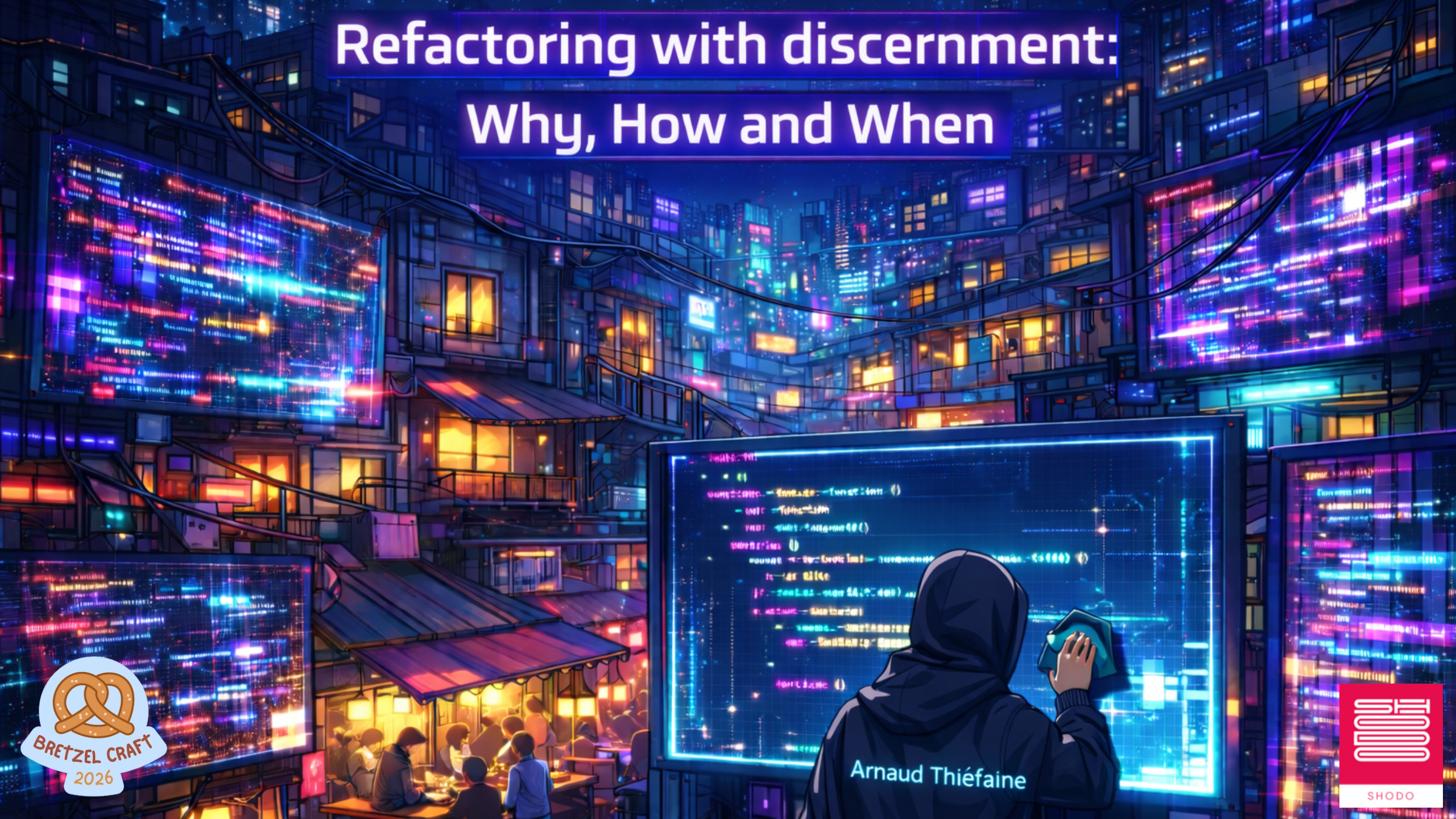
Refactoring with discernment: Why, How and When



A car light bulb issue

Sometimes, changing a light bulb
is not that simple...
CAR BILL
TOTAL $$$$

O'REILLY
Tidy First?
A Personal Exercise in Empirical Software Design
Kent Beck
Foreword by Larry Constantine

KENT BECK

The Addison-Wesley Signature Series
Test-Driven Development
By Example
Kent Beck
Implementation Patterns
Kent Beck
Quick Look-up and Advice
JUnit
Pocket Guide
O'REILLY
Kent Beck
Copyrighted Material
Extreme Programming Explained
Embrace Change
Kent Beck
with Cynthia Andres
Foreword by Erich Gamma
Second Edition

ABOUT ME

Arnaud Thiéfaine

Coach Craft, Tech Lead
@Shodo Boost

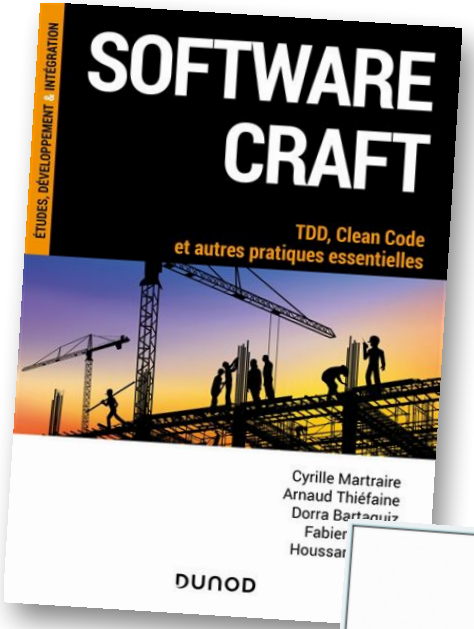
Author: Software Craft

@arnaudthiefaine

athiefaine

arnaudthiefaine

SHODO



THANKS TO THE SPONSORS

VIP

capitale .dev

Or

Scalingo

Argent

azaé

Bronze

coda

SHODO

[sf≡ir]

bloomind

WHAT IS TIDYING ?

