Peer Review Process in HCI & HCI Design Patterns

Prof. Jan Borchers
Media Computing Group
RWTH Aachen University

Summer term 2016

http://hci.rwth-aachen.de/cthci

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NO SMOKING
REGISTRATION
PARKING
RESTAURANTS • LOBBY BAR
COCKTAIL LOUNGE
SHOPS
MEETING ROOMS
BOARD ROOMS
EXECUTIVE OFFICES
BALLROOMS
MEETING ROOMS
STOP
RUN
NO SMOKING
BALLROOMS
MEETING ROOMS
MEETING ROOMS
BOARD ROOMS
EXECUTIVE OFFICES
REGISTRATION
PARKING
STOP
RUN

Dissemination of Research in HCI

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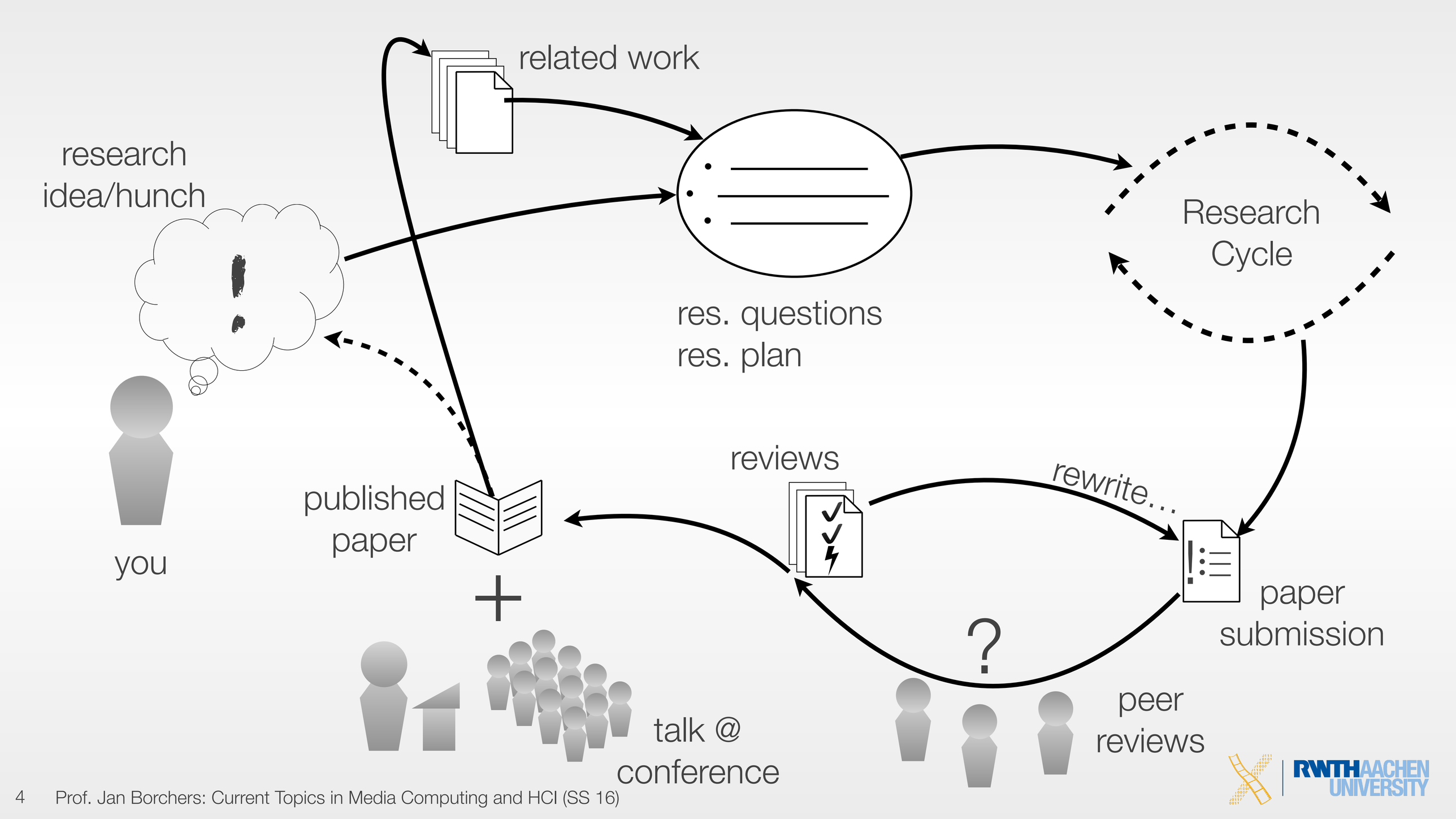
related work
research
idea/hunch
res. questions
res. plan
Research
Cycle
reviews
rewrite…
published
paper
you
paper
submission
?
peer
reviews
talk @
conference

Criteria for a Good Paper

- Contribution: What new insights does it bring to the field?
- Benefits: What can you learn from this / do with this?
- Novelty: Prior publications?
- Validity: Are the claims properly backed up?
- Applicability: How good does the paper match the likely audience?
- Format: Readability and clarity

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Structure of a Review

- Overall rating (e.g., at CHI): 1: definite reject – 5: definite accept
- Short summary of the contributions and benefits
  - “This paper presents…” (who) will benefit from (what)
- Concerns
  - Originality
  - Validity
  - Clarity
- Suggestions for improvement
- Reviewer’s expertise: 1: no knowledge – 4 expert

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Reviewing Checklist

- Recommending accept
  - Convince yourself that it has no serious defects
  - Convince the editor that it is of an acceptable standard, by explaining why it is original, valid, and clear
  - List the changes that should be made before it appears in print
    - Where possible: indicating not just *what to change* but *what to change it to*
  - Take reasonable care in checking details, e..g, mathematics, formulas, and bibliography
- Recommending reject
  - Clearly explain the faults and, where possible, discuss how they could be rectified
  - Indicate which parts of the work are of value and which should be discarded
  - Check the paper to a reasonable level of detail

From *Writing for Computer Science* (Zobel, 2004)

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Reviewing Checklist

- Always do the following in either case
  - Provide good references with which the authors should be familiar
  - Ask yourself whether your comments are fair, specific, and polite
  - Be honest about your limitations as a referee of that paper
  - Check your review carefully as you would check one of your own paper prior to submission

From *Writing for Computer Science* (Zobel, 2004)

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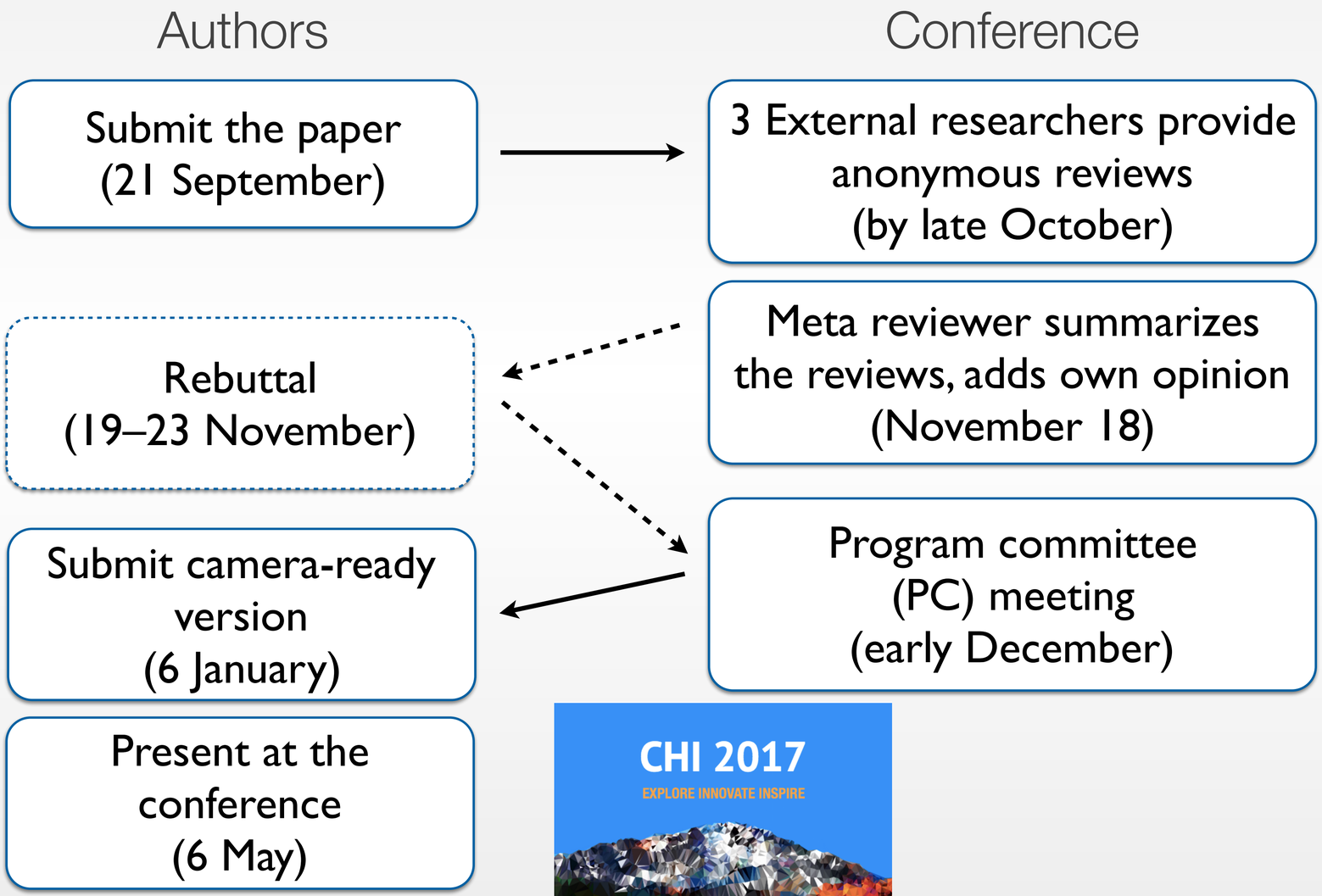
Sample Peer Reviewing Process



http://chi2017.acm.org/papers.html

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HCI Design Patterns

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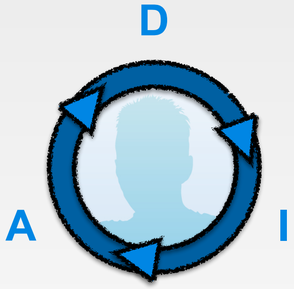

Interdisciplinary Design

In-Class Exercise

You are a software developer working on a new software project. List all other disciplines/professions/stakeholders that you think you will need to involve as part of your team.

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Problem: Interdisciplinary Design

interdisciplinary

values

Communication

methods

respect

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What's a Design Pattern?

- A design pattern describes a successful solution to a recurring contextualized design problem in a consistent format that is readable by non-experts and networked into a language.

