

# 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  
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“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...”*

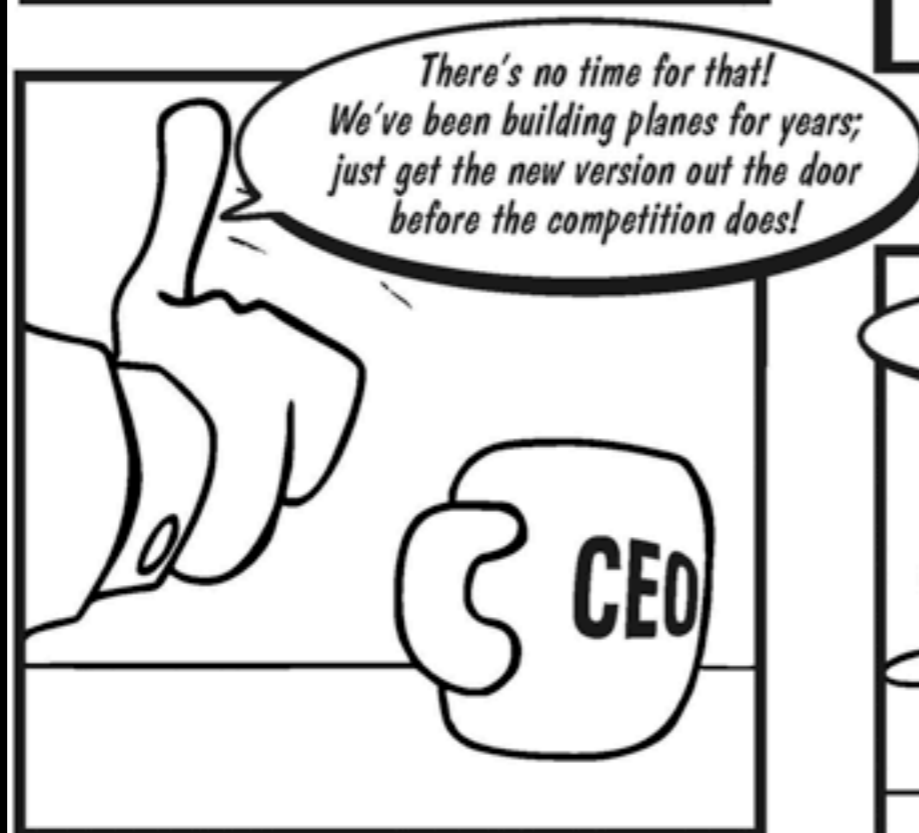
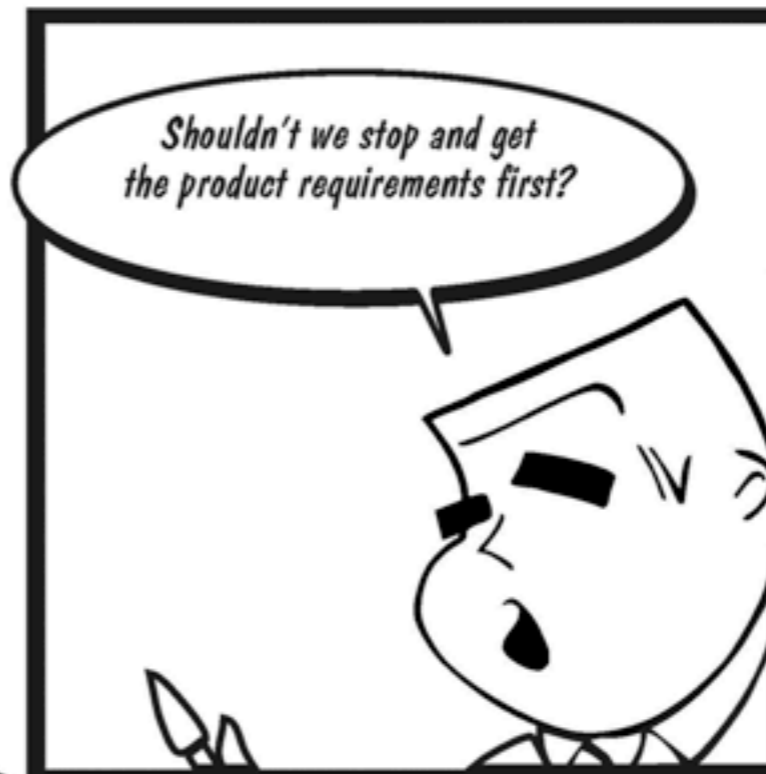


# Requirements Eng. (RE)

*“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?



Later...



# 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

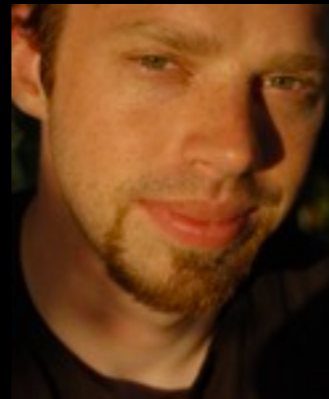
- Lectures
  - Elicitation, Specification, Agile RE, QA, Management, MDRE, ...
- Individual assignments
- Group assignment
  - Elicit, document/specify and prioritize requirements
  - Groups of 4-7 people, 2 customer interviews
- Written exam