TIDYING = REFACTORING ?

WHAT IS REFACTORING ?

Definition Of Refactoring

CHANGING THE CODE WITHOUT CHANGING ITS OBSERVABLE BEHAVIOR

1 September 2004

Martin Fowler

REFACTORING

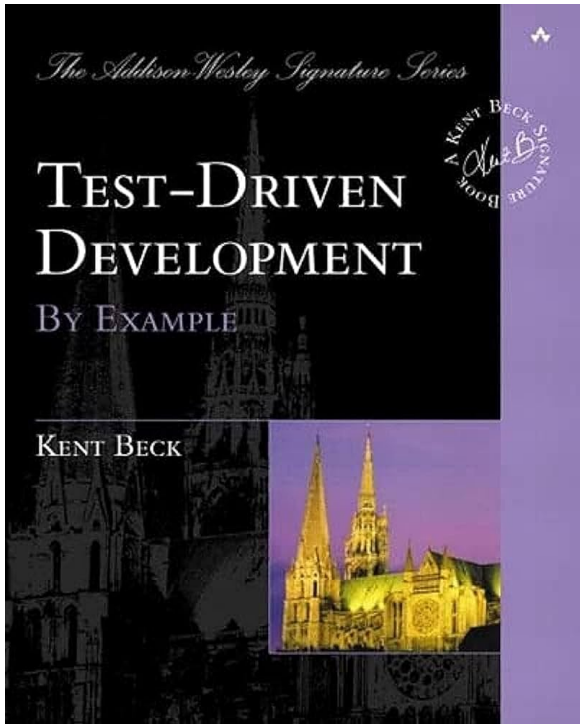
In my refactoring book, I gave a couple of definitions of refactoring.

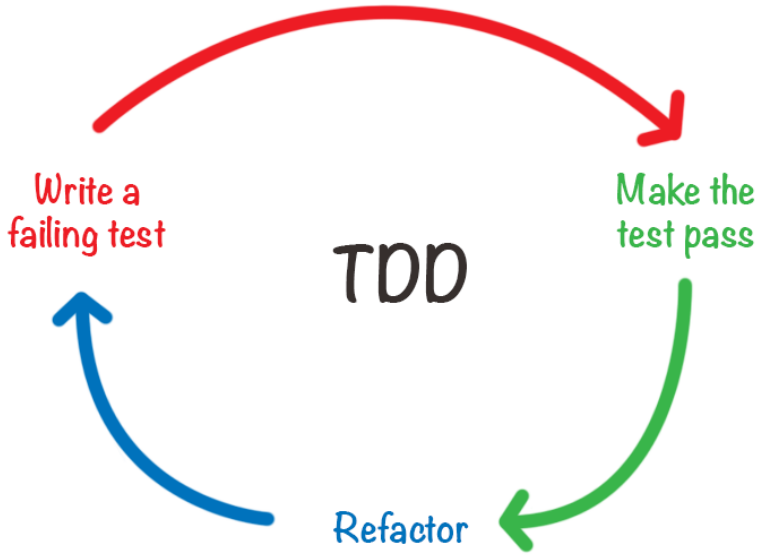
Refactoring (noun): a change made to the internal structure of software to make it easier to understand and cheaper to modify without changing its observable behavior.

Refactoring (verb): to restructure software by applying a series of refactorings without changing its observable behavior.