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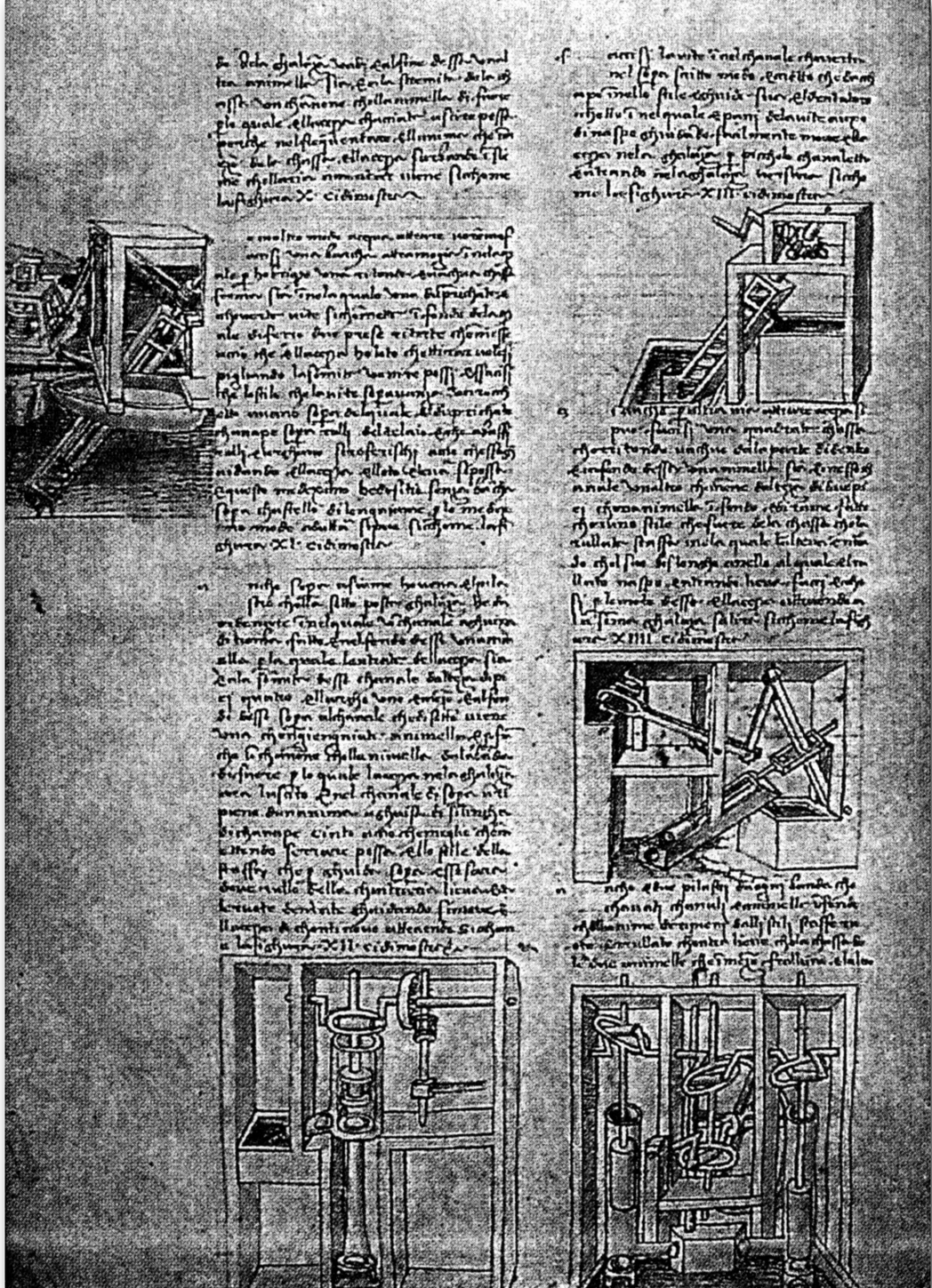
Tratato I

Francesco
di Giorgio

Renaissance
Master Builder

1480



A New Literary Form

Poem

Encyclopedia

Pattern

Newspaper

Novel

Letter

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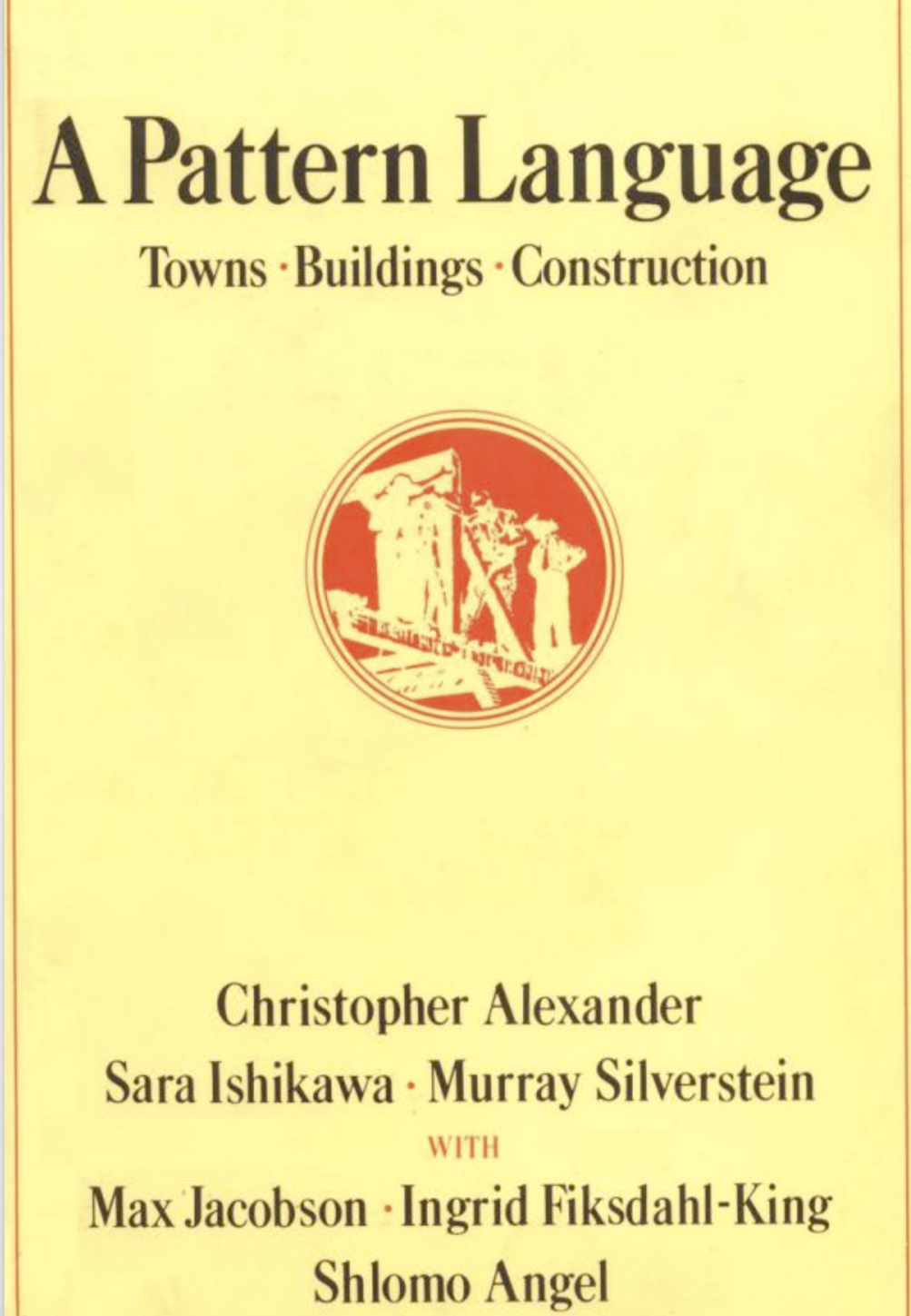
Urban architecture

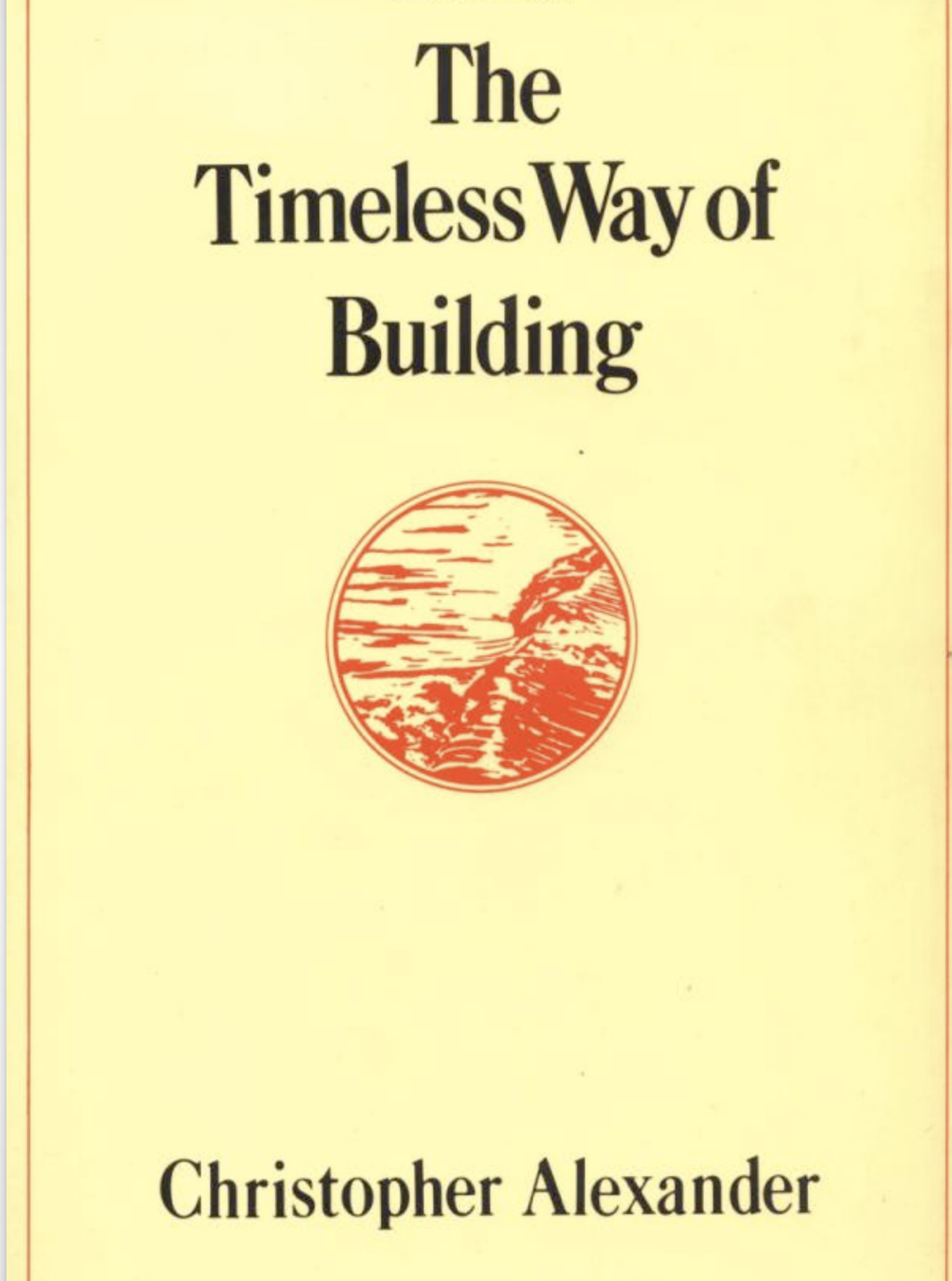
253 patterns

1977



Patterns idea and process

1979



Patterns of Events and Space

“A building or town is given its character, essentially, by those events that keep on happening there most often.”

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Patterns of Events and Space

- QWAN
- Inhabitants create better environments
- Participatory design!