# Course Team



**Robert**

**Examiner,  
Lecturer**



**Emil**

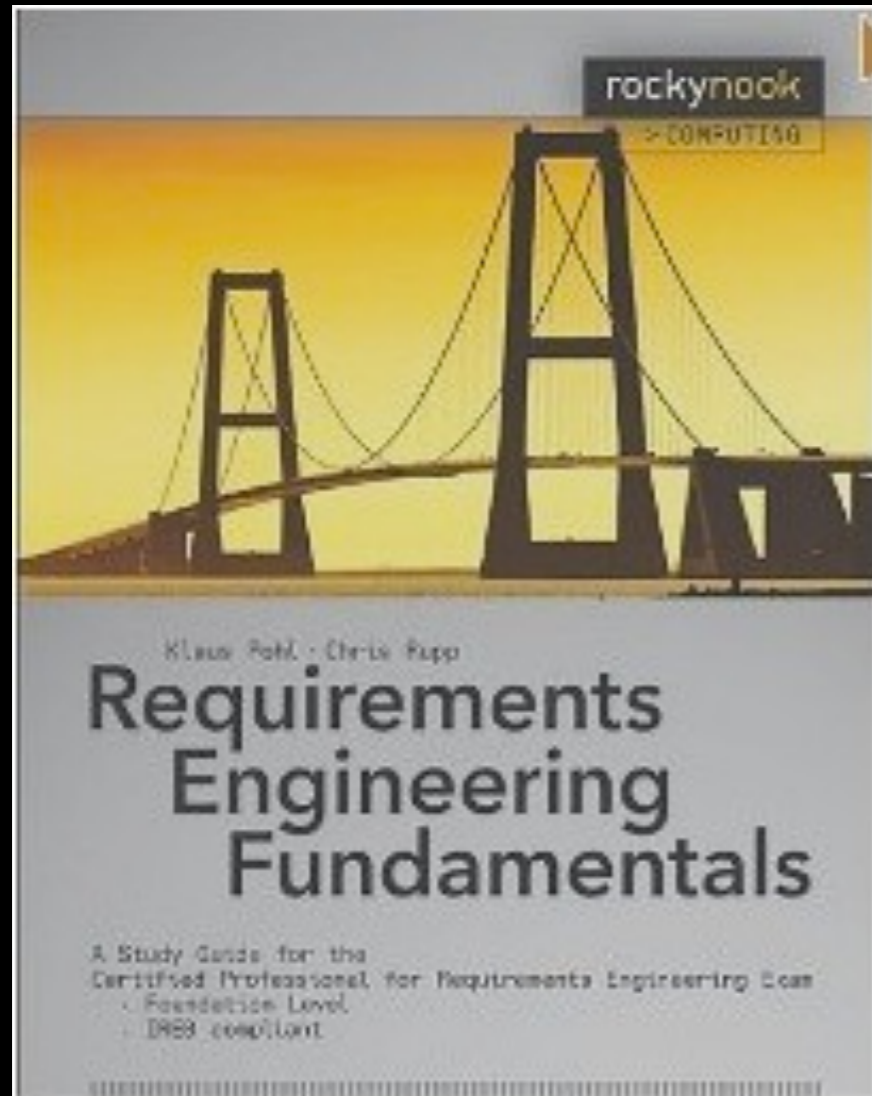
**Assistant**



**Pariya**

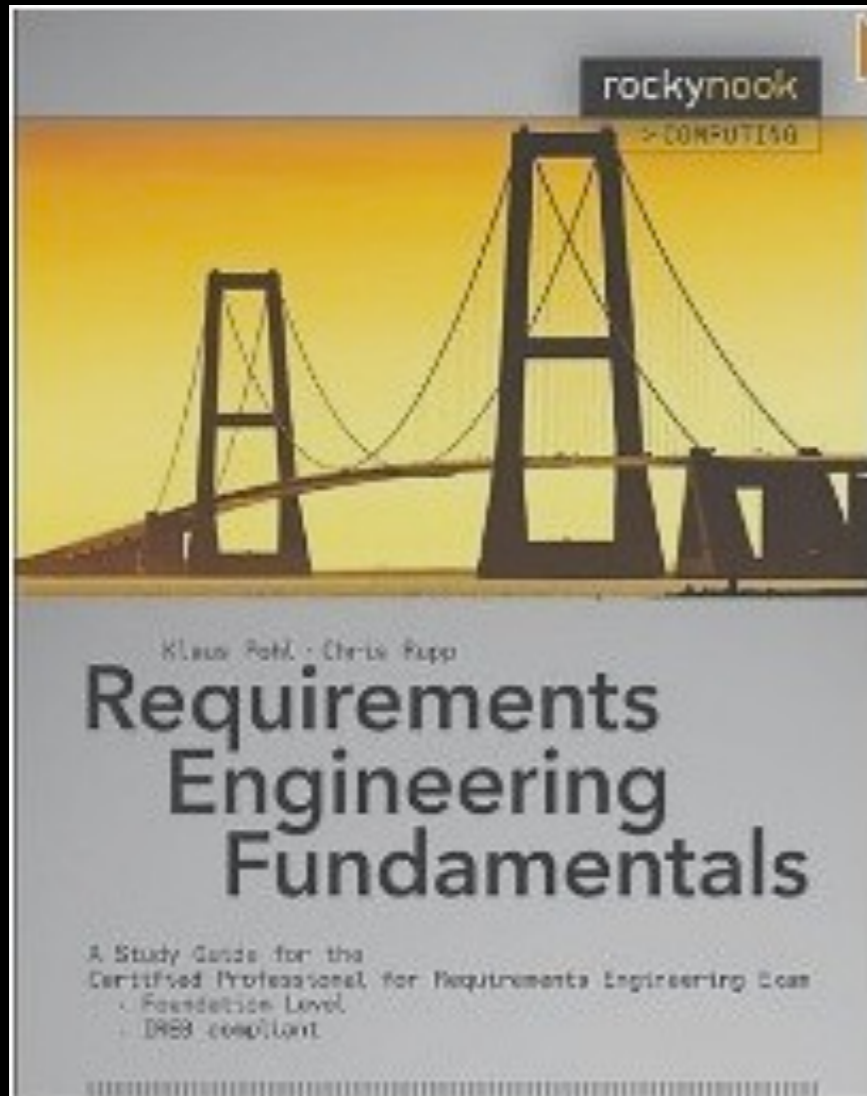
**Assistant**

# Material



# Material

+ research  
articles



## Requirements Engineering: A Roadmap

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180 Queen's Gate  
London SW7 2BZ, U.K.  
Email: [ban@doc.ic.ac.uk](mailto:ban@doc.ic.ac.uk)

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6 King's College Road  
Toronto, Ontario M5S 3H5, Canada  
Email: [sme@cs.toronto.edu](mailto:sme@cs.toronto.edu)

## Stakeholder Identification in the Requirements Engineering Process

**ABSTRACT**  
*This paper presents the main areas of research issues.*

**1 Introduction**  
The primary motivation for identifying stakeholders is to ensure that the requirements engineering process is intended, broad, and effective.

Helen Sharp  
Centre for HCI Design,  
School of Informatics,  
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[h.e.sharp@soi.city.ac.uk](mailto:h.e.sharp@soi.city.ac.uk)

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([a.finkelstein@cs.ucl.ac.uk](mailto:a.finkelstein@cs.ucl.ac.uk), [g.galal@cs.ucl.ac.uk](mailto:g.galal@cs.ucl.ac.uk))

### Abstract

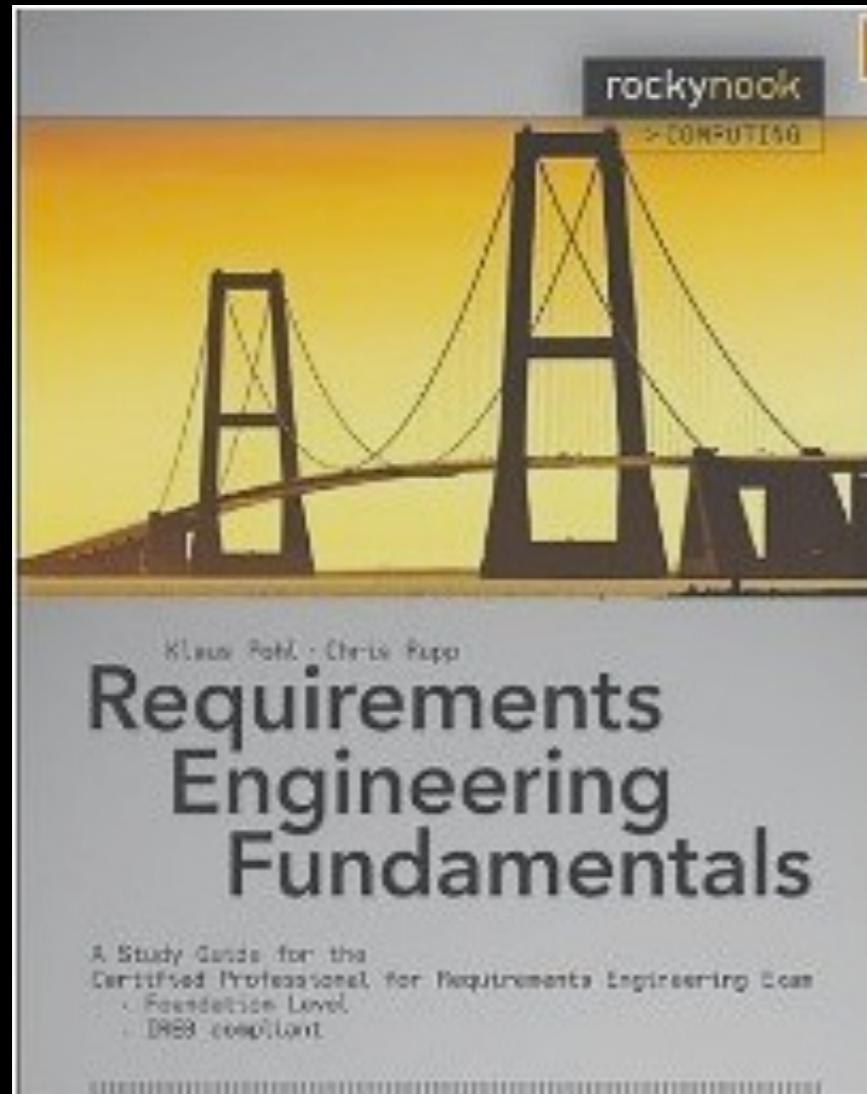
*Adequate, timely and effective consultation of relevant stakeholders is of paramount importance in the requirements engineering process.*

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 participants who have an interest in the system.'*

# Material

+ research  
articles



**Requirements Engineering: A Roadmap**

**Bashar Nuseibeh**  
Department of Computing  
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180 Queen's Gate  
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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

**Stakeholder Identification in the Requirements Engineering Process**

**ABSTRACT**  
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**1 Introduction**  
The primary purpose of this paper is to introduce the concept of stakeholder identification in the requirements engineering process.

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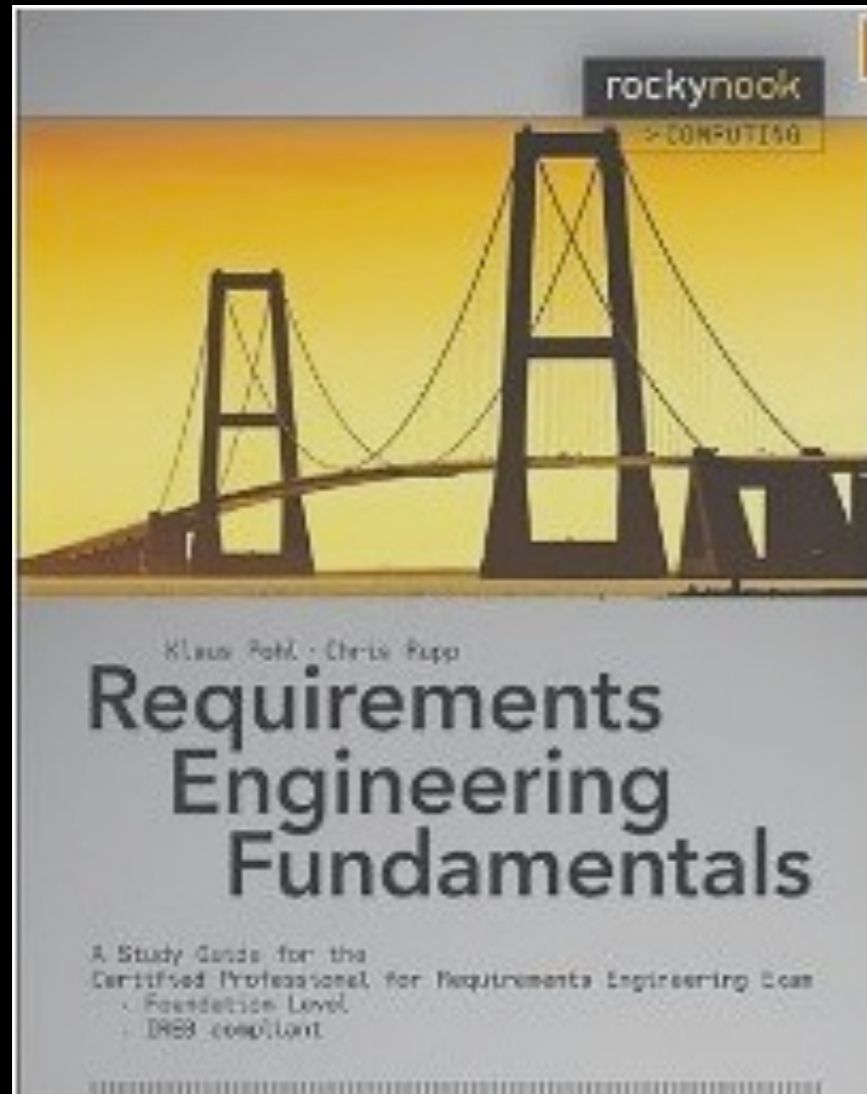
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+ videos