https://martinfowler.com/bliki/DefinitionOfRefactoring.html

REFACTORING: IMPORTANCE OF TESTING





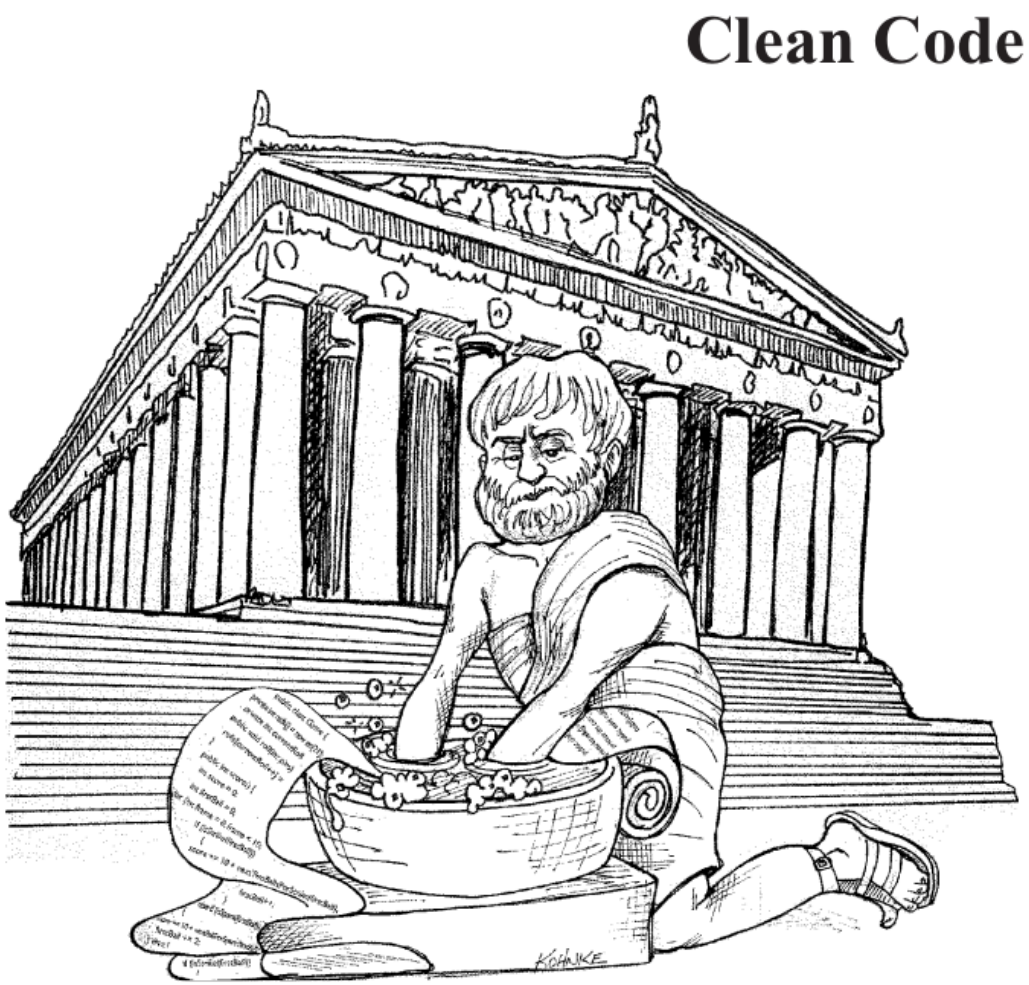
SAFETY NET

"Any fool can write code that a computer can understand. Good programmers write code that humans can understand."