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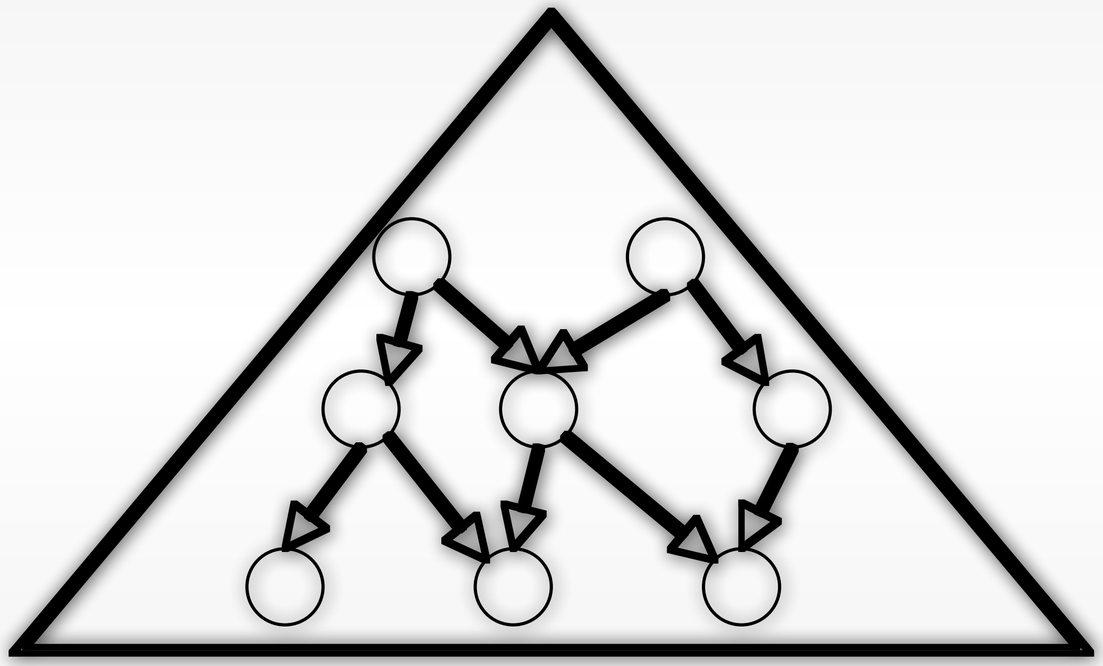
Pattern Languages



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Patterns Balance Forces

- Patterns solve a problem of conflicting forces
- Example: WINDOW PLACE (psychological)
  - People naturally drawn towards light
  - But like to sit
- Forces can be social, economic, natural, or physical

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243 SITTING WALL**

Name, Ranking

Sensitizer

. . . if all is well, the outdoor areas are largely made up of positive spaces—POSITIVE OUTDOOR SPACES (106); in some fashion you have marked boundaries between gardens and streets, between terraces and gardens, between outdoor rooms and terraces, between play areas and gardens—GREEN STREETS (51), PEDESTRIAN STREET (100), HALF-HIDDEN GARDEN (111), HIERARCHY OF OPEN SPACE (114), PATH SHAPE (121), ACTIVITY POCKETS (124), PRIVATE TERRACE ON THE STREET (140), OUTDOOR ROOM (163), OPENING TO THE STREET (165), GALLERY SURROUND (166), GARDEN GROWING WILD (172). With this pattern, you can help these natural boundaries take on their proper character, by building walls, just low enough to sit on, and high enough to mark the boundaries.

If you have also marked the places where it makes sense to build seats—SEAT SPOTS (241), FRONT DOOR BENCH (242)—you can kill two birds with one stone by using the walls as seats which help enclose the outdoor space wherever its positive character is weakest.

Context

❖ ❖ ❖

In many places walls and fences between outdoor spaces are too high; but no boundary at all does injustice to the subtlety of the divisions between the spaces.

Problem

Consider, for example, a garden on a quiet street. Here somewhere along the edge between the two there is a need for a seam, a place which unites the two, but does so without breaking down the fact that they are separate places. If there is a high wall or a hedge, then the people in the garden have no way of being connected to the street; the people in the street have no way of being connected to the garden. But if there is no barrier at all—then the division between the two is hard to maintain. Stray dogs can wander in and out at will; it is even uncomfortable to sit in the garden, because it is essentially like sitting in the street.

The problem can only be solved by a kind of barrier which functions as a barrier which separates, and as a seam which joins, at the same time.

A low wall or balustrade, just at the right height for sitting, is perfect. It creates a barrier which separates. But because it invites people to sit on it—invites them to sit first with their legs on one side, then with their legs on top, then to swivel round still further to the other side, or to sit astride it—it also functions as a seam, which makes a positive connection between the two places.

Examples: A low wall with the children's sandbox on one side, circulation path on the other; low wall at the front of the garden, connecting the house to the public path; a sitting wall that is a retaining wall, with plants on one side, where people can sit close to the flowers and eat their lunch.

Ruskin describes a sitting wall he experienced:

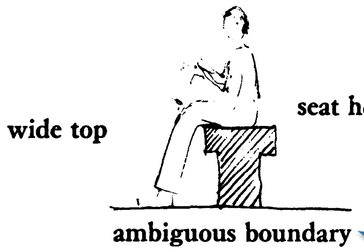
> Last summer I was lodging for a little while in a cottage in the country, and in front of my low window there were, first, some beds of daisies, then a row of gooseberry and currant bushes, and then a low wall about three feet above the ground, covered with stonecress. Outside, a corn-field, with its green ears glistening in the sun, and a field path through it, just past the garden gate. From my window I could see every peasant of the village who passed that way, with basket on arm for market, or spade on shoulder for field. When I was inclined for society, I could lean over my wall, and talk to anybody; when I was inclined for science, I could botanize all along the top of my wall—there were four species of stone-cress alone growing on it; and when I was inclined for exercise, I could jump over my wall, backwards and forwards. That's the sort of fence to have in a Christian country; not a thing which you can't walk inside of without making yourself look like a wild beast, nor look at out of your window in the morning without expecting to see somebody impaled upon it in the night. (John Ruskin, *The Two Paths*, New York: Everyman's Library, 1907, p. 203.)

Examples

Therefore:

Surround any natural outdoor area, and make minor boundaries between outdoor areas with low walls, about 16 inches high, and wide enough to sit on, at least 12 inches wide.

Solution



Diagram

❖ ❖ ❖

Place the walls to coincide with natural seat spots, so that extra benches are not necessary—SEAT SPOTS (241); make them of brick or tile, if possible—SOFT TILE AND BRICK (248); if they separate two areas of slightly different height, pierce them with holes to make them balustrades—ORNAMENT (249). Where they are in the sun, and can be large enough, plant flowers in them or against them—RAISED FLOWERS (245). . . .

References

Designing with Patterns

Design is unfolding
Piecemeal Growth

OOPSLA ’87: The Smalltalk Experiment

- Kent Beck (Apple), Ward Cunningham (Tektronix)
  - http://c2.com/doc/oopsla87.html
- Problem: E-R does not work for OOP
- End-user programming: Alexander
- Guiding designer
- 5 Smalltalk window design patterns (GUI!)
  - Example: COLLECT LOW-LEVEL PROTOCOL
- Successful experiment with non-Smalltalk-programmers
- Started software design patterns

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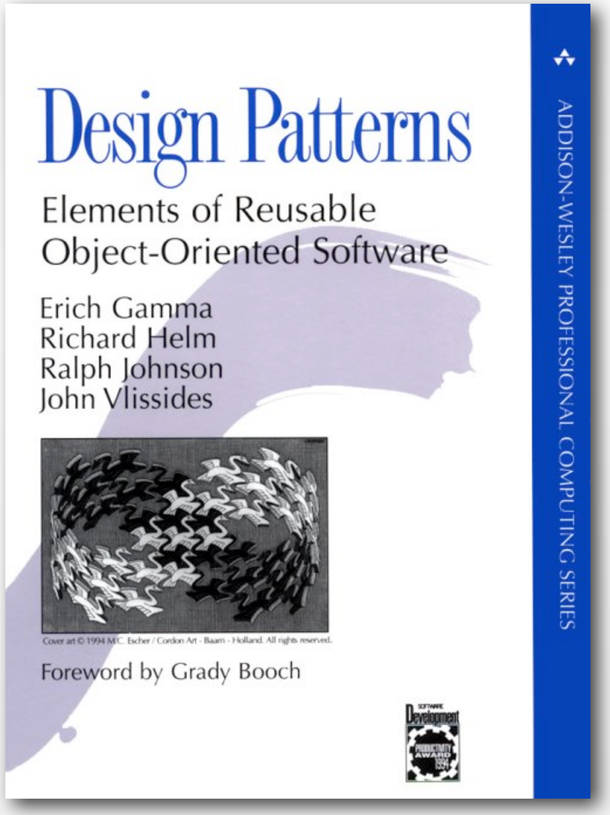
The Gang Of Four Book

- Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides: Design Patterns (1995)
- 23 patterns for software engineering
  - Creational, structural, behavioral
- Famous: Singleton, AbstractFactory, Adapter, Façade
- Each pattern ~10 book pages of text



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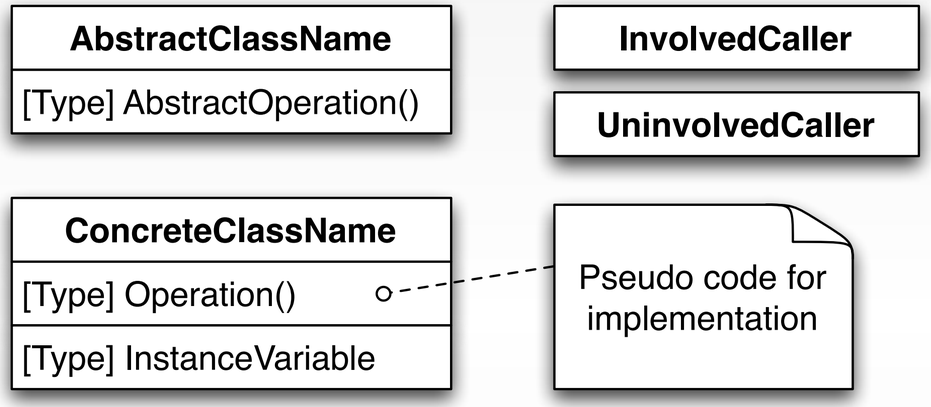
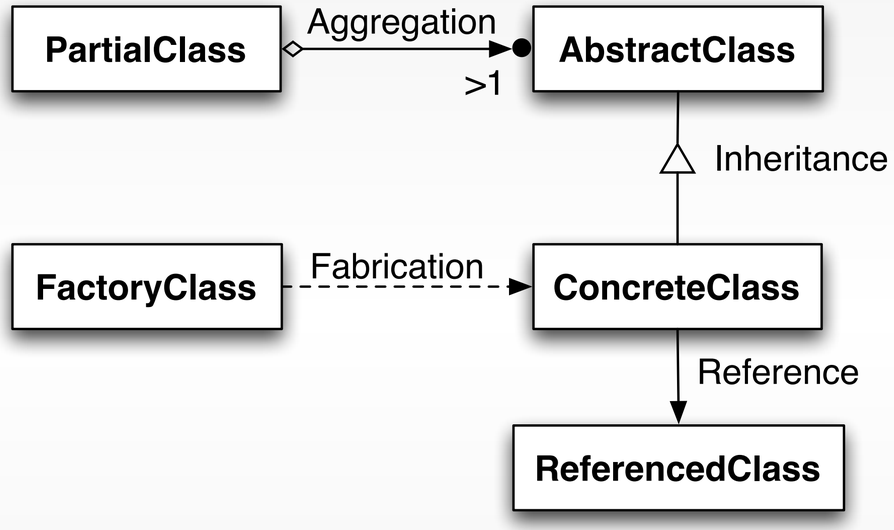
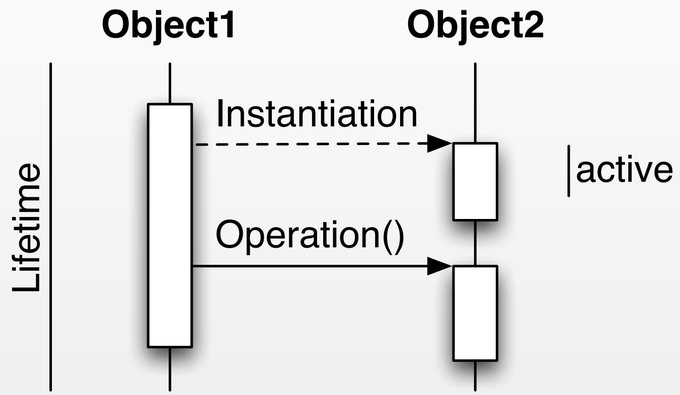
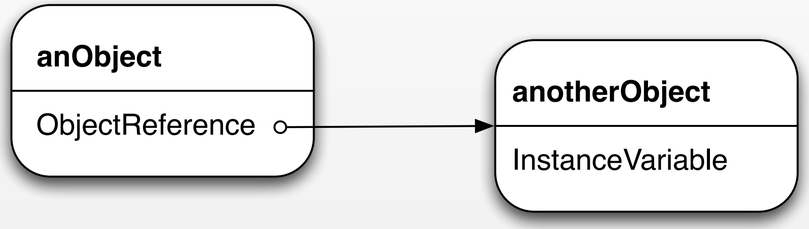
(Notation Cheat Sheet: See Gamma book, back cover)









