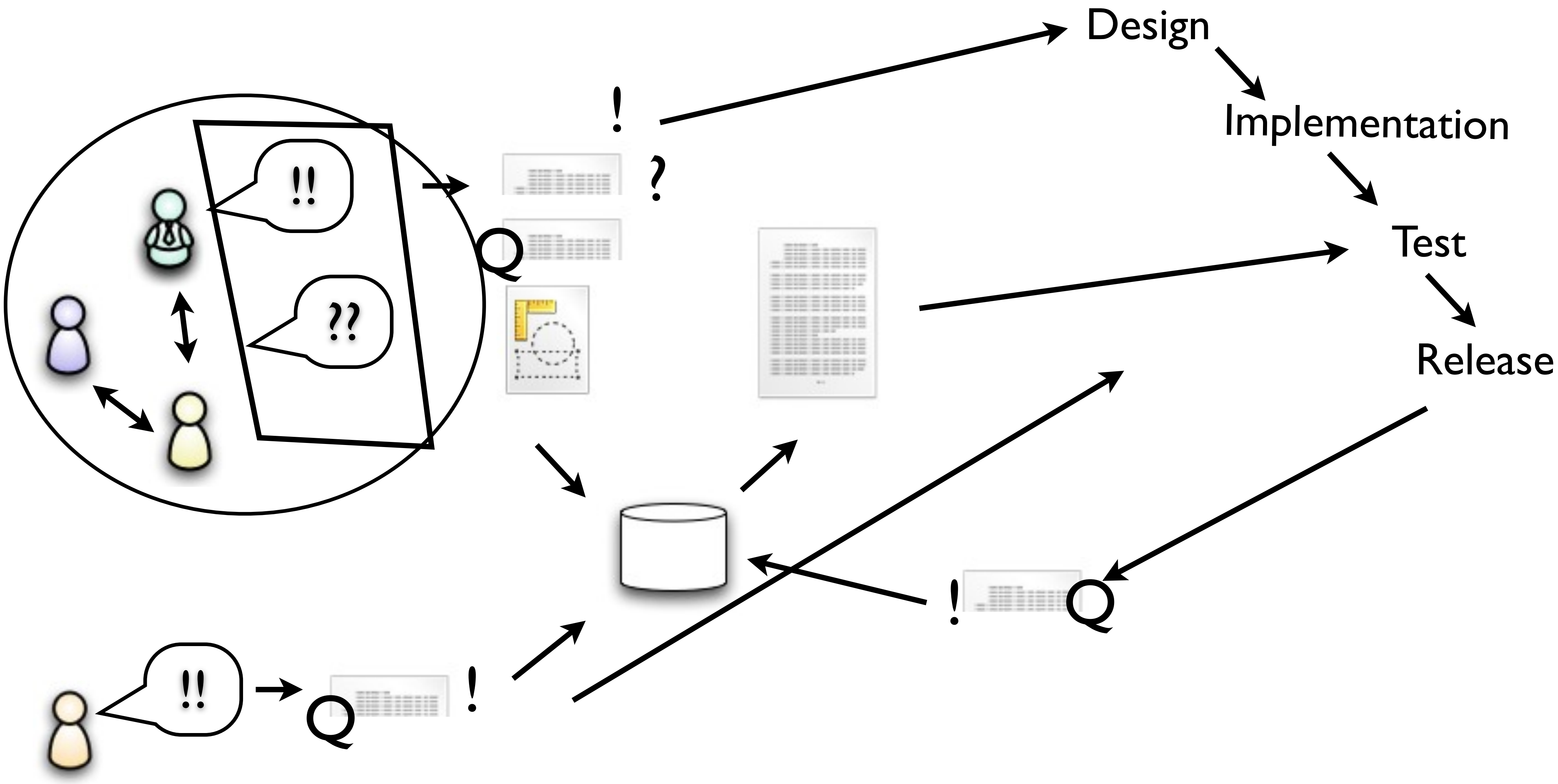
Implementation

Test

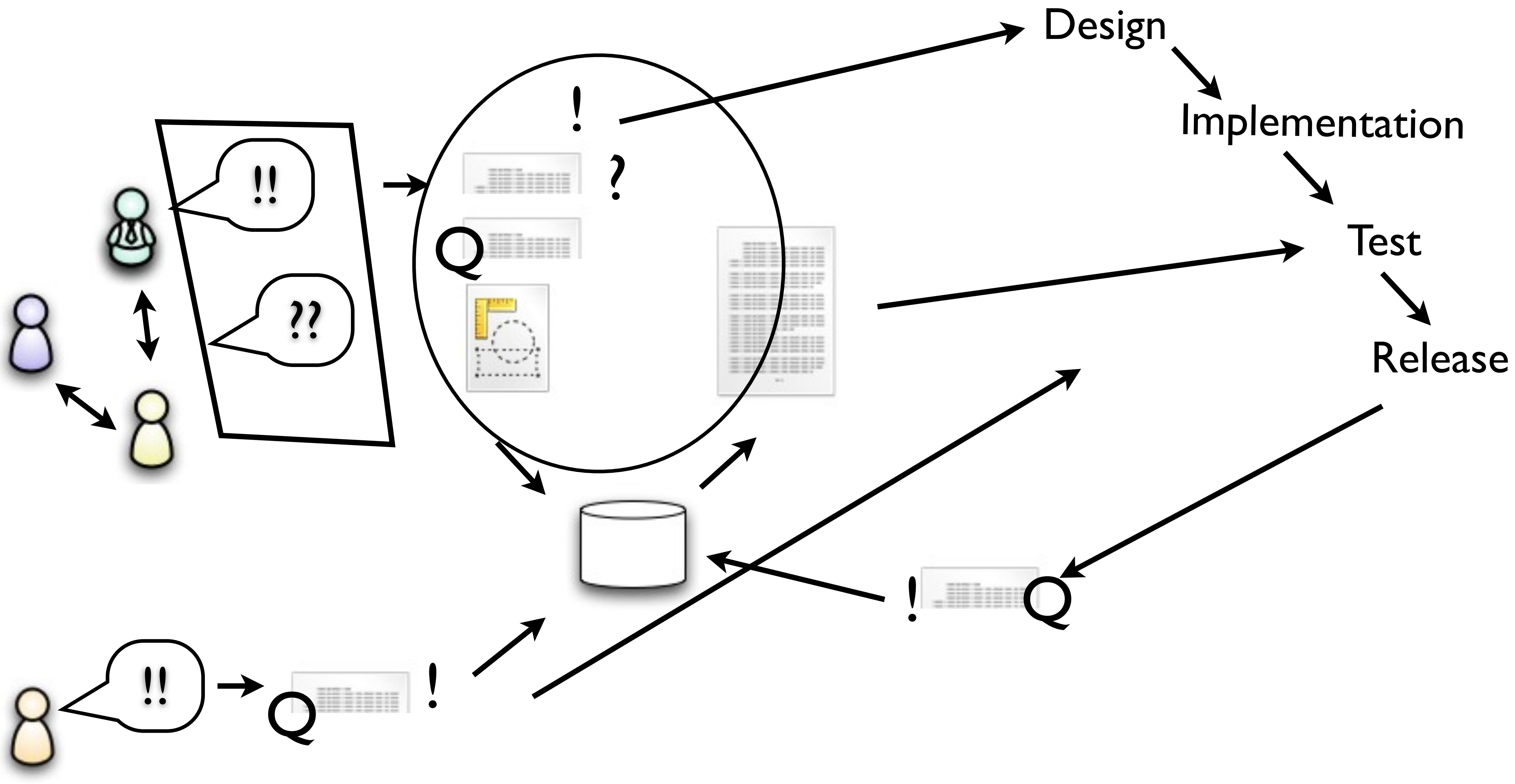
Release

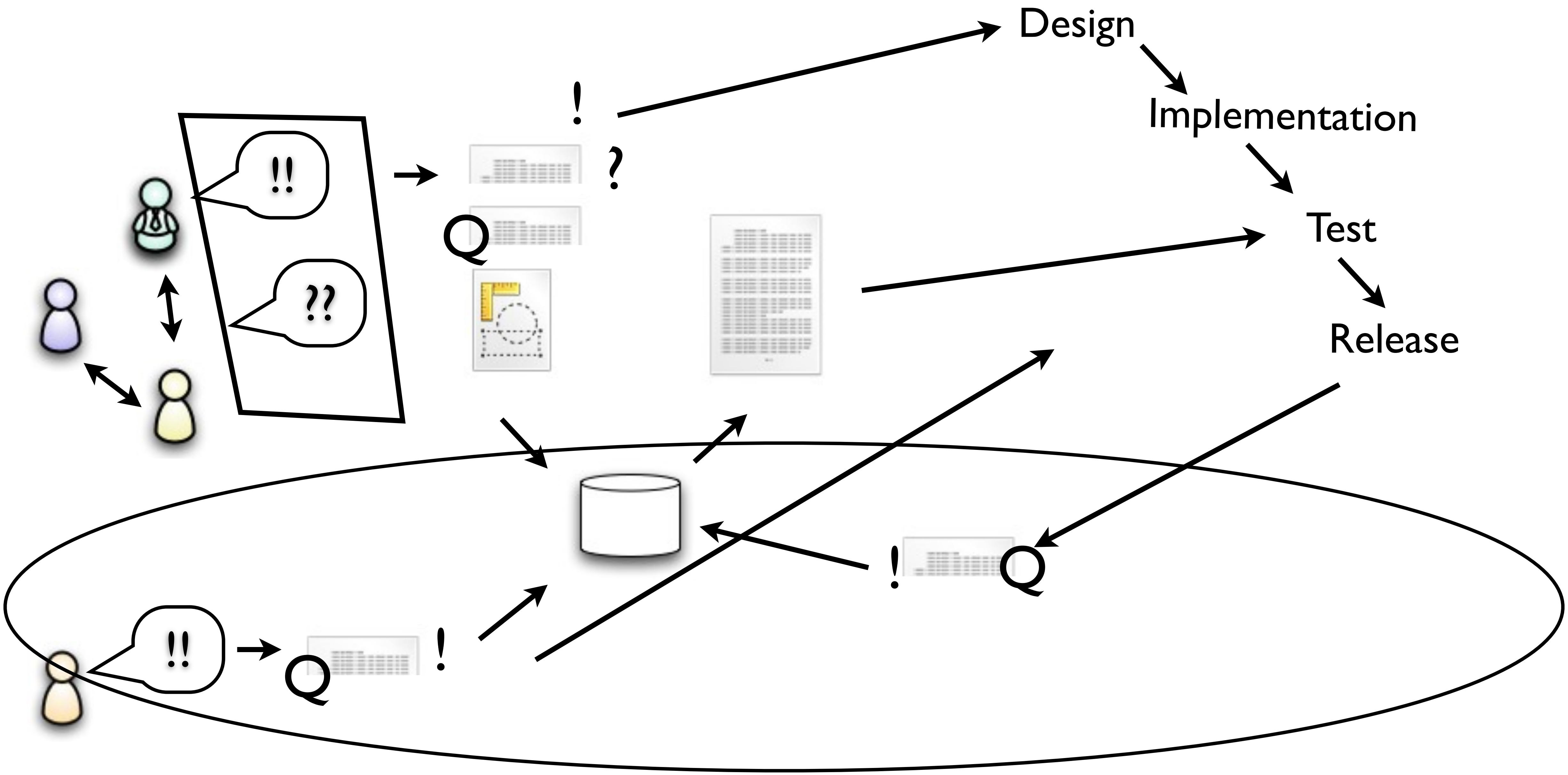
Reuse

Elicitation

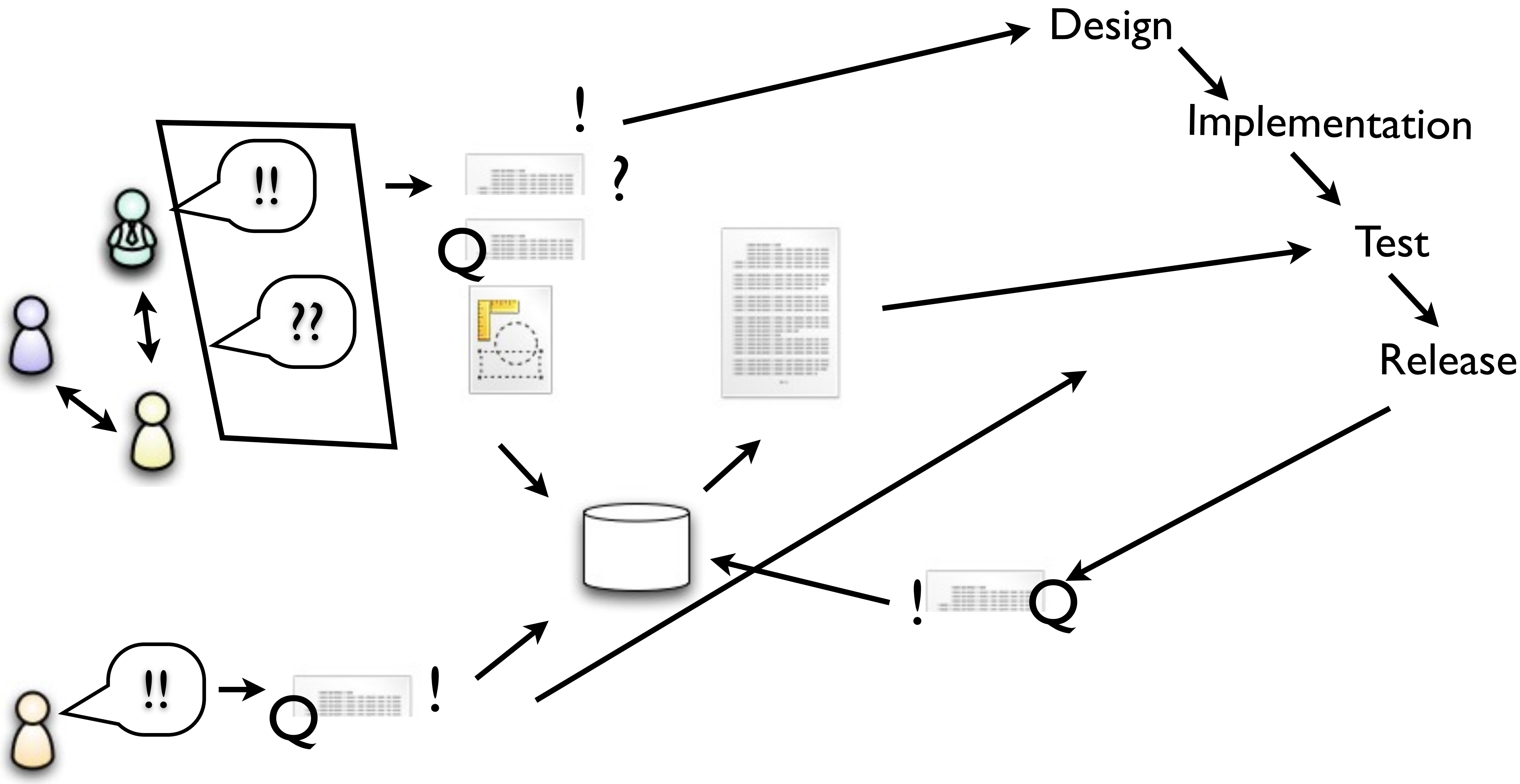


Specification & Analysis





Management



Design

Implementation

Test

Release

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

Features

Specific functions

Quality Reqs

Functional Reqs

Quality Reqs

Features

Specific functions

“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

Functional Reqs

Features

Specific functions

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

Quality Reqs

aka. Non-Functional Reqs

aka. “-ilities”

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

“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 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”