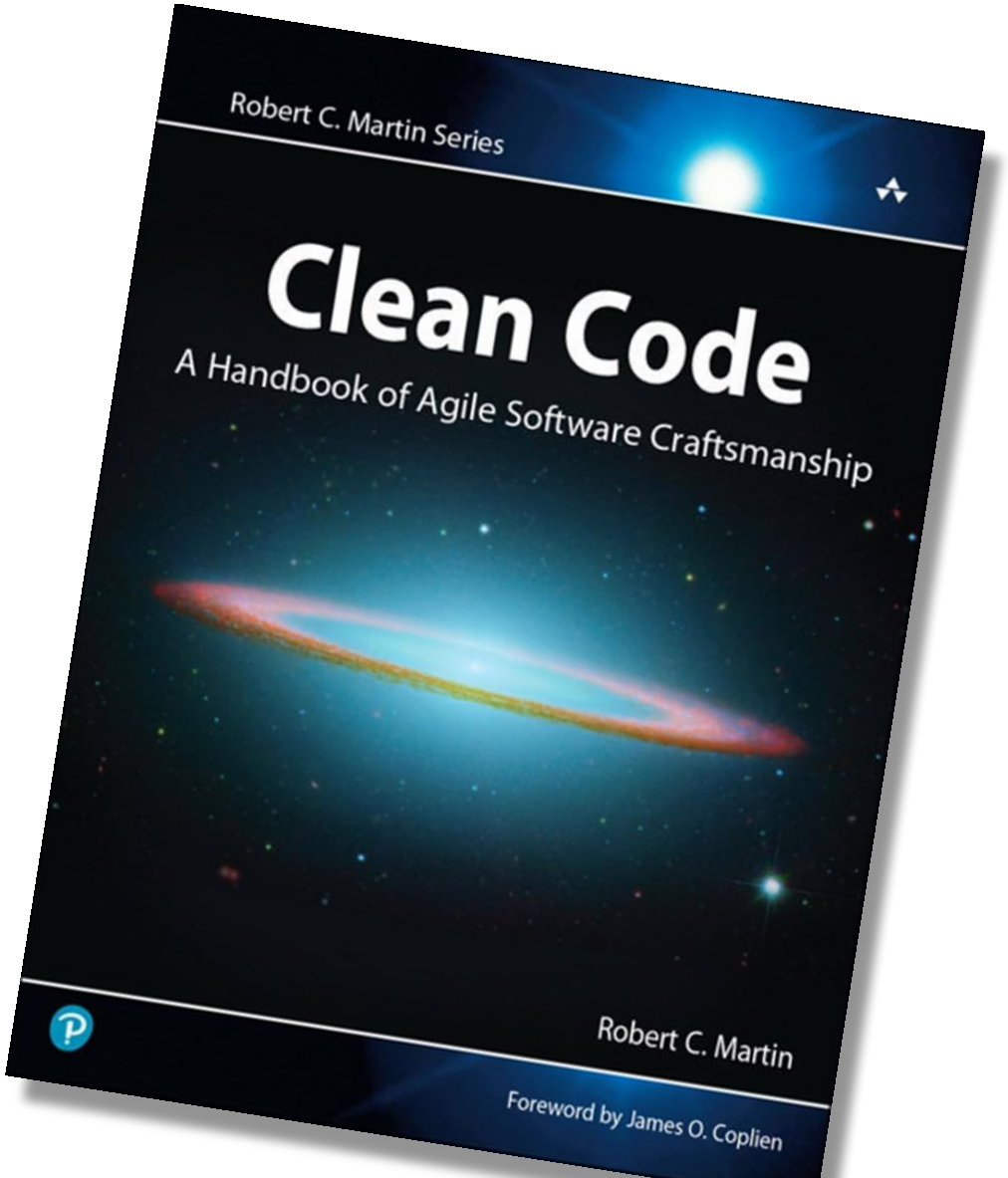
Martin Fowler

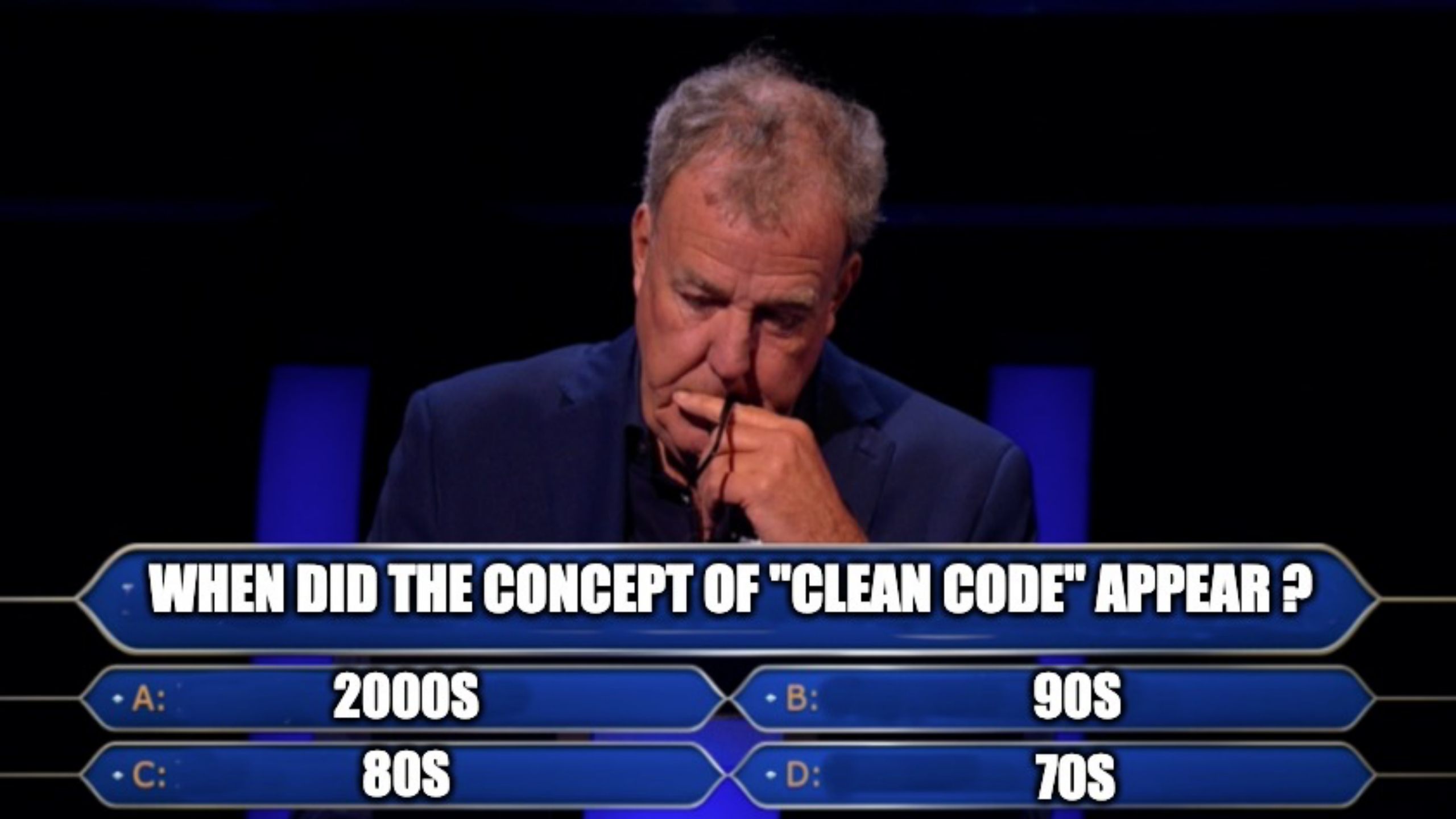
CODE IS A COMMUNICATION MEDIUM

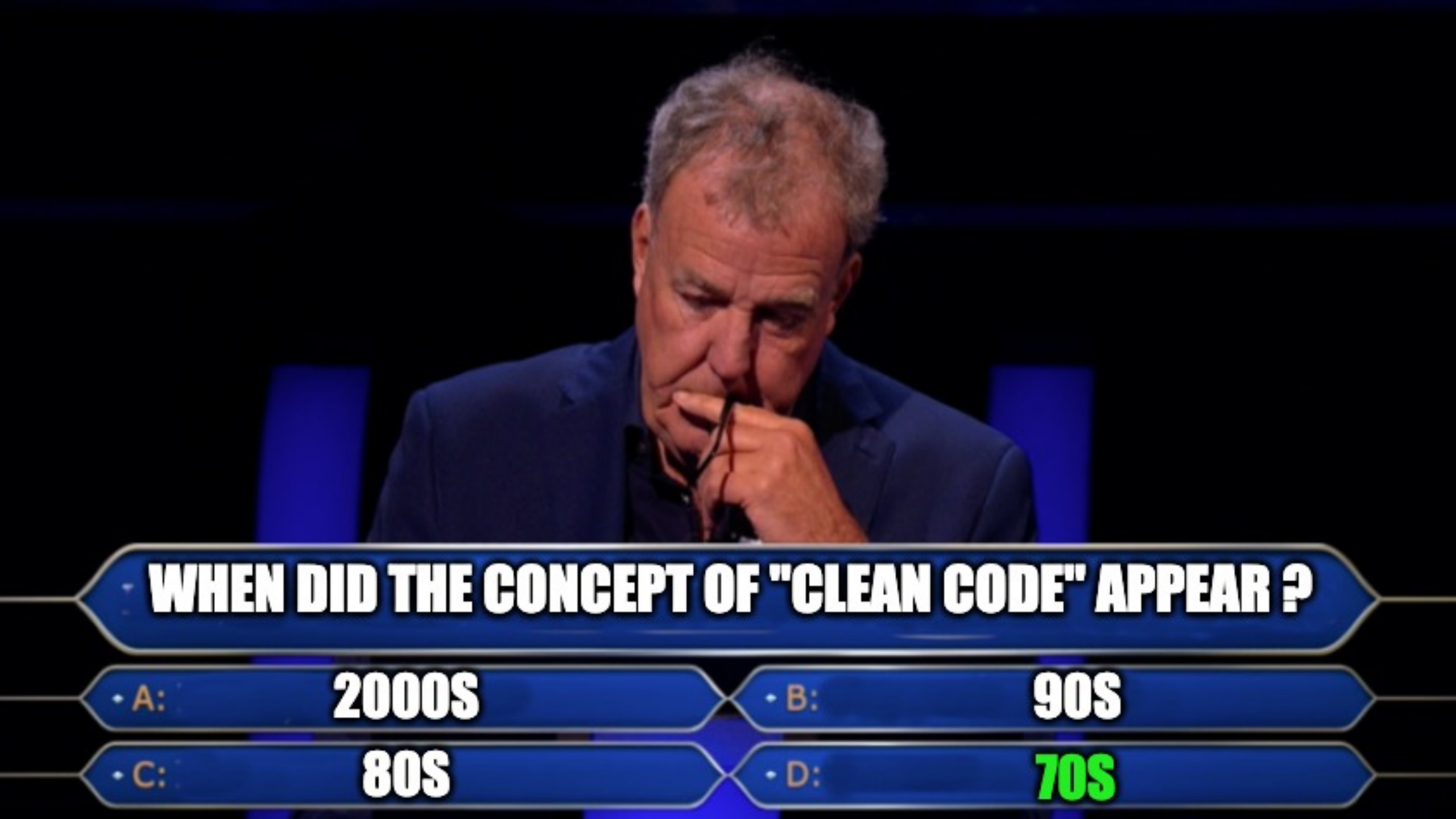
WHAT IS TIDYING ?