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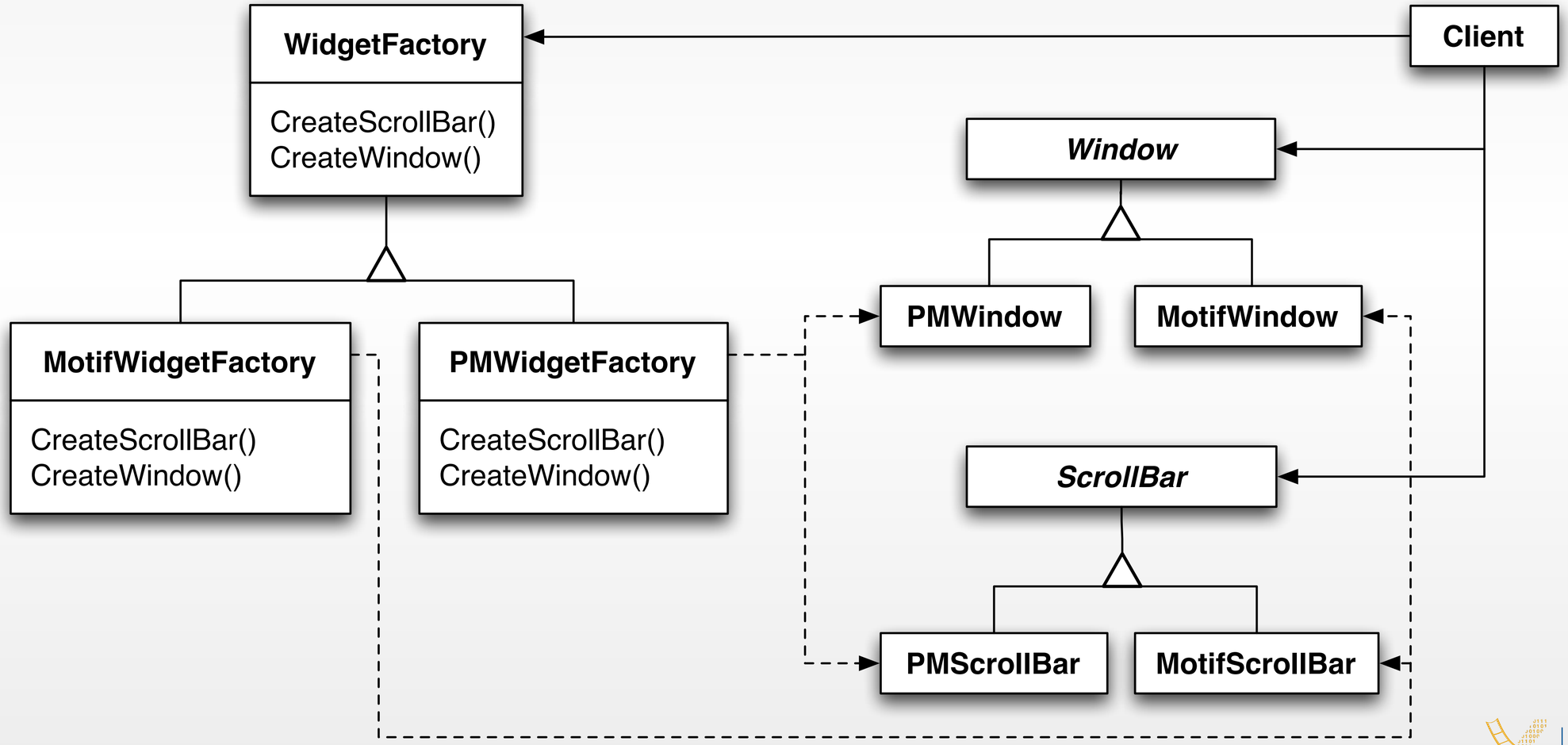
AbstractFactory Pattern: WidgetFactory Example



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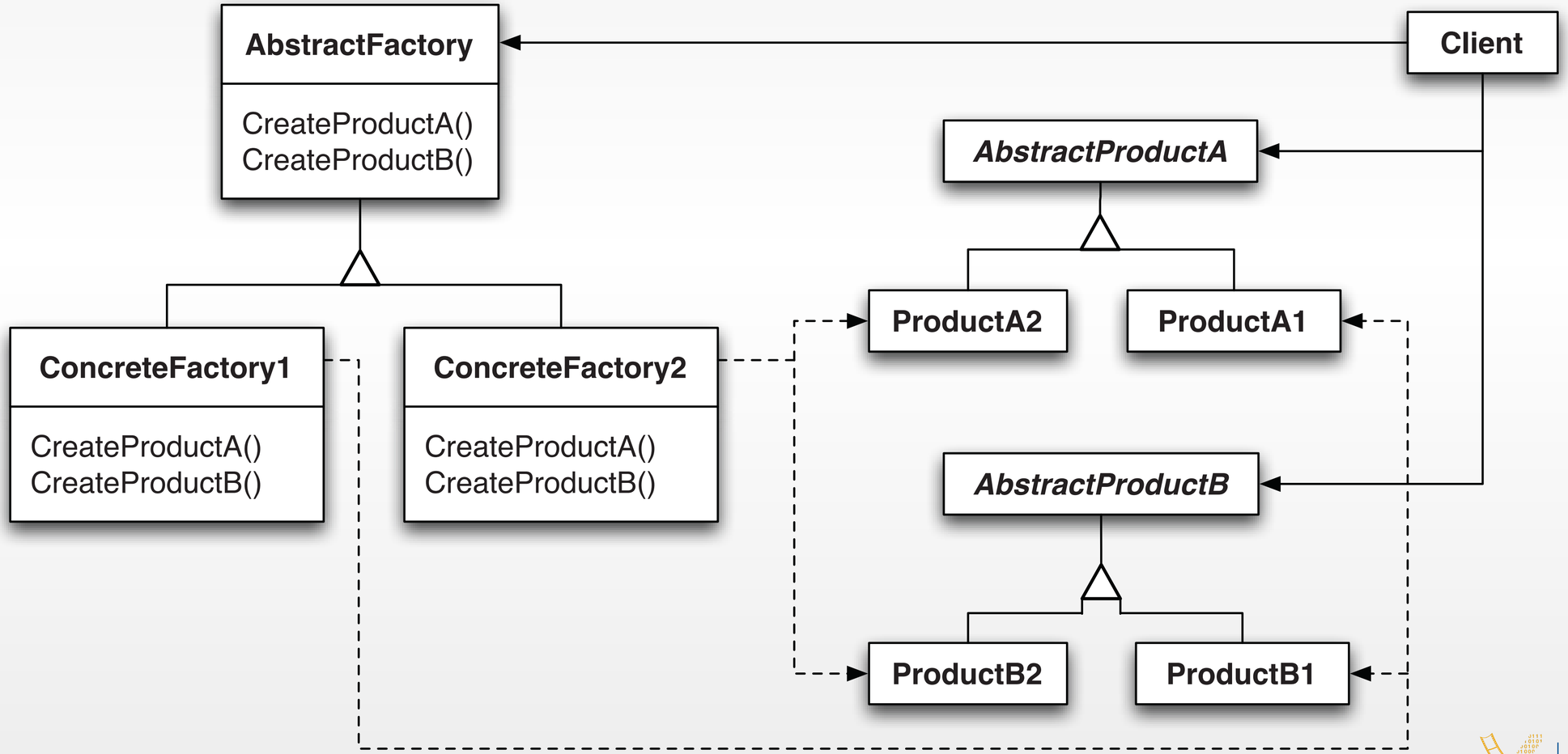
AbstractFactory Pattern: The General Solution



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GoF Book: Evaluation

- Highly successful among developers
  - Great for expert communication
  - Instead of reading code
- Not complete language
  - Workarounds instead of good design?
- Not readable by non-developers
  - 50% implementation details
  - Not empowering users
  - Language, intent, audience, values?
- The “Trial”
  - OOPSLA 1999

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PLoP Conferences

- PLoP Conference Series
  - Special format: non-academic, shepherding, proceedings
  - Strangely omits HCI area for a long time
  - PLoP 1998: “Have we exhausted this [HCI] field?”
- The OOPSLA’96 keynote by Alexander

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The OOPSLA'96 keynote by Alexander

- Annual ACM Conference on Object-Oriented Programming, Systems, Languages, and Applications
- Had been the location of patterns "birth" 9 years before
- Alexander was invited to comment on the efforts of the SW community in creating patterns, such as the GoF book and others
- His remarks were quite devastating, but also very helpful to understand his ideas…