# Material

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articles



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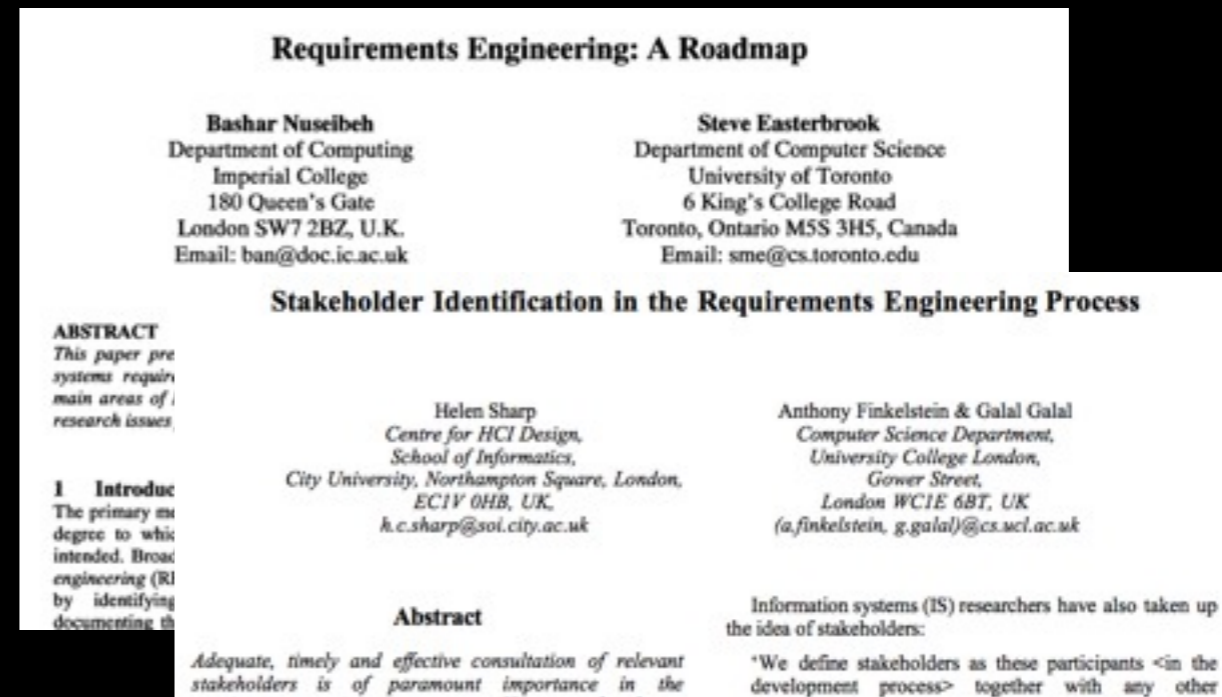
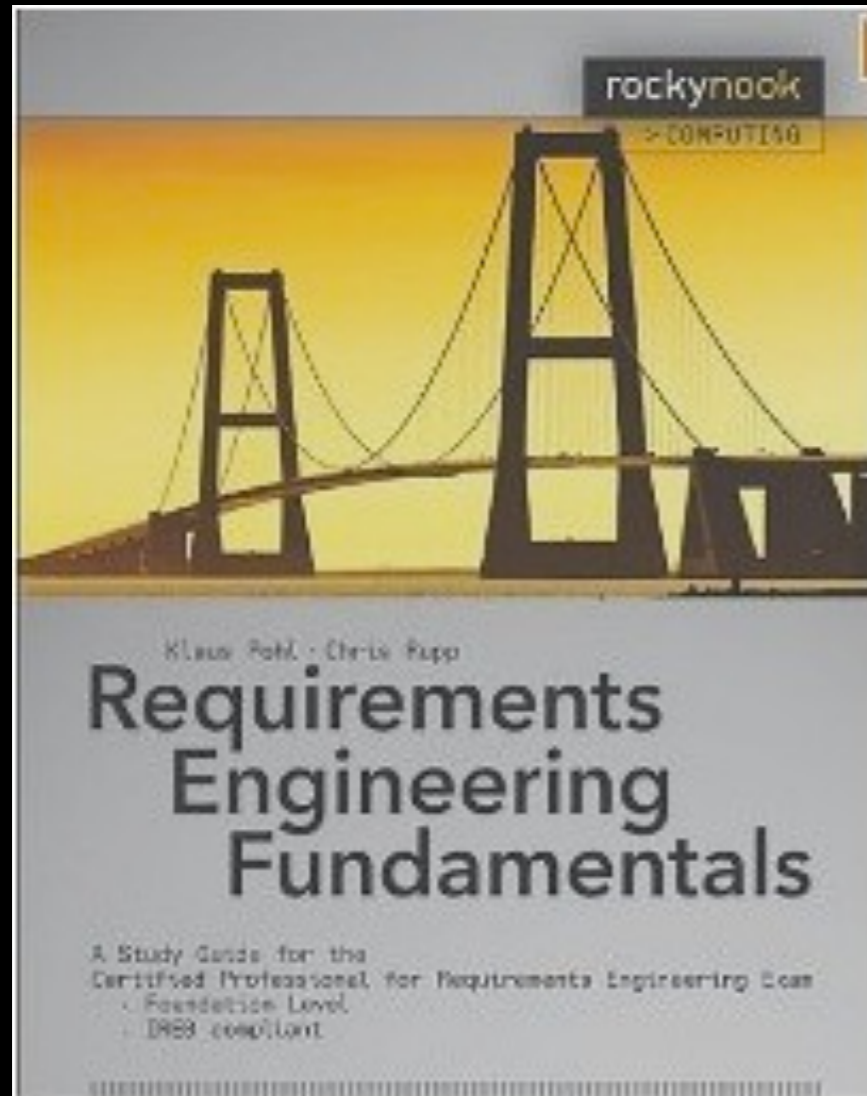
+ videos

+ assignment  
experience



# Material

+ research  
articles



+ videos

+ assignment  
experience

IREB

# 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 assignment 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,  $\text{floor}((\text{group\_points}-50)/10)$  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/>

The screenshot shows the home page for the Requirements Engineering Course at Chalmers University of Technology. The page features a navigation menu with links for home, schedule, video, docs, course book, contact us, and links. A prominent green banner contains a Twitter feed for the course, with a clock icon on the left. Below the banner, there are two main sections: 'Welcome to Req Eng 2012!' and 'The teachers'. The 'Welcome' section provides an overview of the course's focus on software development challenges. The 'The teachers' section introduces Robert Feldt, the course instructor, with a portrait photo and a brief biography.

Requirements Engineering Course 

home schedule video docs course book contact us links

**Follow our Twitter for course/RE news:**


 **RE** reqengsecth  
**reqengsecth**

**reqengsecth** The ReqEng course starts tomorrow, Tuesday 4th of Sept 2012 at 10:15 In room Beta, house Saga, Chalmers Lindholmen campus. C U there!  
17 hours ago · reply · retweet · favorite

**reqengsecth** Course home page has now been updated. Better layout and easier to navigate: [cse.chalmers.se/~feldt/courses/](http://www.cse.chalmers.se/~feldt/courses/) #chalmers  
5 days ago · reply · retweet · favorite

**reqengsecth** Be sure not to miss the guest lecture on Sept 25th! Stefan from Inceptive will talk about real-world RE. [inceptive.se](http://www.inceptive.se) #chalmers  
6 days ago · reply · retweet · favorite


**reqengsecth** Note about schedule: Lectures In Beta and Omega. First 2 weeks: many lectures to give you basis for practical work in project. Don't miss!  
10 days ago · reply · retweet · favorite

 Join the conversation

**Welcome to Req Eng 2012!**

One of the main challenges in software development is to make sure you are developing the right system, i.e. to understand the requirements that need to be fulfilled. The focus of this course is how to find and collect requirements both at the start and during a software development project. But also how to manage changes as a software projects evolves. This area of Software Engineering (SE) is called Requirements Engineering (RE).