(from *Clean Code* book by Robert C. Martin)




WHEN DID THE CONCEPT OF "CLEAN CODE" APPEAR ?
A: 2000S
B: 90S
C: 80S
D: 70S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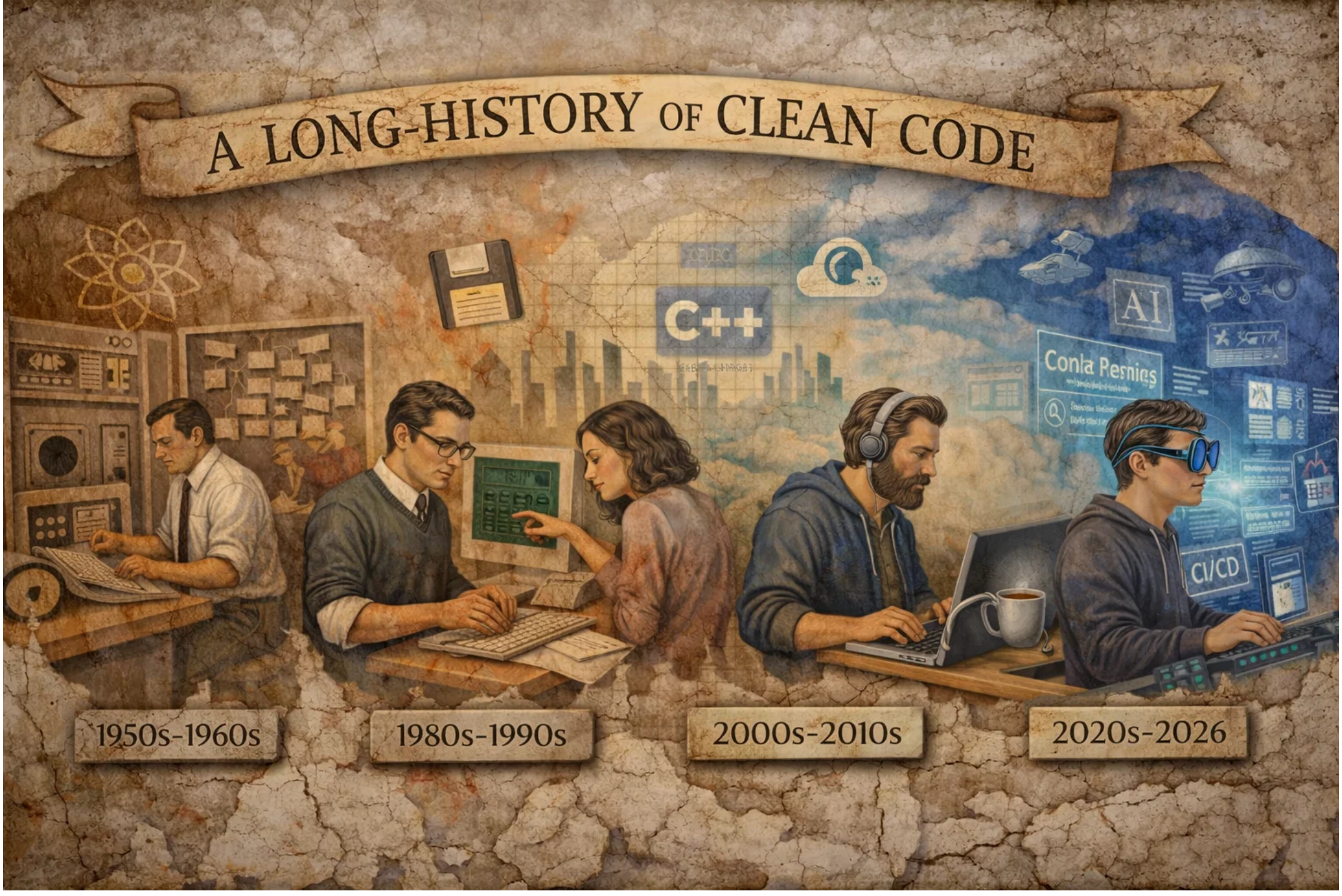