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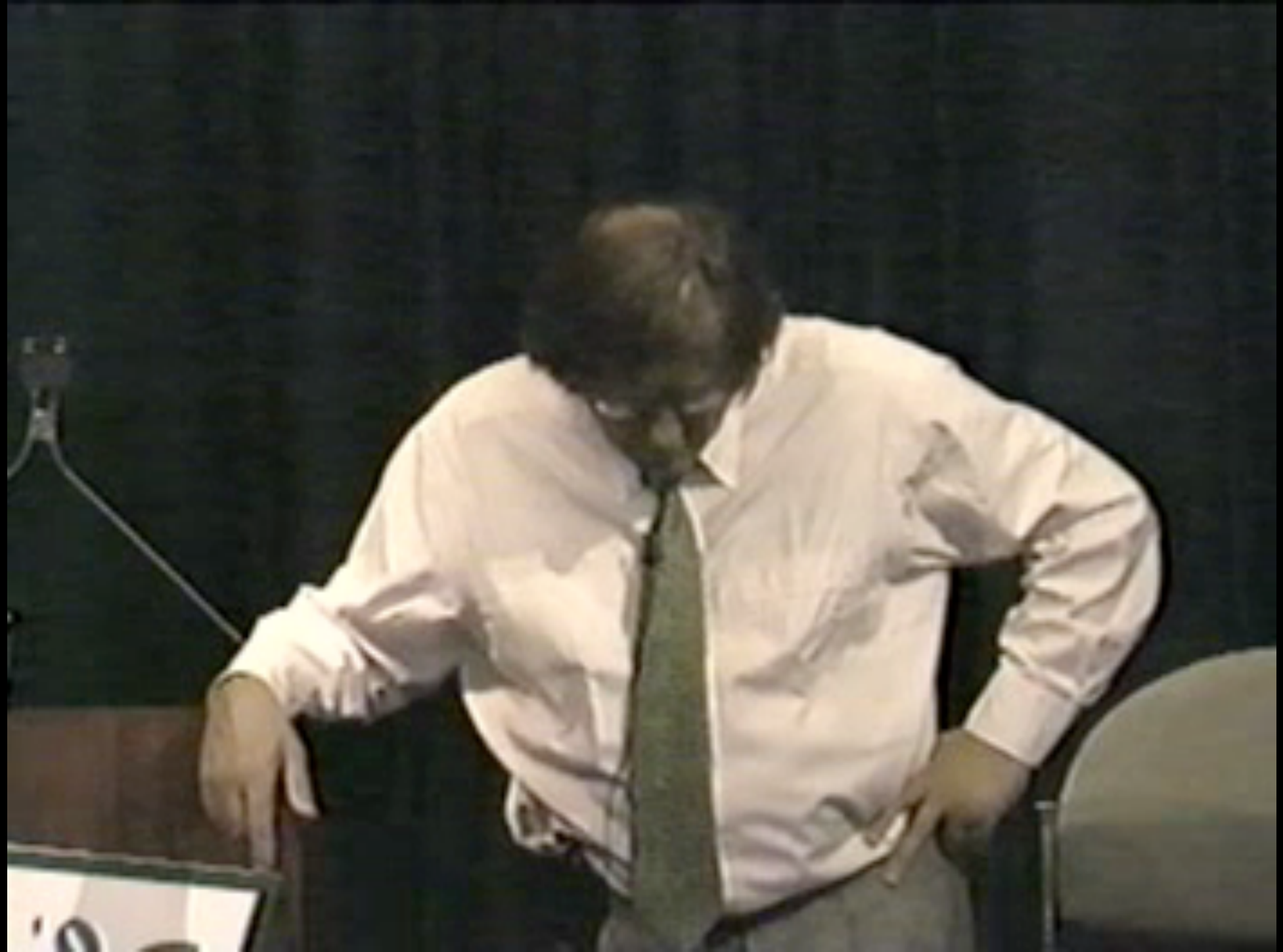
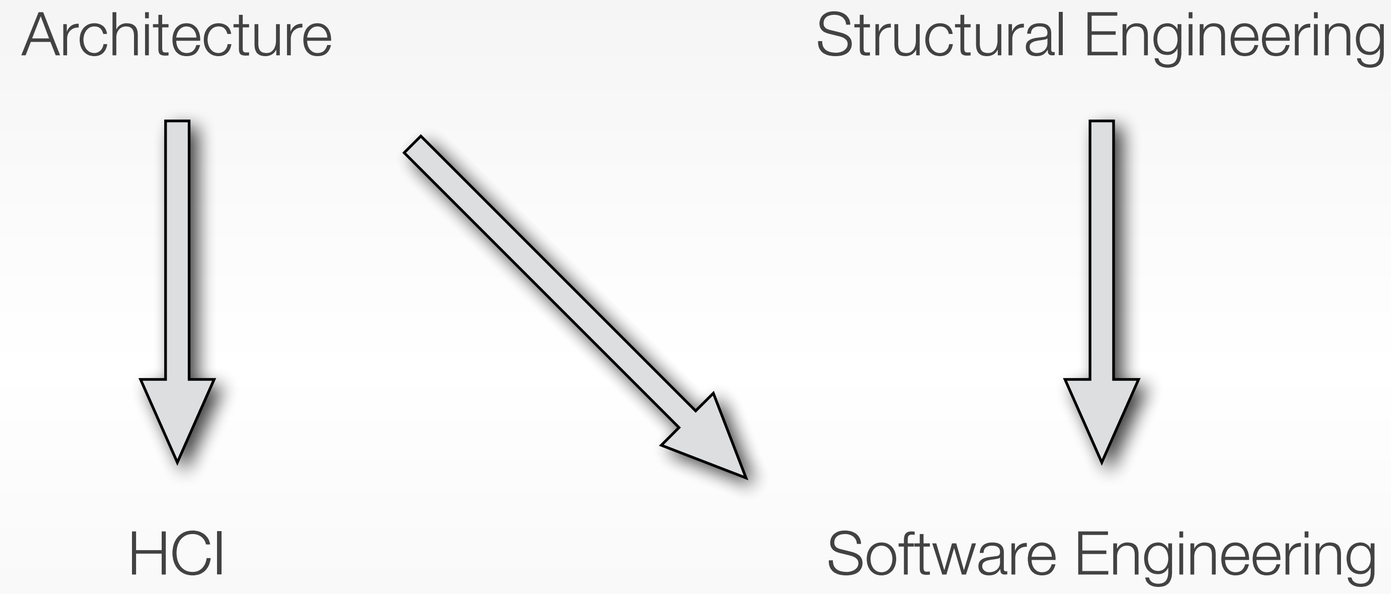


Mismatched Adoption



- Mitch Kapor’s 1990 “Software Design Manifesto”

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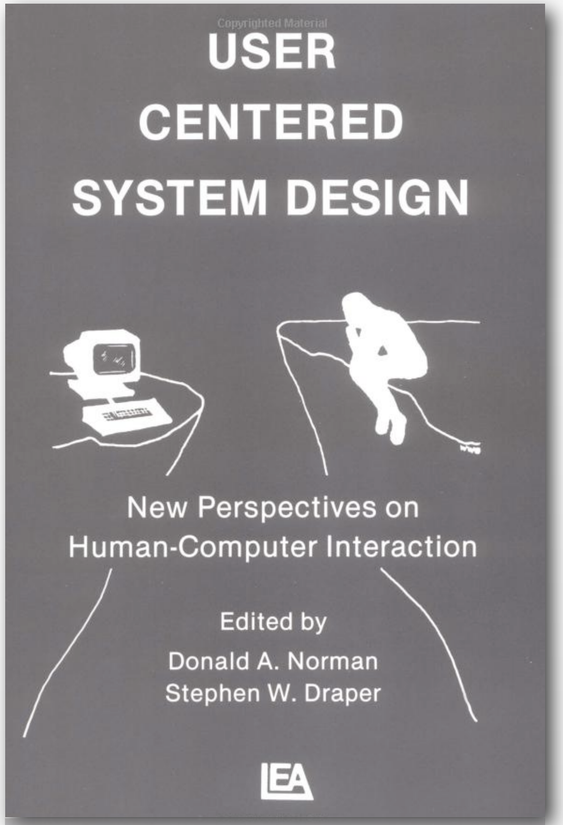
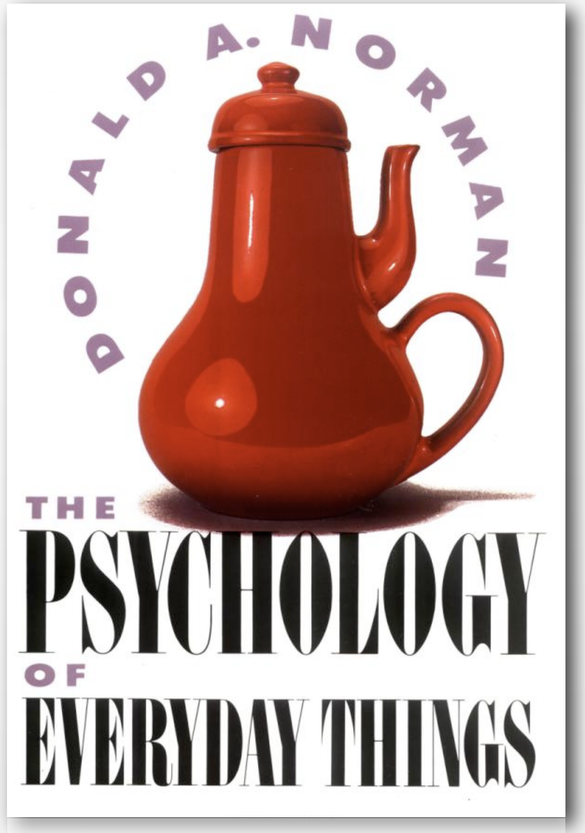
Patterns in HCI





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. . .

(X)PLML,...

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Name, Ranking

Sensitizer

Figure 17: Passing on a mouse for a group display.

Context

…you have picked your hardware to control the room and its services—ROOM CONTROLLER (15), and now need to decide how the technology is operated by the users.

♦♦♦

Problem

Interactive technology likes to be told when something happens or when it is supposed to do something. But people easily forget that extra step, especially when in the middle of a high-energy brainstorming session.

A research video by MIT once showed a group of researchers having a meeting around the table, and the room was "listening in" on the conversation going on. Whenever a certain point was reached, such as deciding to add a new item to the agenda, or delegating a task to a member in the room, everybody had to shut up, and the moderator would speak the corresponding commands for the computer to keep up with what was going on. It was the worst group support interface imaginable.

Good group support software follows what's going on in the room as good as it can, trying to detect from a variety of sensors, models, and other input what the current activity and actors are, and then takes initiative on a simple, reliable level to help the actors, without presuming to understand more than it can.

Computer scientists will argue that deriving this information from sensor values is not reliable, so the computer needs clear commands in order not to do something wrong. This is perfectly true in distributed settings with low bandwidth for human communication: If user A decides to pass control over the shared mouse cursor to remote user B in a shared application, he usually has to click a button to do so.

Examples

In a collocated setting of an AE, an enormous advantage comes to the help of the system: social protocol. The people in the room can see and hear each other. If one person is controlling the mouse cursor using their laptop, and someone else wants to take over with their own laptop, they will just say so. The computer does not need to understand this verbal command, nor does he need to lock the cursor for everybody else but one user at a time: It can simply accept cursor movement from everybody in the room; if there's a conflict of concurrent access, the users will quickly and easily notice and resolve it among themselves. This approach, on the other hand, saves the users having to send explicit messages each time they wish to pass control of that cursor to someone else, making the interaction much more fluid.

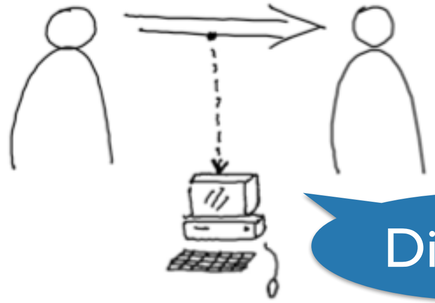
Examples include the design of the interaction for the iRoom's remote cursor control that allows "mouse fights" to occur, simply always using the last coordinate received; or its iClipboard feature that lets people cut and paste in a single shared clipboard for the room.

Winograd et al., in their chapter elsewhere in this book, reflect on this concept by suggesting room infrastructure in which "...users and social conventions in an environment take responsibility for actions, and the system infrastructure is responsible for providing a fluid means to execute those actions."

Therefore:

Solution

Do not put unnecessary protocols into place that are aimed at avoiding overlapping access to technology, if that collision can be easily noticed and fixed by the users through social interaction. If a user issues a social protocol act, such as passing a wireless mouse to someone else, [illegible] an additional repetitive step from the user to tell the room what he just did for everyone else to clearly see.



Diagram

♦♦♦

This is a basic pattern with no further references within this language.

References

Evaluating Patterns

- Shepherding
  - Experienced pattern author provides feedback
  - Usually part of the paper submission process
- Writers' Workshops

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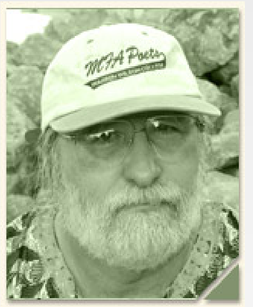
Writers' Workshops



Richard Gabriel

- Originally invented for poets' meetings
- Adopted by Richard Gabriel for the software patterns community
- Designed to respect the author and to create a relaxed, positive and friendly atmosphere
  - Welcome, reading, positive first, constructive, sandwich, applaud, unrelated story

EuroPLoP 2010

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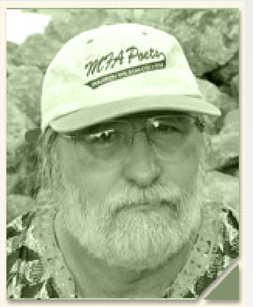
Writers' Workshops



Richard Gabriel

- Immensely valuable experience for the author
  - Feedback as in a very thorough review of a paper, thesis, exam…
  - Plus, you get to listen to the review process
  - Often reveals that others have totally different views than yourself about your work and topic
- Tip: Use this format also in other situations

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Writers' Workshops

1. Everybody reads pattern before workshop
2. Welcome
3. Read part of work to remind of author
4. Author: Fly on the wall
5. Summary
6. Things to keep (form, content)
7. Suggestions for improvement (form, content)
8. Sandwich: Summarize positive points

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Writers' Workshops

9. Welcome author back
10. Author asks clarifying questions (no defending)
11. Applaud the author
12. Unrelated story =)

(See ChiliPLoP'99 HCI patterns workshop report for details.)