**The teachers**

 **Robert Feldt**

Robert will give lectures and examine the course. He has a long background in Software Engineering both in academia (associate professor at Chalmers) and with 18 years of experience from software consulting. He has high standards and can be demanding but he really wants you to develop and grow and will go to great


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Requirements Engineering Course 

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# Until Guest Lecture

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

# Overview of RE



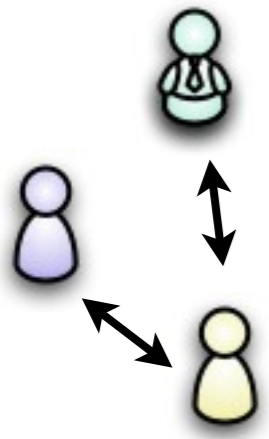
# Document





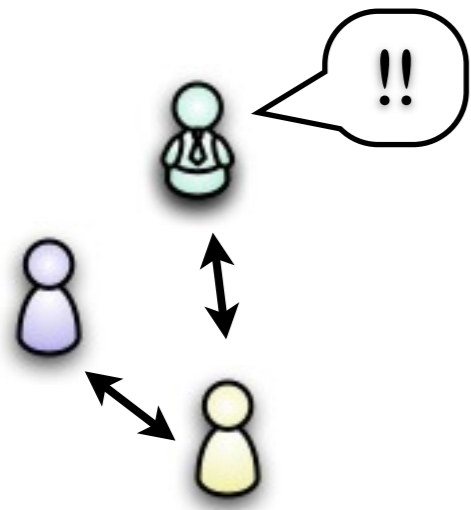
# Stakeholders





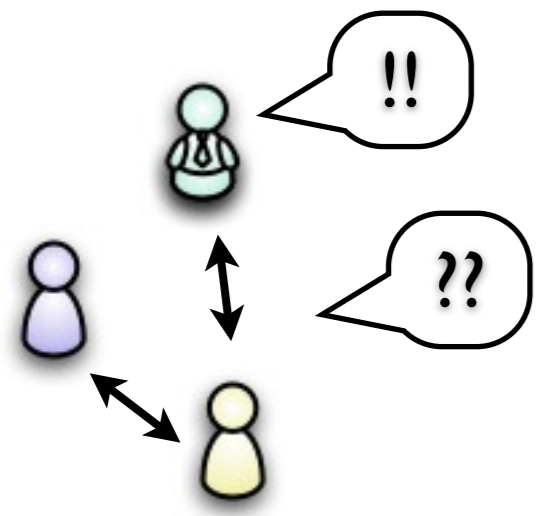
# Relations

Say

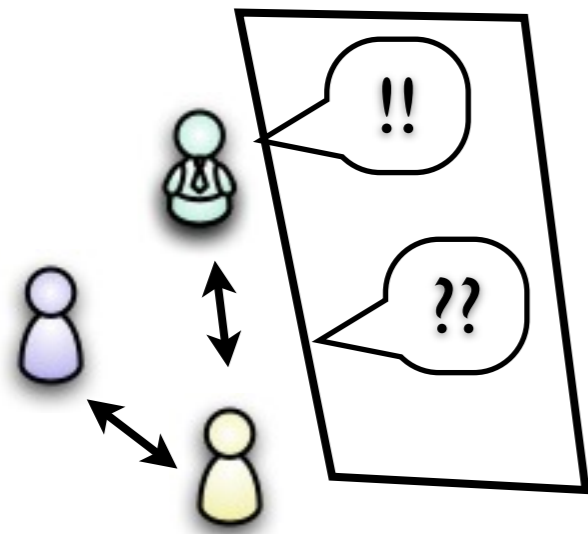


# Need!

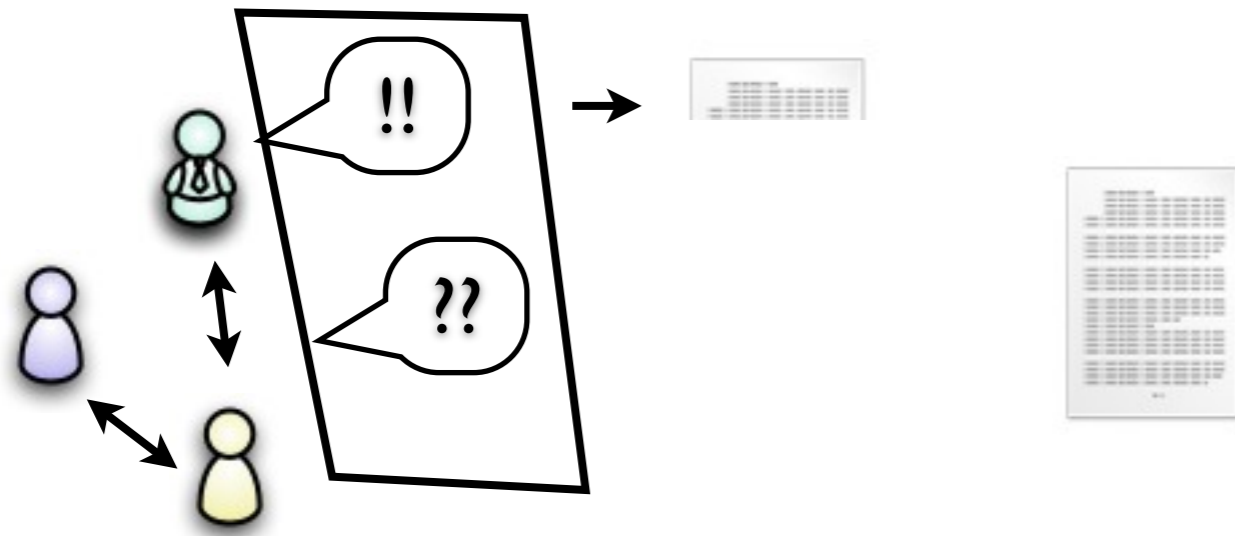
## Say Think



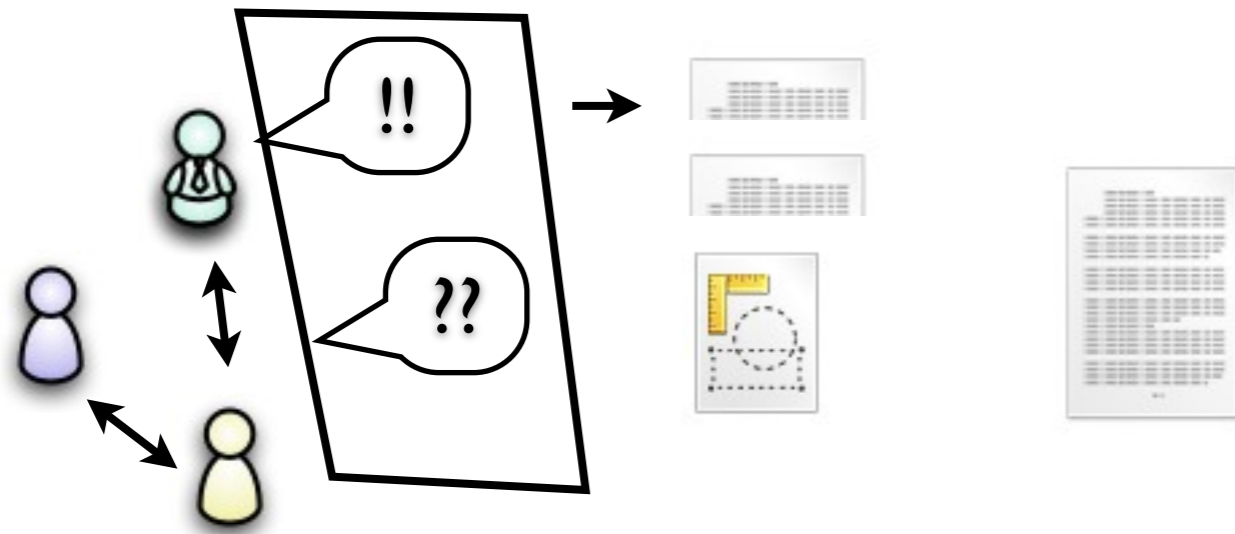
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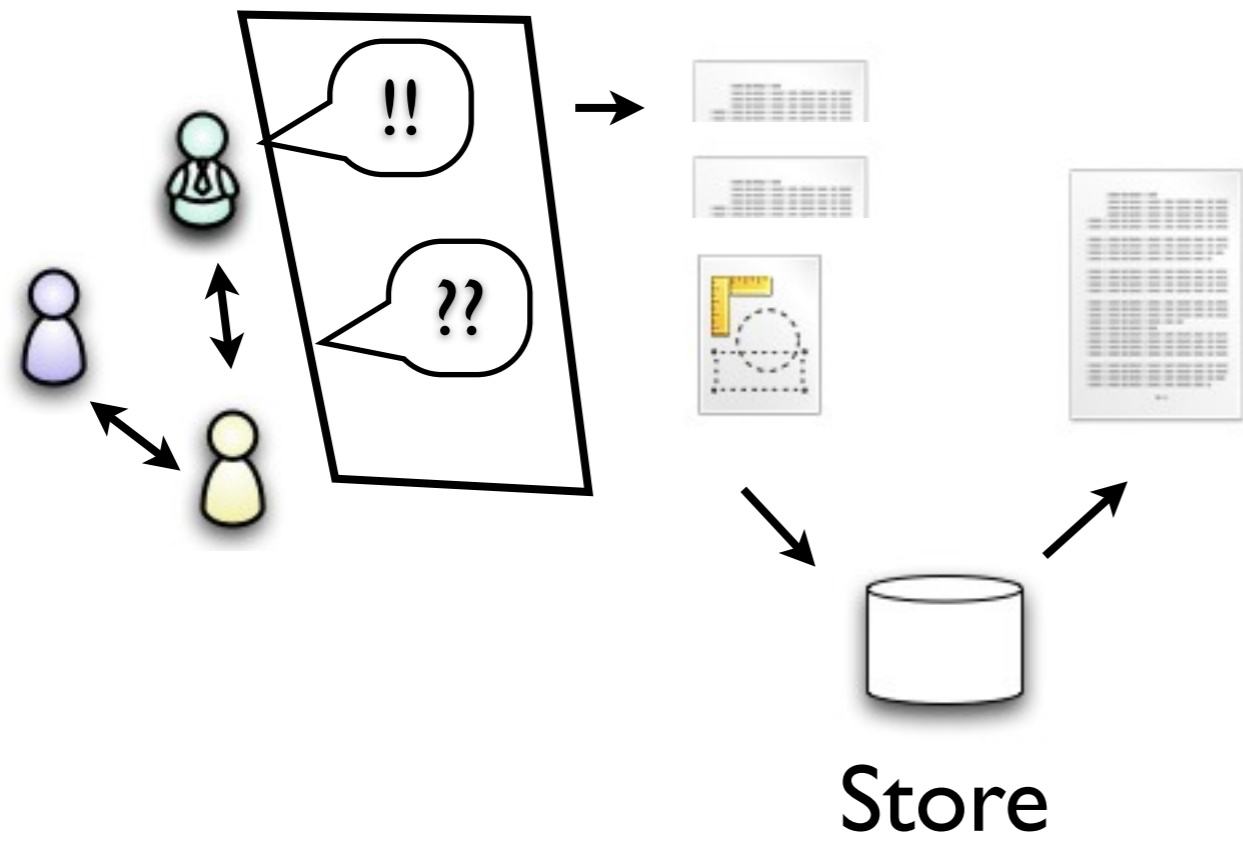