A LONG-HISTORY OF CLEAN CODE
C++
AI
CI/CD
1950s-1960s
1980s-1990s
2000s-2010s
2020s-2026

1968

Edgar Dijkstra: Go To Statement Considered Harmful

```
C       PROGRAM TO COMPUTE PRIME NUMB
C
        PROGRAM PRIME
        INTEGER MAXINT, N, DIVSOR
        INTEGER QUOT, PROD
        READ(*,100) MAXINT
        N=2
        WRITE(*,150) MAXINT
  5     IF (MAXINT-N) 200,10,10
 10     DIVSOR = 2
 15     IF ((N-1)-DIVSOR) 30,20,20
 20     QUOT = INT(N/DIVSOR)
        PROD = INT(QUOT*DIVSOR)
        IF (N-PROD) 25,30,25
 25     DIVSOR = DIVSOR + 1
        GO TO 15
 30     IF (DIVSOR-(N-1)) 40,40,35
 35     WRITE (*,100) N
 40     N=N+1
        GO TO 5
100     FORMAT(I5)
150     FORMAT('THE PRIME NUMBERS FROM 2 TO ',I5,' ARE: ')
200     STOP
        END
```

Go To Statement Considered Harmful

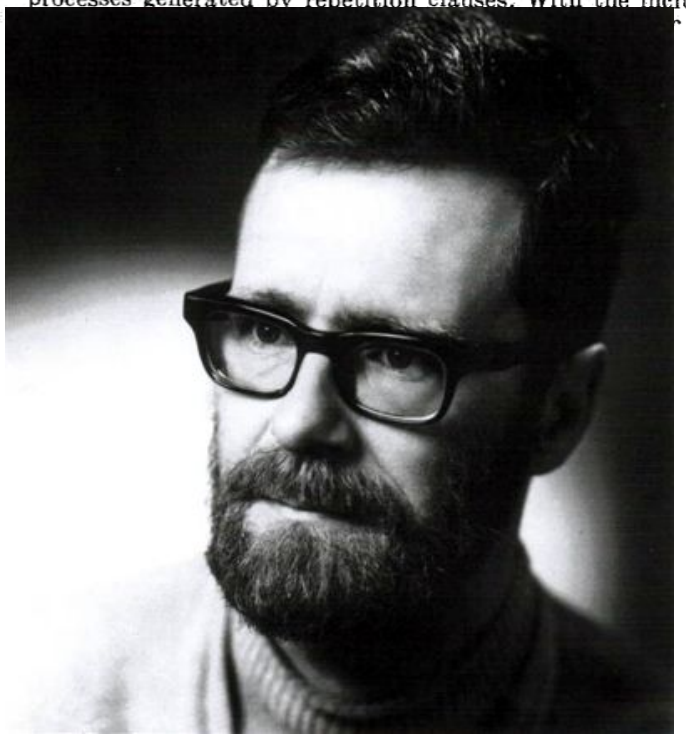
Key Words and Phrases: go to statement, jump instruction, branch instruction, conditional clause, alternative clause, repetitive clause, program intelligibility, program sequencing
CR Categories: 4.22, 5.23, 5.24

EDITOR:

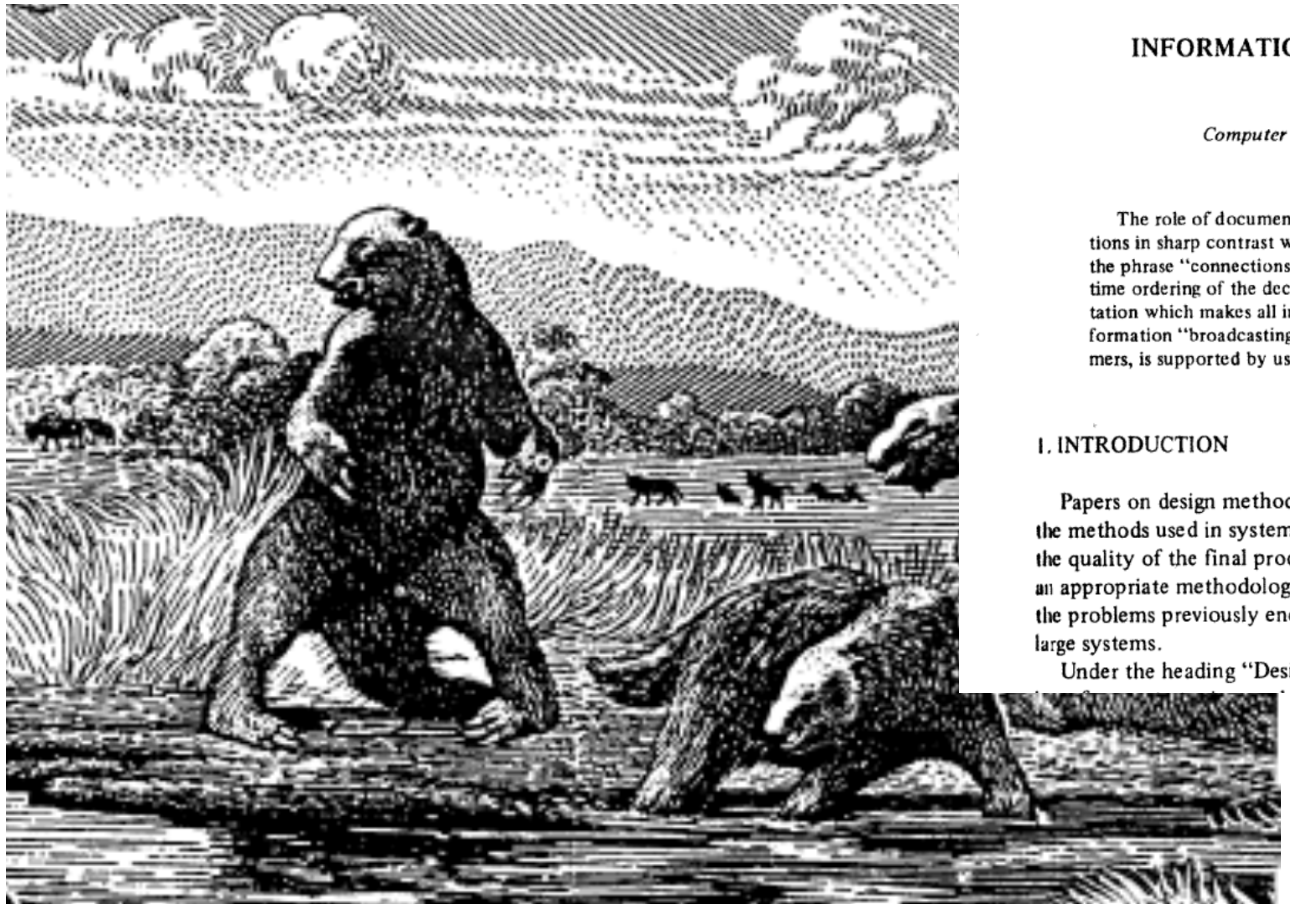
For a number of years I have been familiar with the observation that the quality of programmers is a decreasing function of the density of **go to** statements in the programs they produce. More recently I discovered why the use of the **go to** statement has such disastrous effects, and I became convinced that the **go to** statement should be abolished from all "higher level" programming languages (i.e. everything except, perhaps, plain machine code). At that time I did not attach too much importance to this dis-