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PLML 1.0

- Early formalization:
  DAG, nodes = patterns
- PLML: Pattern Language Markup Language
- Goals:
  - Specify pattern language structure
  - Do not limit authors to specific pattern formats
  - Facilitate authoring and browsing tool support
- Formulated as XML DTD at CHI 2003 Workshop

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PLML 1.0: Use

- Applied to several pattern languages, including Interactive Exhibits
- Recommended format for pattern submissions at CHI 2004 workshop
- Common data format for emerging tool support

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First book that brought design patterns to HCI

A PATTERN APPROACH TO INTERACTION DESIGN

Jan Borchers

WILEY

WILEY SERIES IN SOFTWARE DESIGN PATTERNS

QWAN

HCI is heir

lingua franca

Corp. Memory

Values

hcipatterns.org

A PATTERN APPROACH TO INTERACTION DESIGN

Jan Borchers

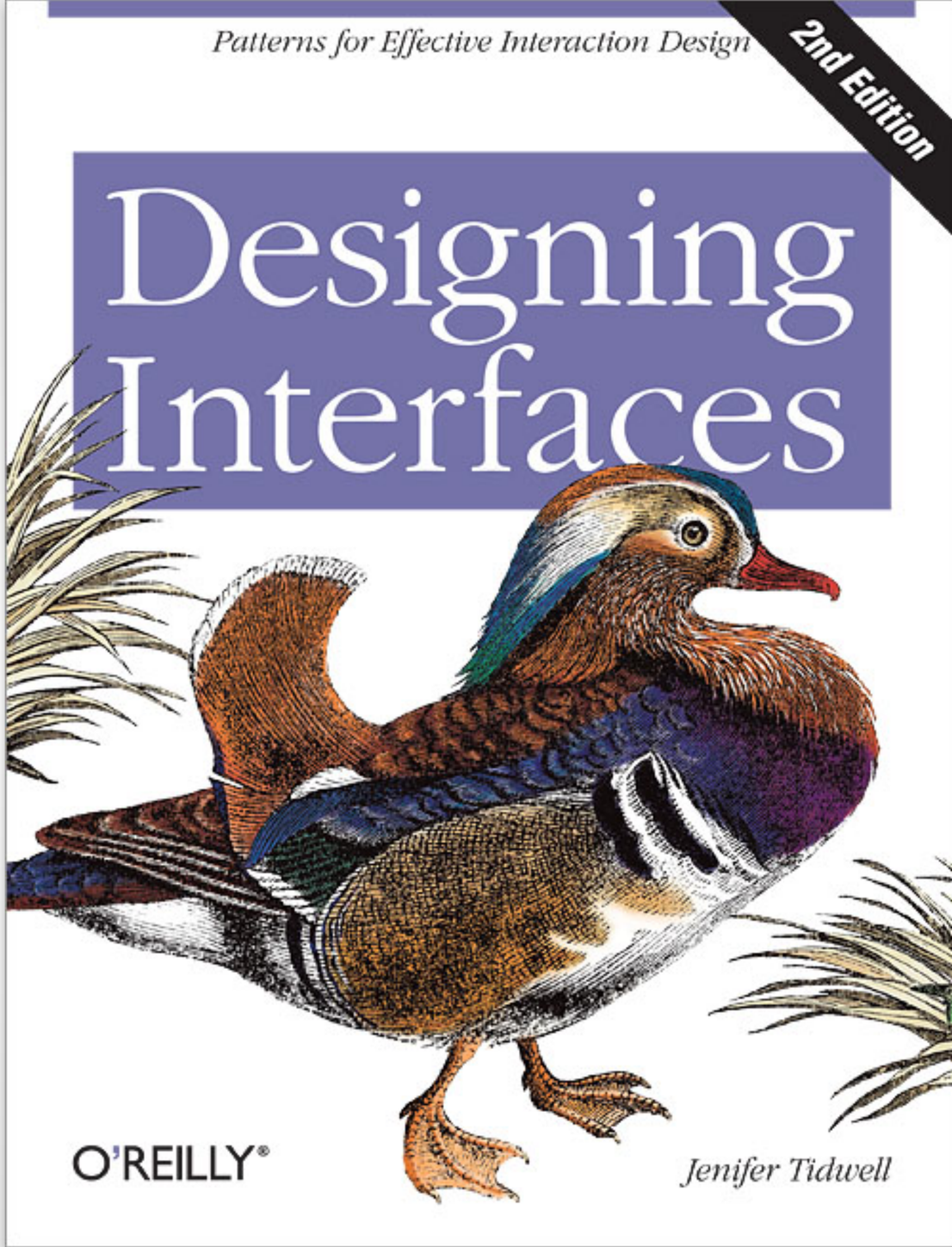
WILEY

WILEY SERIES IN SOFTWARE DESIGN PATTERNS

Jenifer Tidwell, 2005

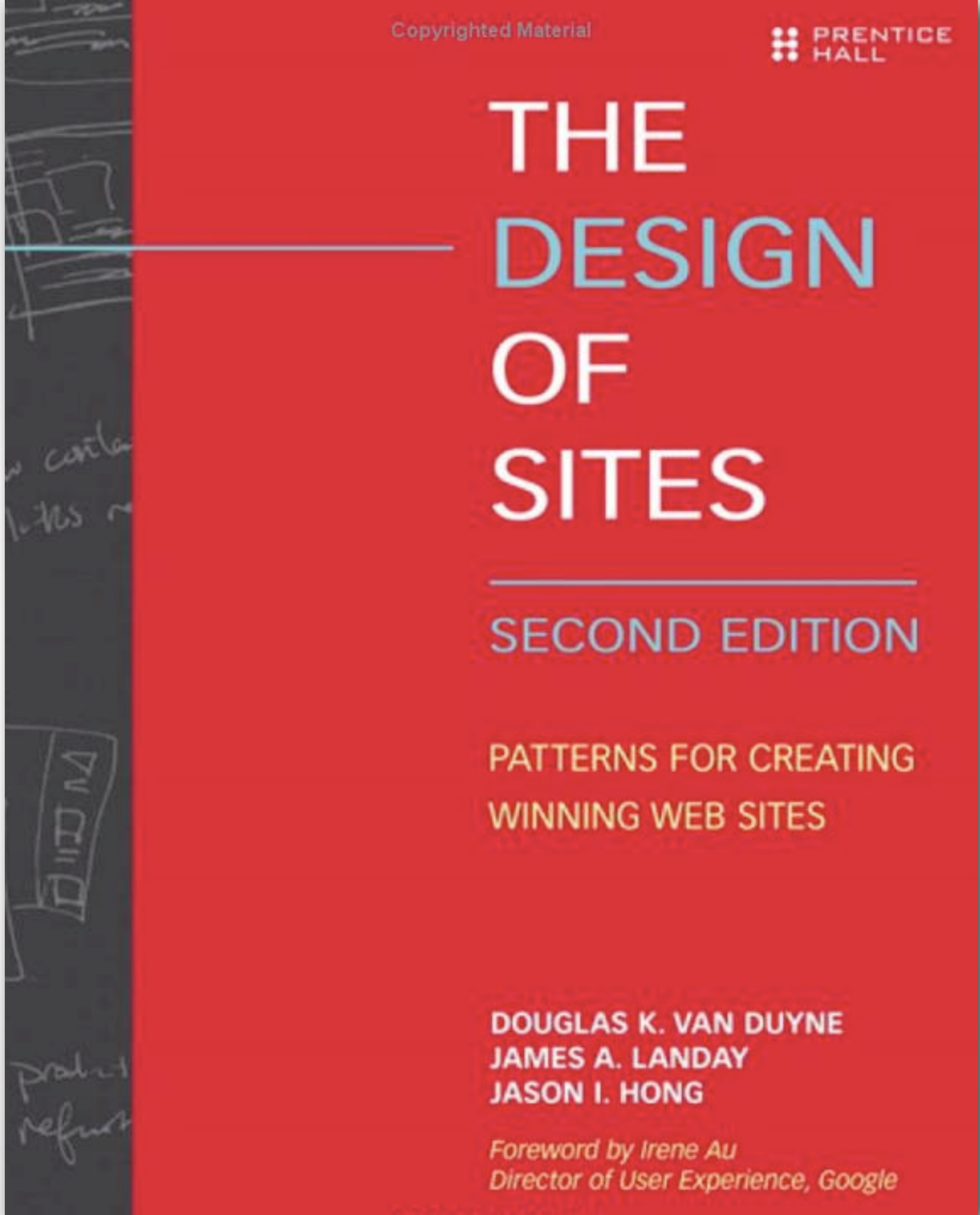
Developed from “Common Ground”
Pattern Language (1997)
http://www.mit.edu/~jtidwell/common_ground.html

In part available at
designinginterfaces.com

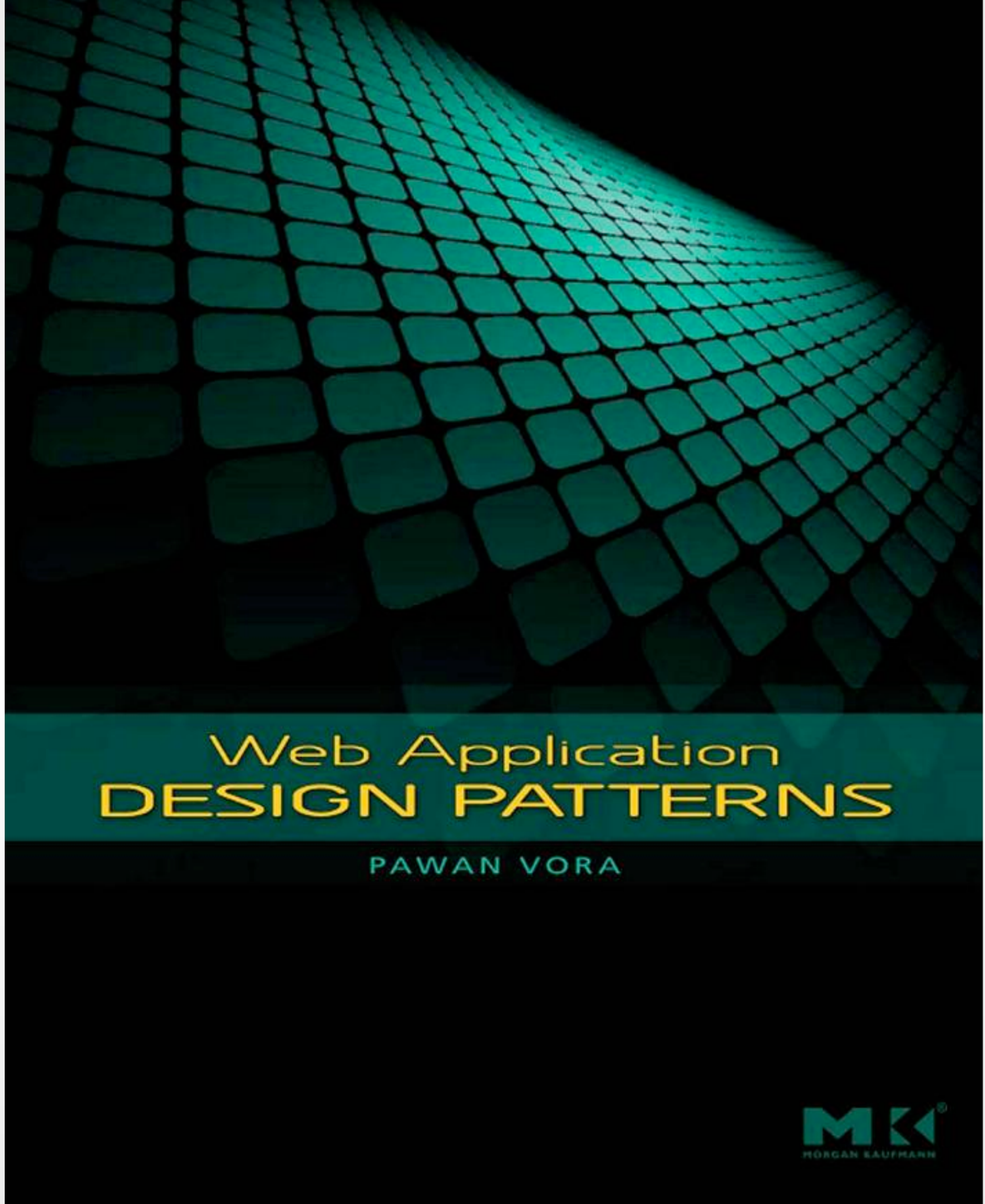


- Staffan Bjork, Jussi Holopainen, 2005
- 300 patterns
- Instantiates – Modulates – May Conflict