# Transform

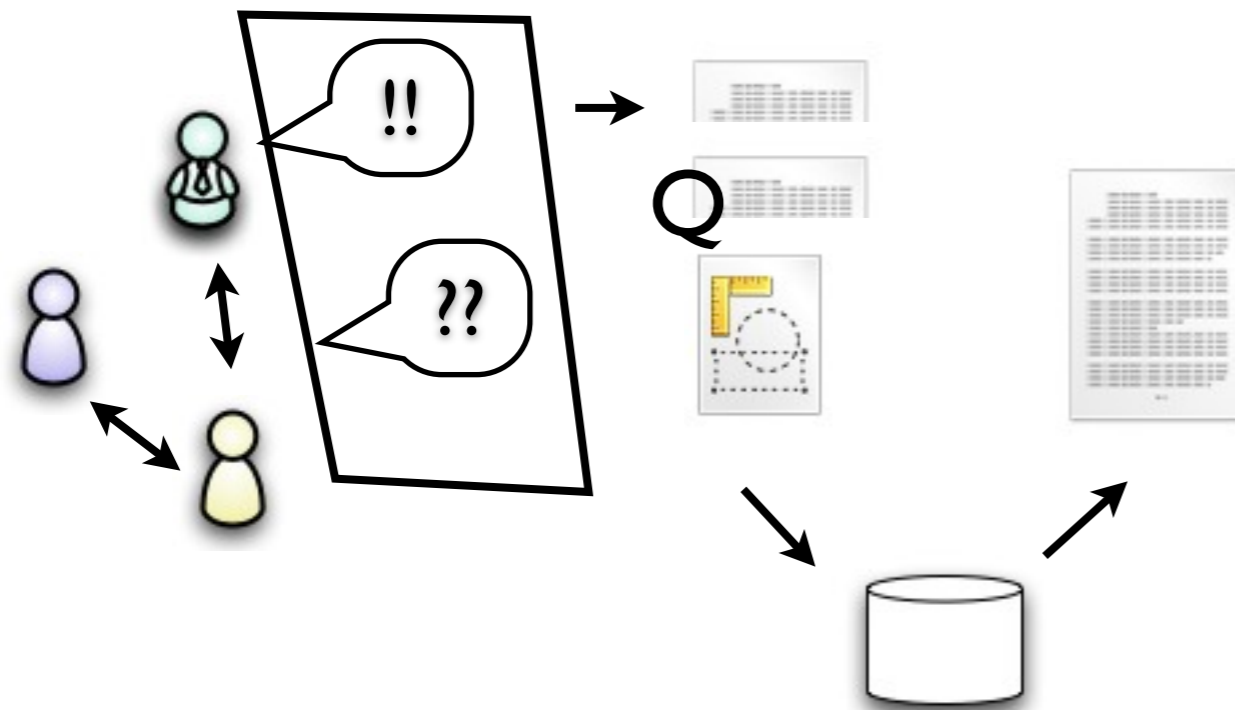


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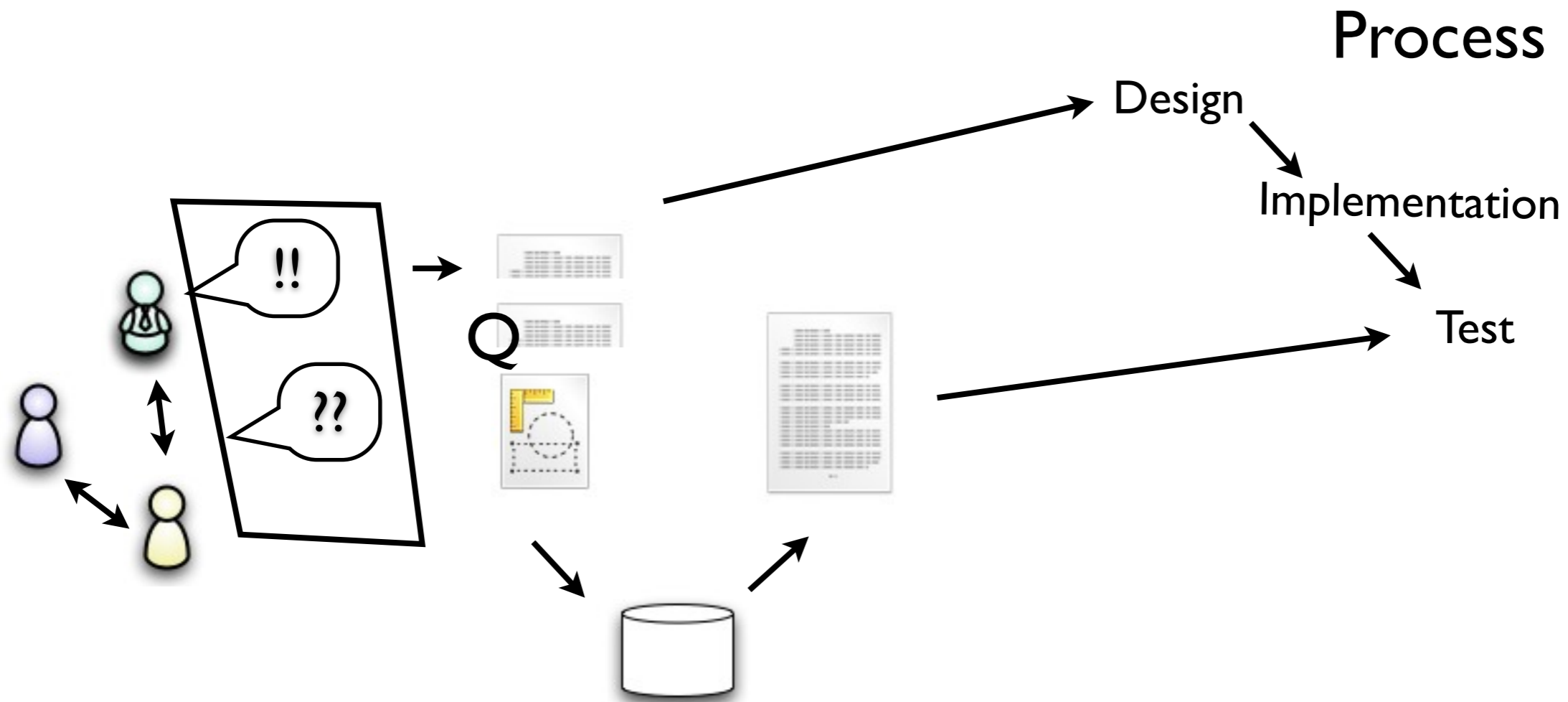