dynamic progress is only characterized when we also give to which call of the procedure we refer. With the inclusion of procedures we can characterize the progress of the process via a sequence of textual indices, the length of this sequence being equal to the dynamic depth of procedure calling.

Let us now consider repetition clauses (like, **while** *B* **repeat** *A* or **repeat** *A* **until** *B*). Logically speaking, such clauses are now superfluous, because we can express repetition with the aid of recursive procedures. For reasons of realism I don't wish to exclude them: on the one hand, repetition clauses can be implemented quite comfortably with present day finite equipment; on the other hand, the reasoning pattern known as "induction" makes us well equipped to retain our intellectual grasp on the processes generated by repetition clauses. With the inclusion of



1971



(from *The Mythical Man Month* by Fred Brooks)

INFORMATION PROCESSING 71 – NORTH-HOLLAND PUBLISHING COMPANY (1972)

INFORMATION DISTRIBUTION ASPECTS OF DESIGN METHODOLOGY *

D.L. PARNAS

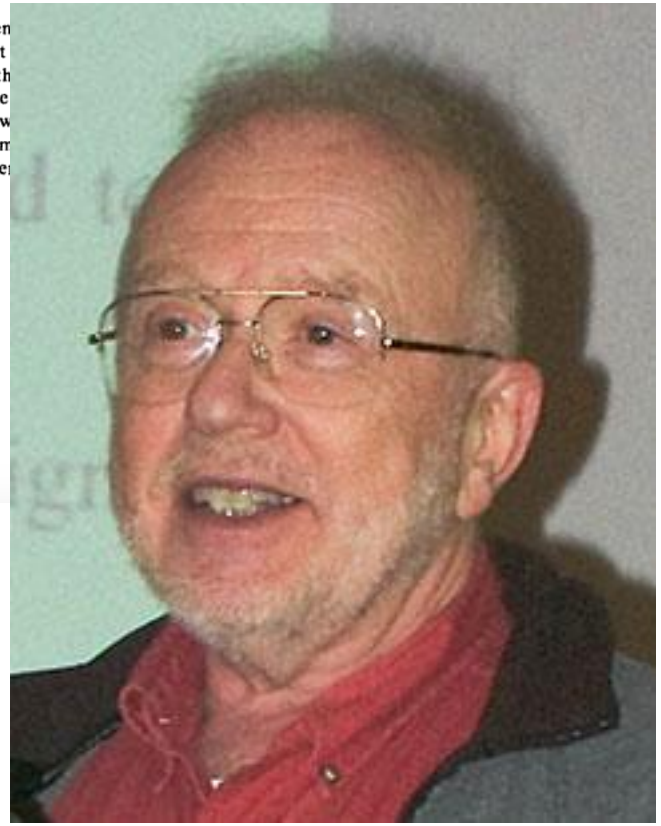
Computer Science Department, Carnegie-Mellon University, Pittsburgh, Pennsylvania, USA

The role of documentation in the design and implemen
tions in sharp contrast with current practice. The concept
the phrase "connections between modules". It is shown th
time ordering of the decisions) may be inconsistent. Some
tation which makes all information accessible to anyone w
formation "broadcasting" is harmful, that it is helpful if m
mers, is supported by use of the above mentioned conside