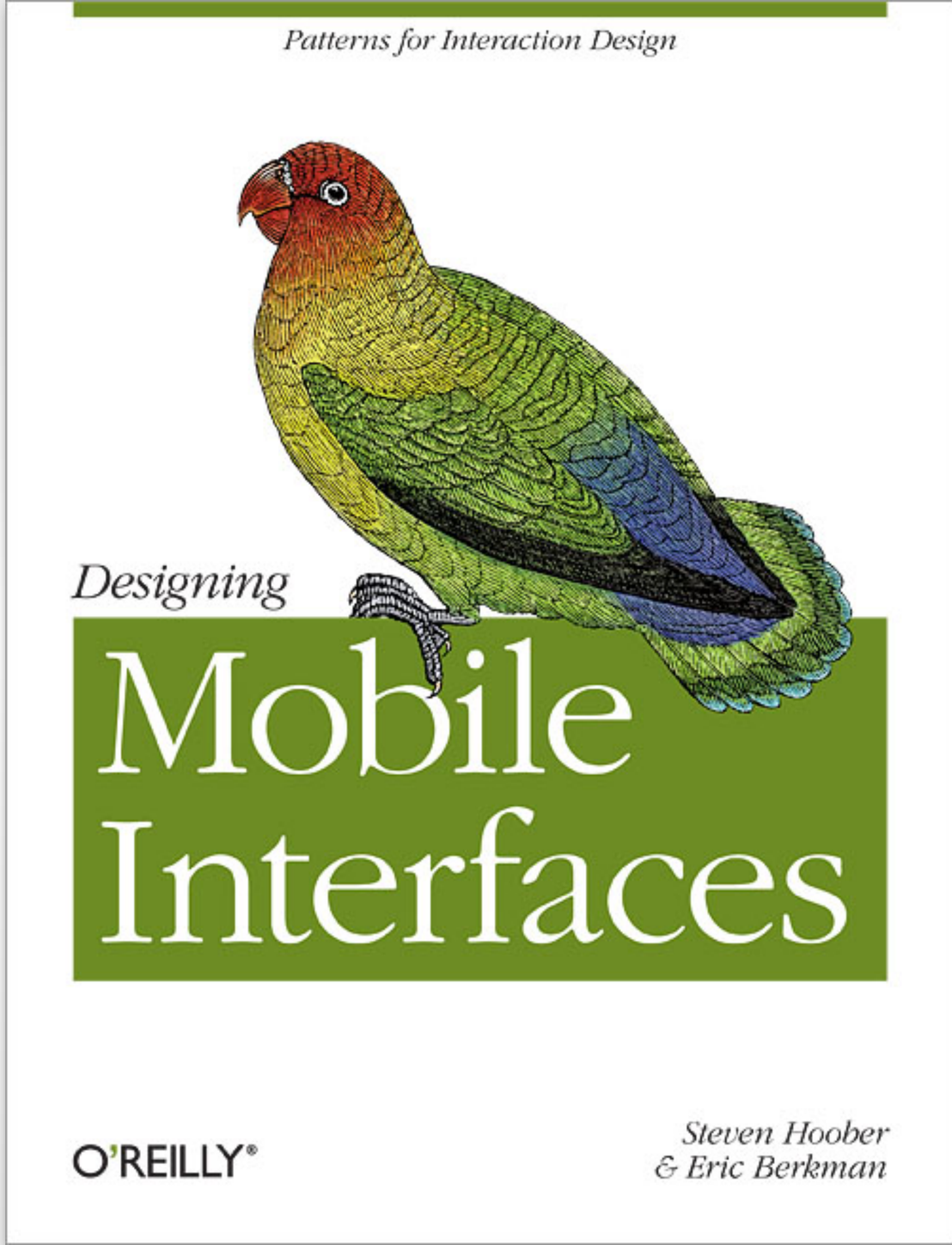
v. Duyne et al., 2006
(2nd ed.)
Successful book on
HCI Design Patterns
for web sites



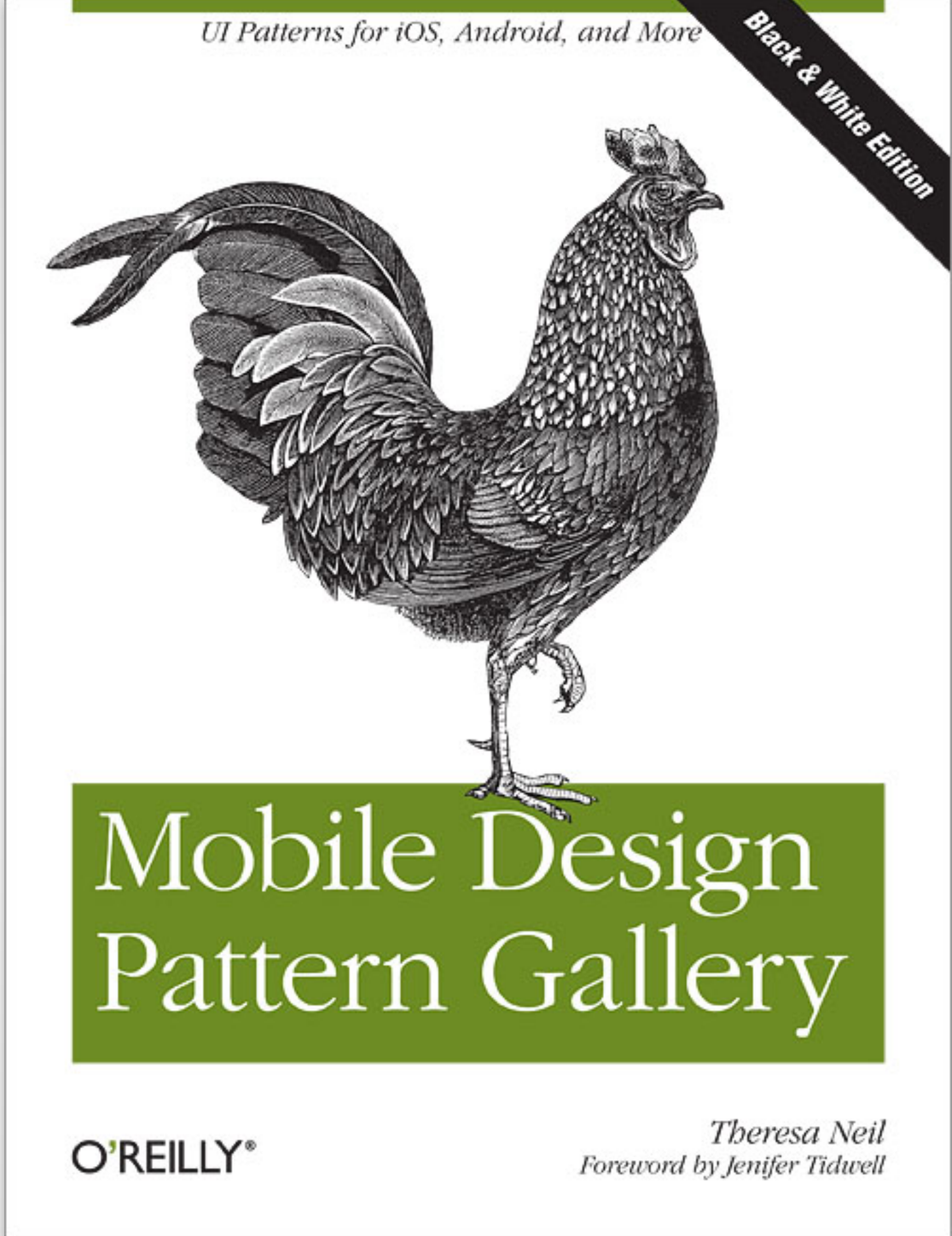
- Pawan Vora, 2009
- 100 patterns



- Steven Hoober and Eric Berkman (2011)
- 76 patterns



- Theresa Neil (2012)
- 400 screenshots for 70 design patterns



More Current Trends

- Dearden & Finlay,
  Human Computer Interaction 21(1), 2006
- *Interactions* 1/2007
- CHI 2009 XPLML

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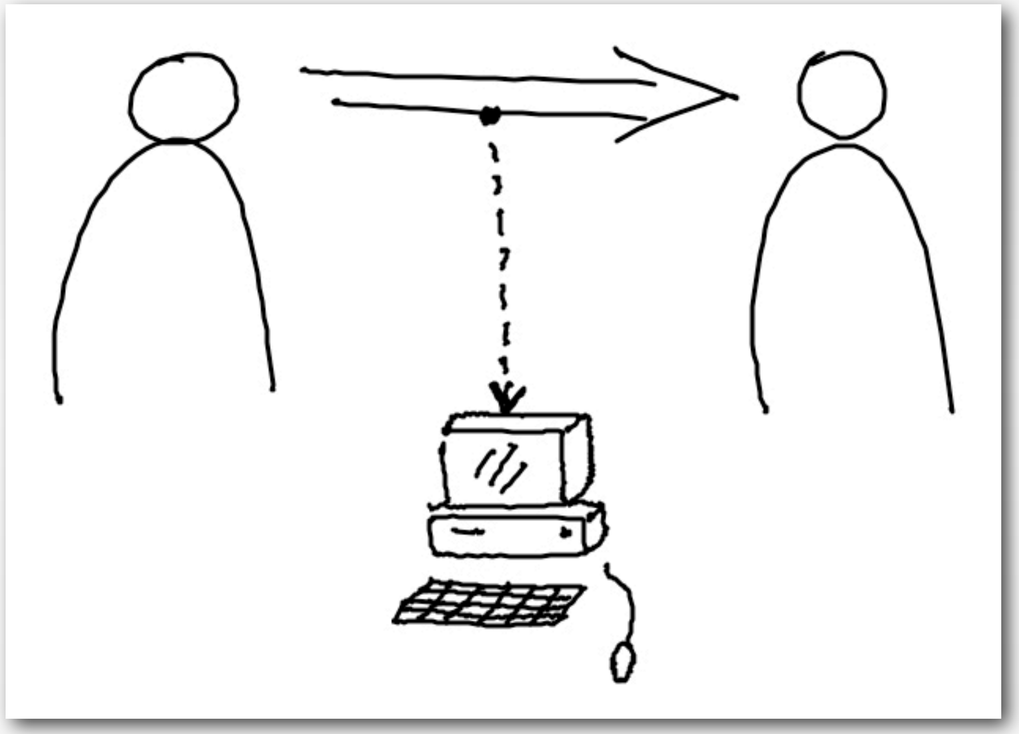
S. Lahlou (ed.), *Designing User Friendly Augmented Work Environments: From Meeting Rooms to Digital Collaborative Spaces*, Computer Supported Cooperative Work, Springer-Verlag, London, 2009

Chapter 10: Jan Borchers,
The Aachen Media Space: Design Patterns for Augmented Work Environments