# Validation





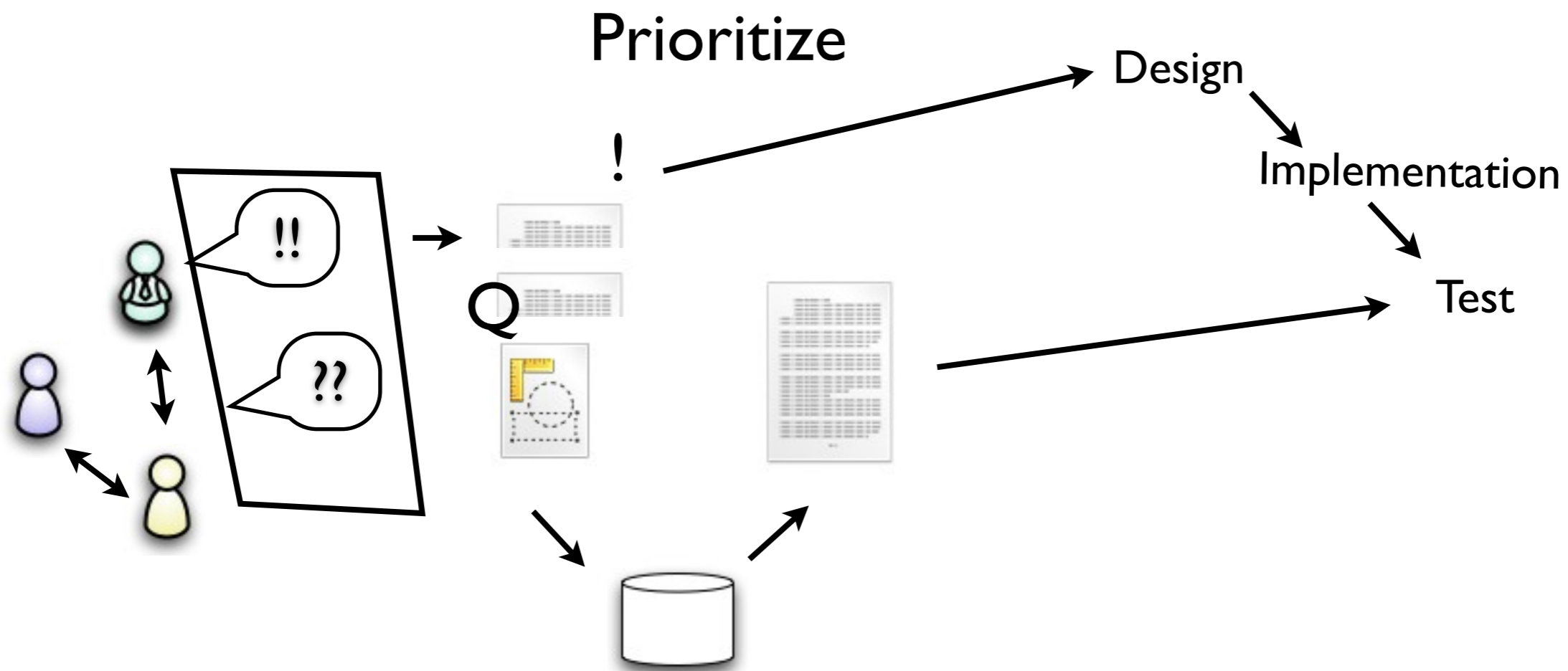


# Process

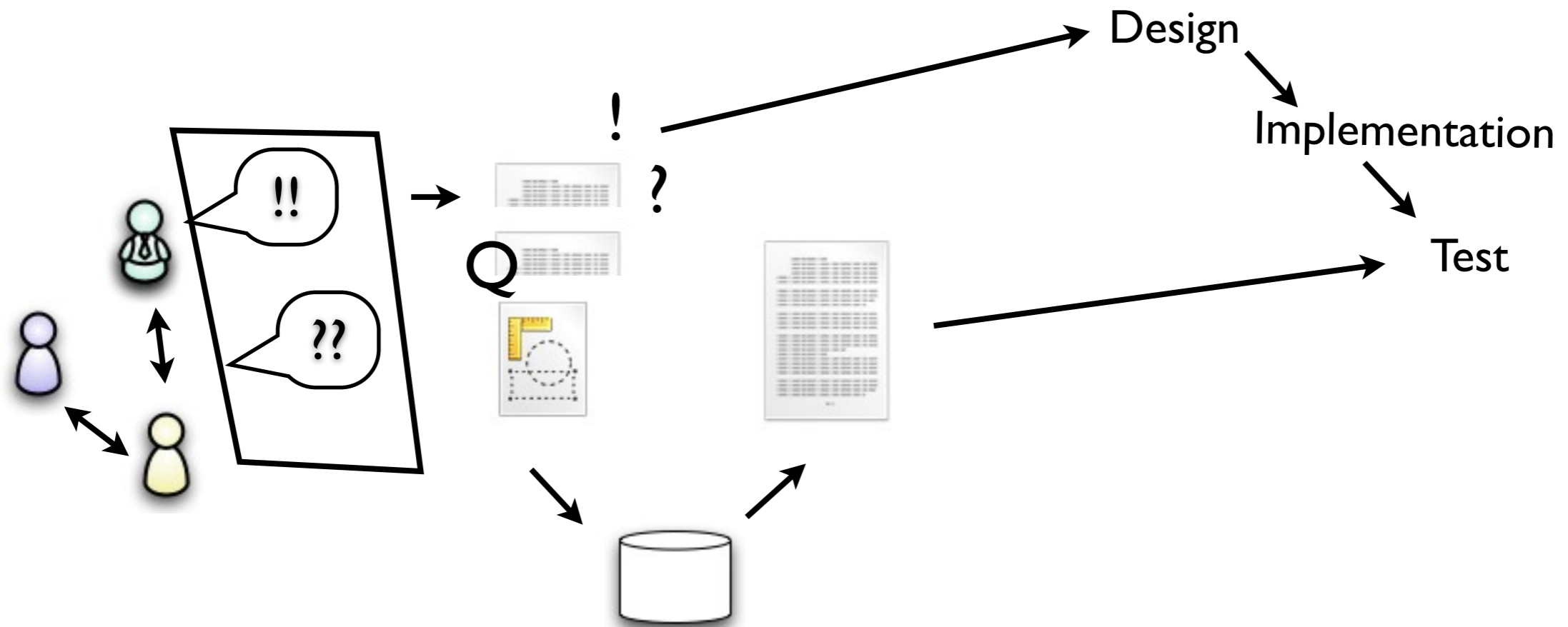
Design

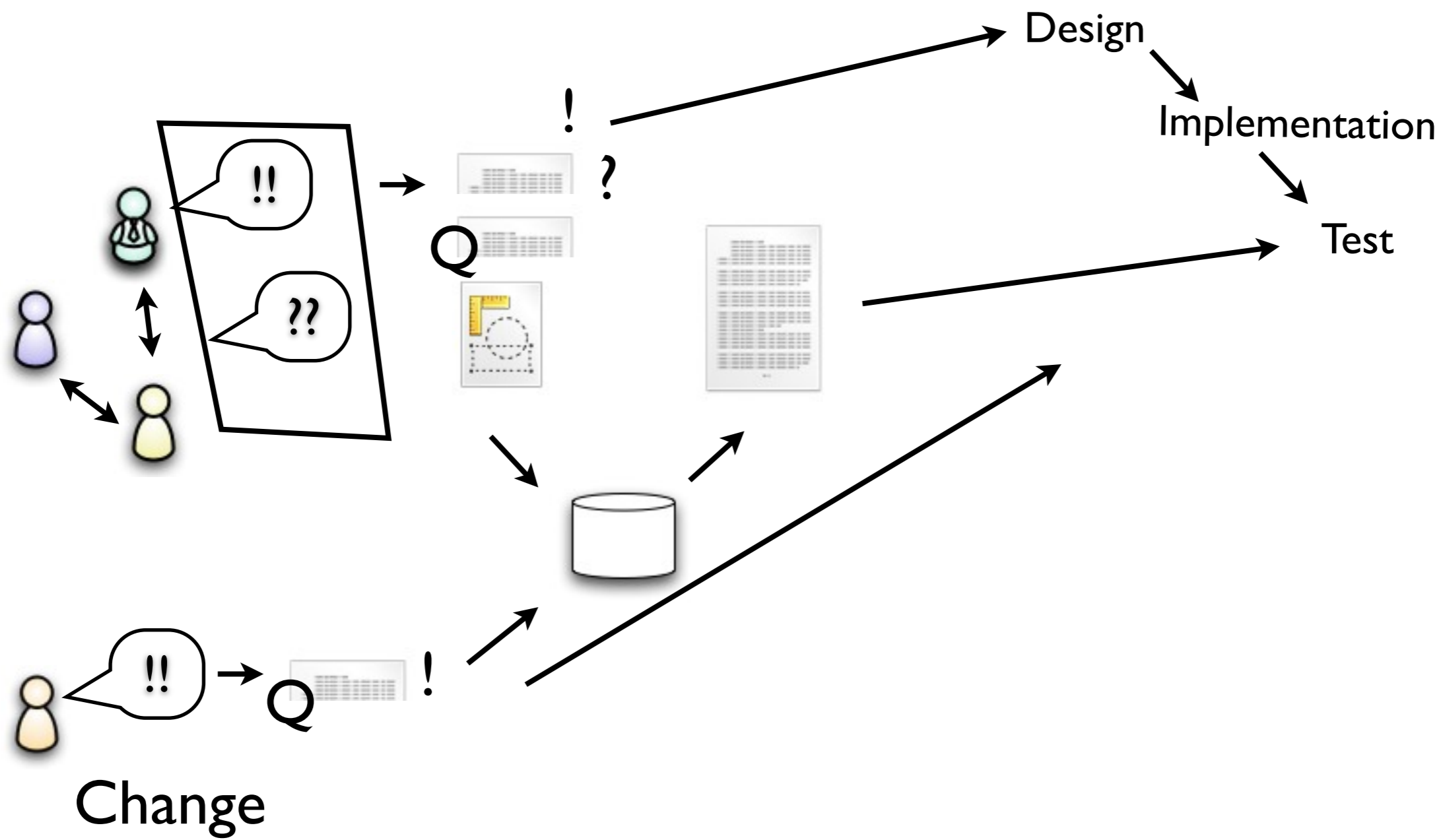
Implementation

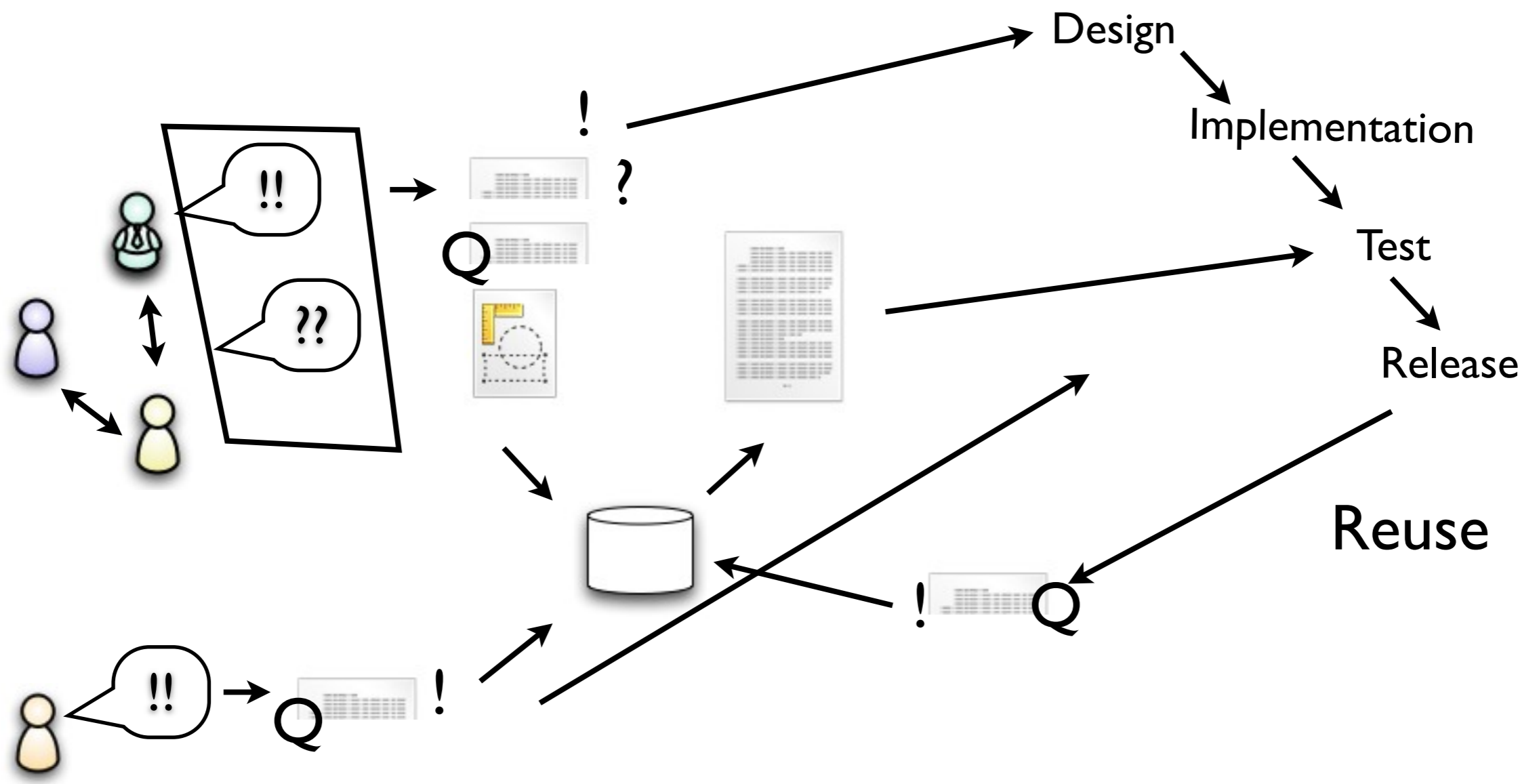
Test



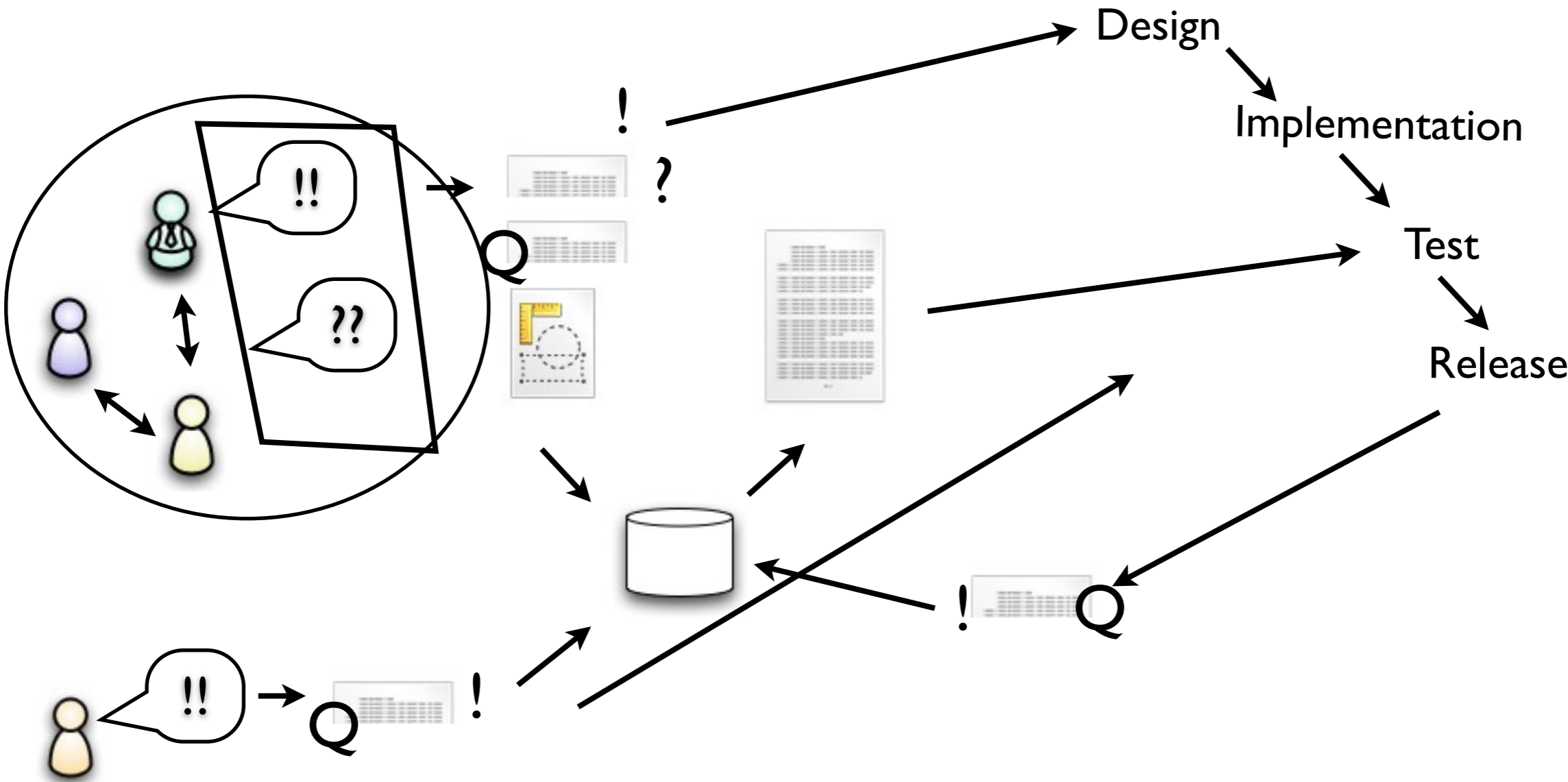
# Negotiate



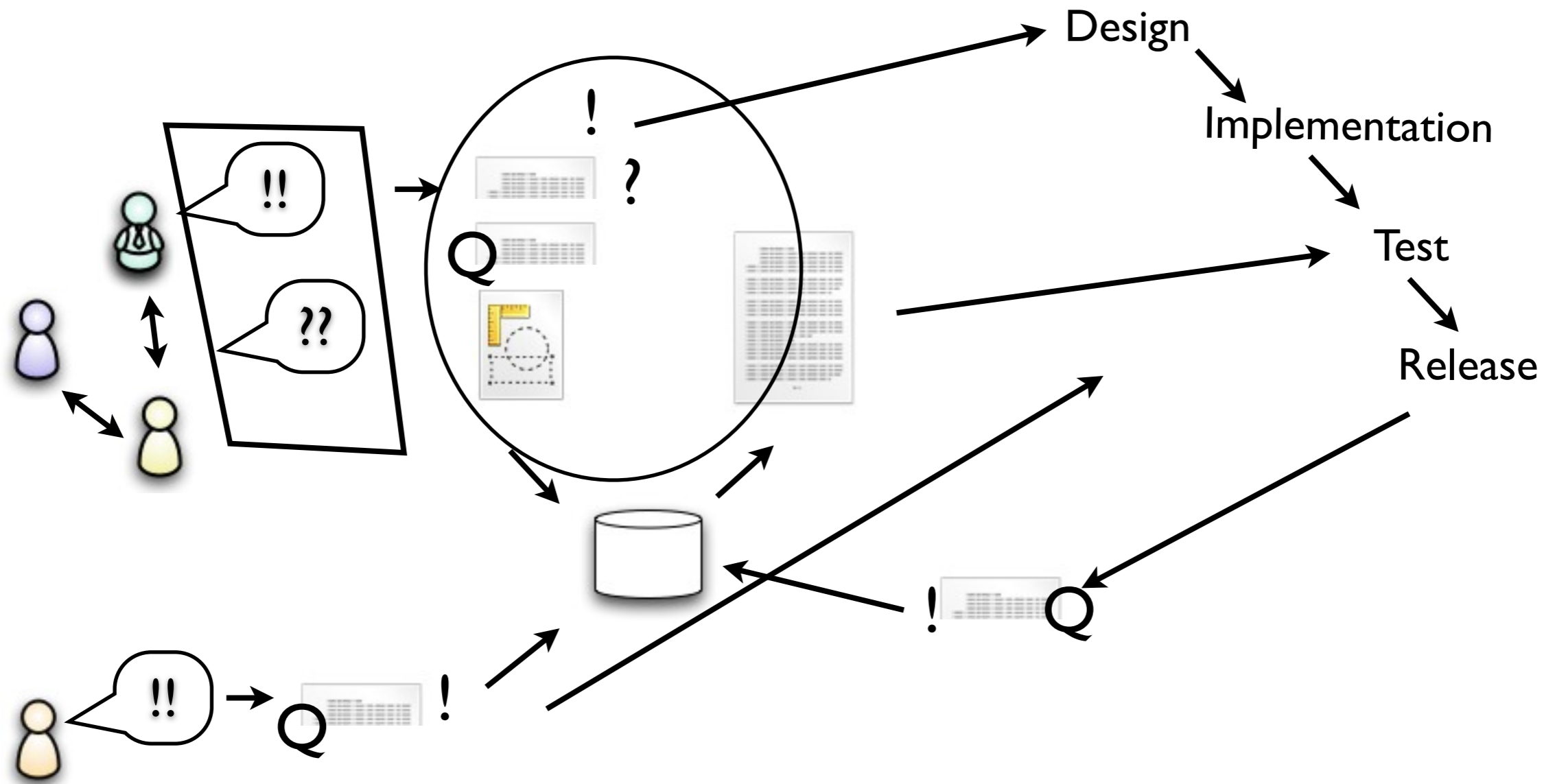


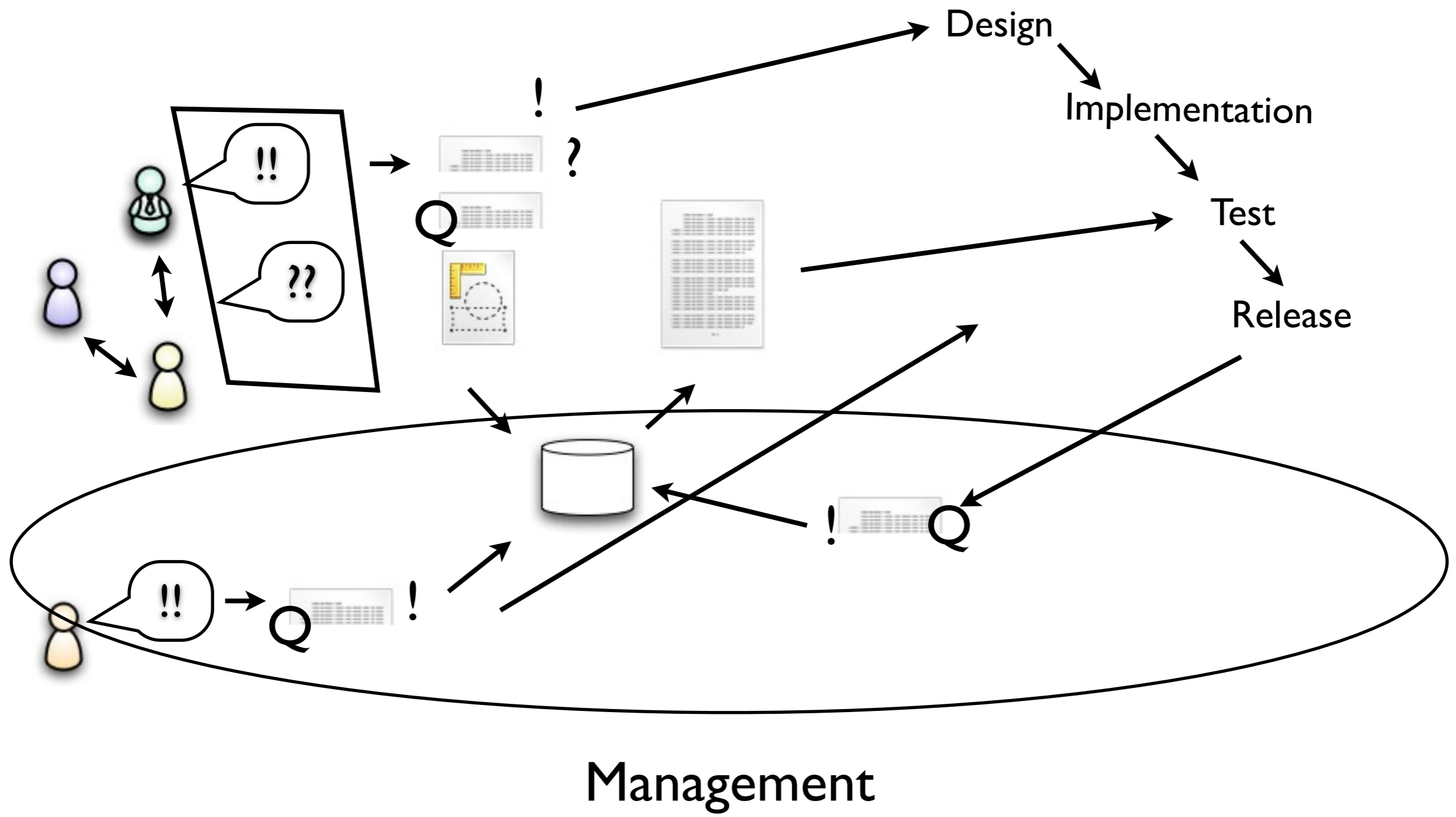


# Elicitation

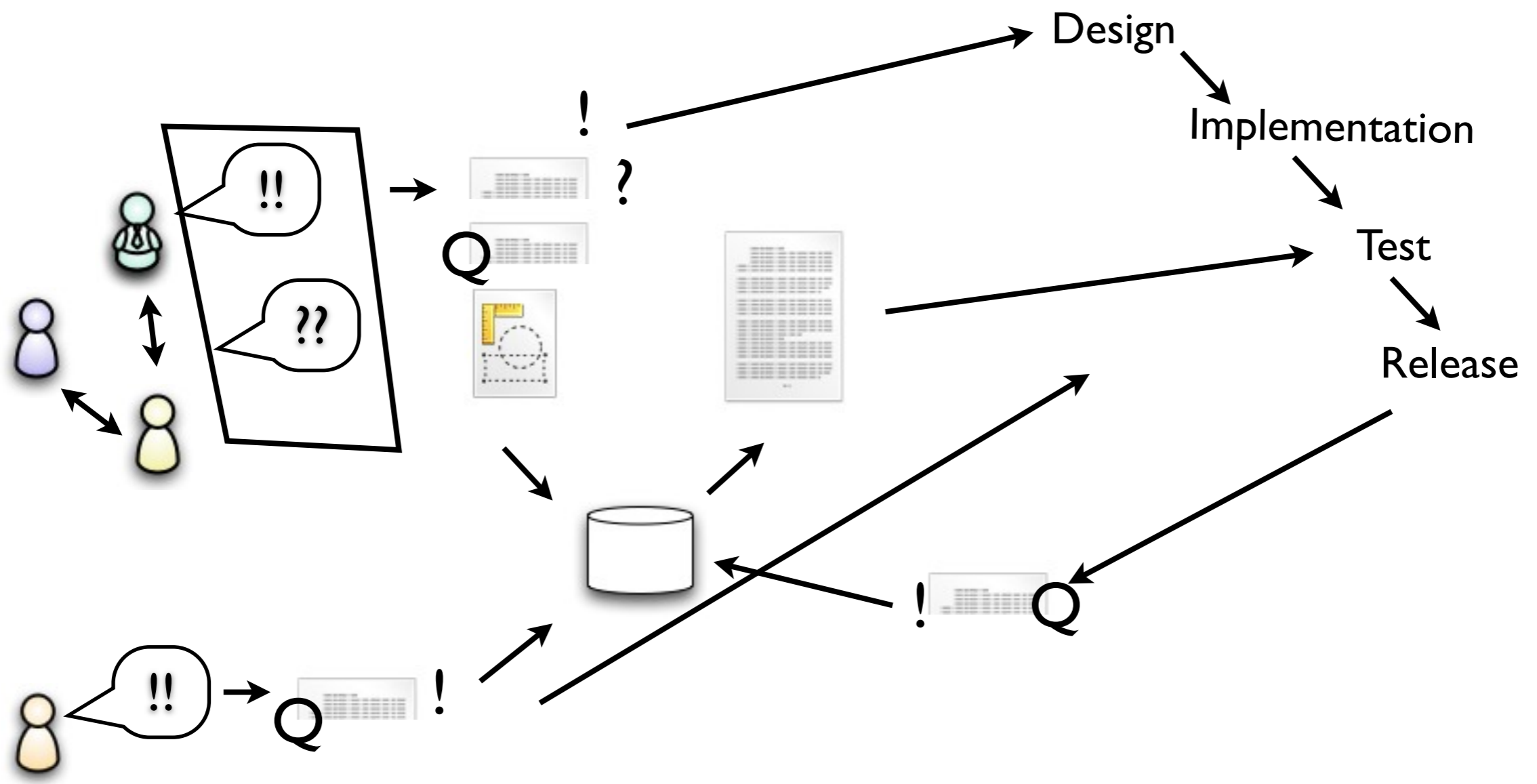


# Specification & Analysis









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  
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Quality  
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Features

Specific functions

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## 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 Performance

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 Performance

Safety ...

*“The response time should be less than 0.6 seconds”*

# Development Constraints



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*“The system should be easily portable to the Mac platform”*

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*“The system must be implemented in Java using the Hibernate library for database access”*

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*“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”*