Social Protocol ***



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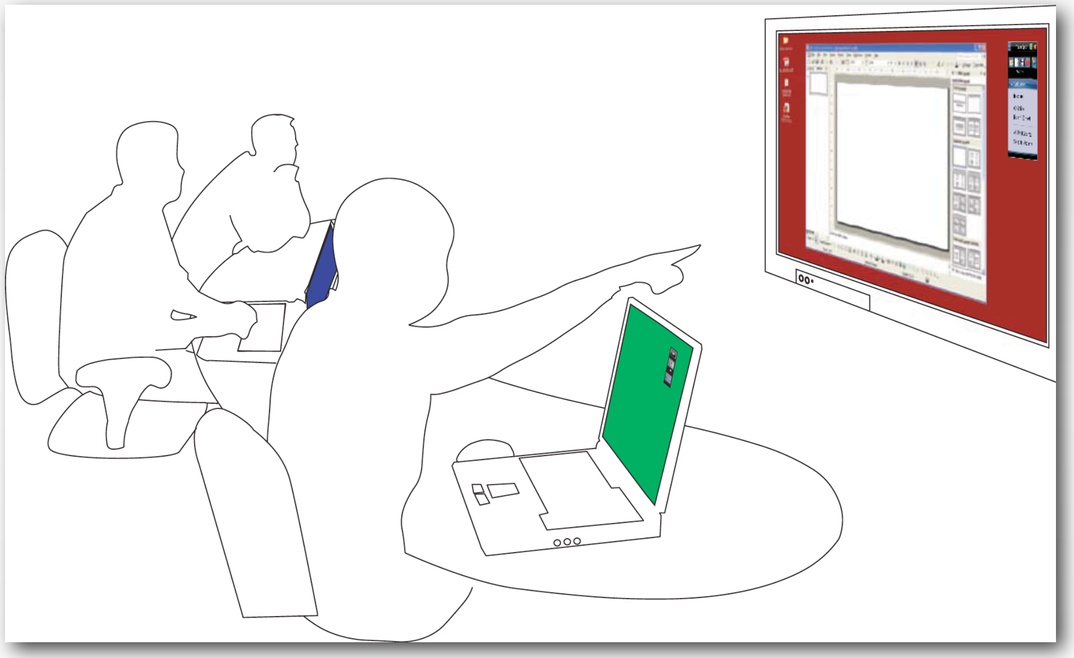
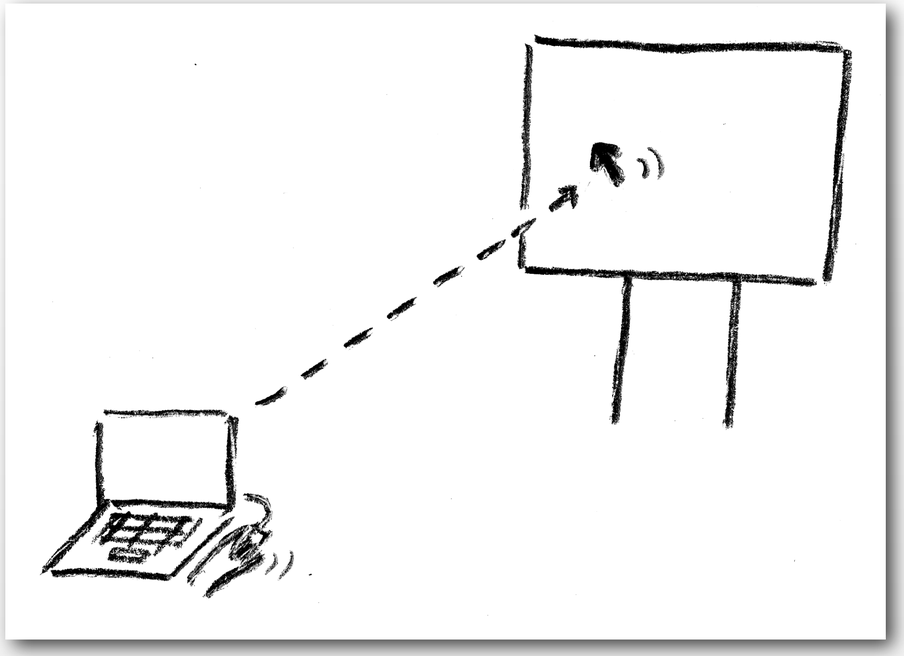
COLLOCATED GROUP SERVICES **





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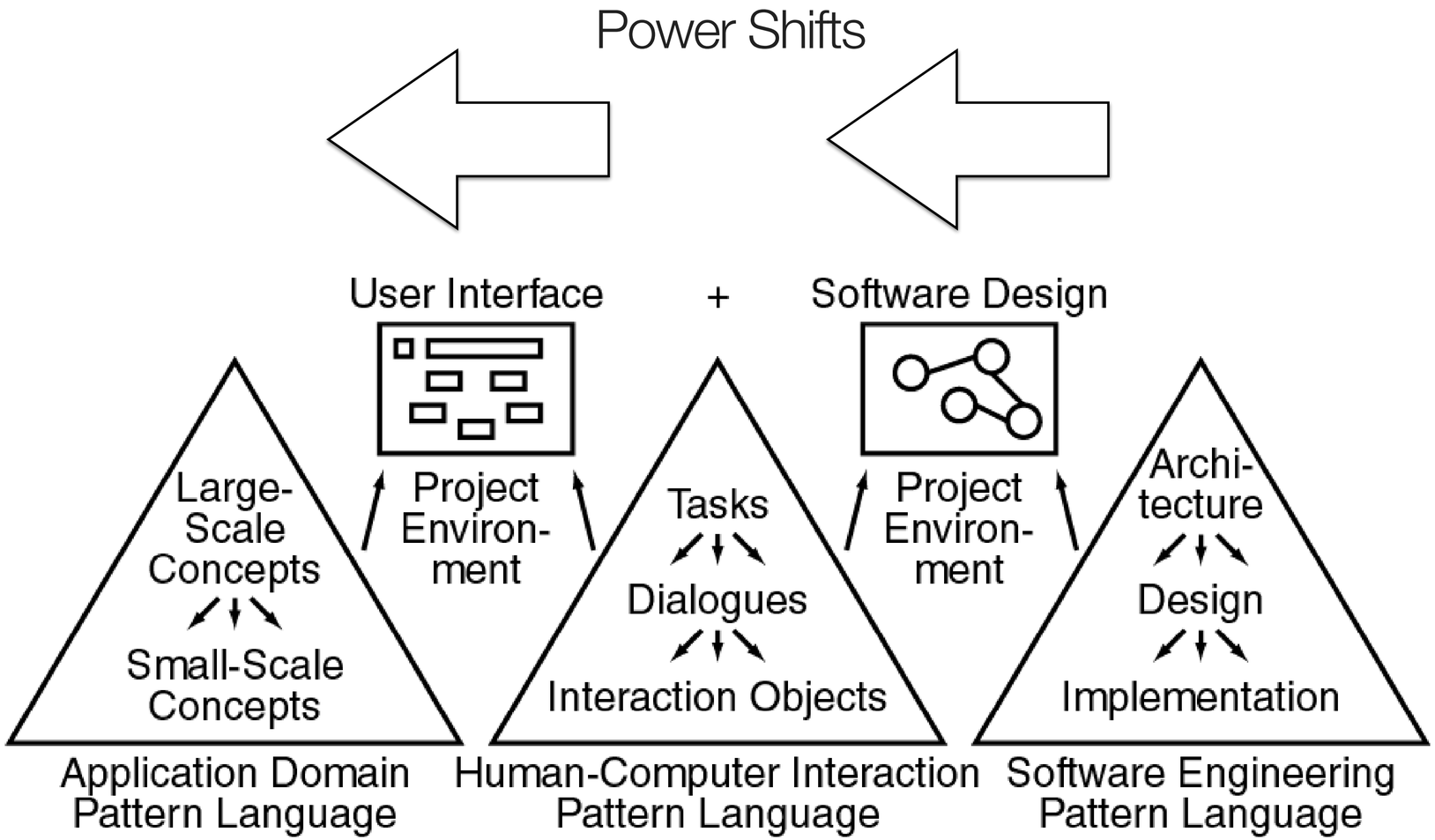
Using Patterns in the Application Domain



Nielsen's Usability Engineering Lifecycle

- Described in detail in:
  Jakob Nielsen, *Usability Engineering*,
  Morgan Kaufmann 1993
- Nielsen is an often-cited usability expert, especially for the web
- His web site useit.com offers current, interesting articles on usability, including his regular Alertbox column

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Nielsen's Usability Engineering Lifecycle

- A software lifecycle model geared towards interactive systems
- Not all stages must be completed for a useful product, but they are recommended
- Not a strict step-after-step waterfall model; some "stages" are more like recommendations, overlapping others

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Nielsen's Usability Engineering Lifecycle

1. Know the User
2. Competitive Analysis
3. Setting Usability Goals
4. Parallel Design
5. Participatory Design
6. Coordinated Design
7. Design Guidelines & Heuristic Analysis
8. Prototyping
9. Empirical Testing
10. Iterative Design
11. Feedback from Field Use

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Stages and Pattern Use

1. Know the User
   - Understand individual user characteristics of your target group and their tasks, then derive functional needs of your system
   - Create application domain pattern language during the task analysis
   - Not perfect patterns, but “work patterns”
   - Simplifies communication

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Stages and Pattern Use

2. Competitive Analysis
   - Study other products to find different solutions and compare usability
   - Generalize observations as HCI design patterns
3. Setting Usability Goals
   - Weigh and prioritize different usability aspects (e.g., simplicity vs. efficiency)
   - Use HCI design pattern forces to model design tradeoffs

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Stages and Pattern Use

4. Parallel Design
   - Have multiple teams develop divergent initial solutions to explore the design space better
   - Use high-level HCI design patterns as guidelines
5. Participatory Design
   - Involve users / application domain experts throughout the design process
   - Use the interdisciplinary vocabulary function of application and HCI design pattern languages

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Stages and Pattern Use

6. Coordinated Design
   - Ensure consistent design of total UI, including help, documentation, earlier versions, and your other products
   - Low-level HCI design patterns support consistency
7. Apply Guidelines and Heuristic Analysis
   - Use style guides, guidelines, standards
   - Pattern languages can serve as “better guidelines” and corporate memory

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Stages and Pattern Use

8. Prototyping
   - Create limited prototypes (see DIS 1)
   - Software design patterns can help relating developer concepts and concerns to HCI team
9. Empirical Testing
   - Test all prototypes with or without users
   - Use application domain patterns for test scenarios
   - Relate usability problems to HCI design patterns

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Stages and Pattern Use

10. Iterative Design

- As in DIS 1
- HCI and software design patterns help because they are constructive
- All languages will evolve, using “known” project examples
- Capture the structural design rationale
- *(Patterns and anti-patterns for process rationale)*

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Stages and Pattern Use

11. Collect Feedback from Field Use
    - After delivery: field tests, followup studies, helpline call analysis…
    - Application domain language as common language
    - HCI pattern language points designers to alternative solutions
    - Also strengthen / rethink patterns as result

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Pattern Languages in HCI: A Critical Review

- In: Human-Computer Interaction Journal, 2006
- by Andy Dearden and Janet Finlay

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Important Characteristics of a Pattern

Characteristic	Wimn & Calder2002	Bayle et al. 1998	van Welie et al. 2000	Granlund et al. 2001	Borchers 2000	Finlay et al. 2002	Fincher & Utting 2002	Erickson 2000a	van Duyne et al. 2003	Tidwell 1998, 1999a
1. A pattern implies an artefact	●		?	?	●	?	?	?	●	?
2. A pattern bridges many levels of abstraction	●						?		?	
3. A pattern includes its rationale	●	?	●	?	●	?	?	?	●	?
4. A pattern is manifest in a solution	●									
5. A pattern captures system hot spots	●									
6. A pattern is part of a language	●		?	●	●	●	●	●	●	?
7. A pattern is validated by use	●	?	●	?		●		?		●
8. A pattern is grounded in a domain	●	?	?	●	●	?		●	●	
9. A pattern captures a big idea	●						●			
10. Patterns support a 'lingua franca'		●	?	?	●	●	●	●	?	●
11. Different patterns deal with problems at different 'scales'		●	●	●	●	?	?	●	●	●
12. Patterns reflect design values		●	?		●	●	●	●	?	●
13. Patterns capture design practice		●	●	?	?	?	●		●	?

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Summary

- HCI Design Patterns capture the essence of successful solutions to recurring problems in user interface design
- Architecture — software engineering — HCI
- Name, ranking: vocabulary
- Context, references: language network
- Problem (forces), solution: summary
- Sensitizing example, examples, diagram: grounding
- A literary form
- Writers' workshops
- Middle ground between Golden Rules and Style Guides
- Now in standard HCI books (Shneiderman, Dix), many languages published
- Benefit today: lingua franca throughout design process

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