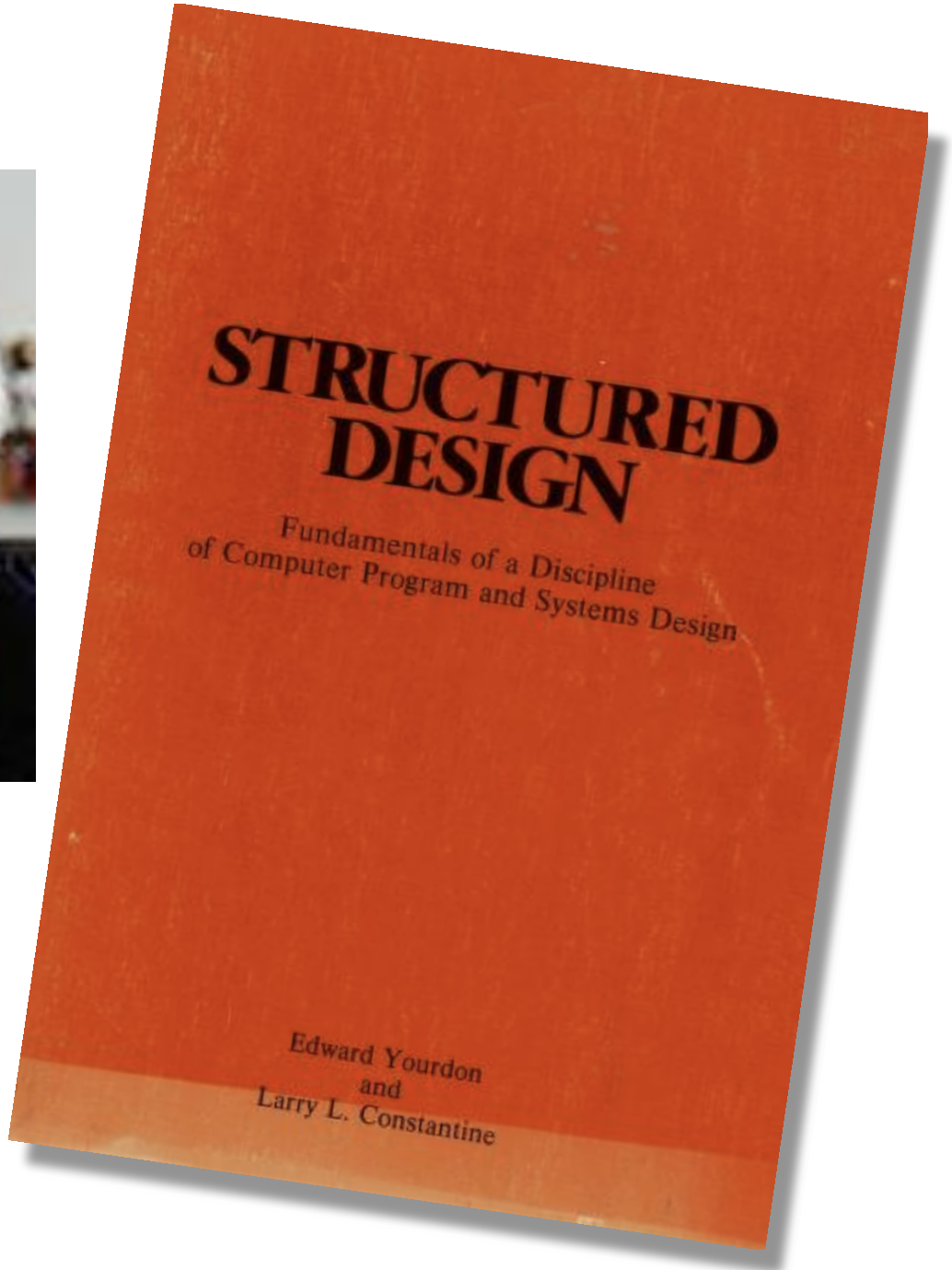
1. INTRODUCTION

Papers on design methodology assume (1) that the methods used in system design strongly affect the quality of the final product; and (2) by selecting an appropriate methodology we can avoid many of the problems previously encountered in constructing large systems.

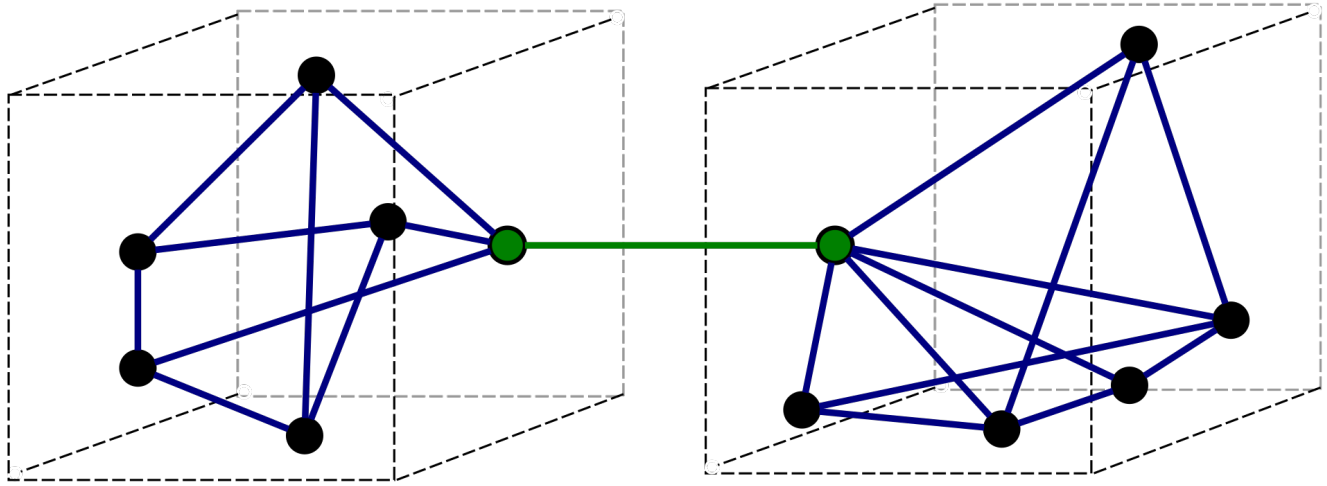
Under the heading "Design Methodology" a num-



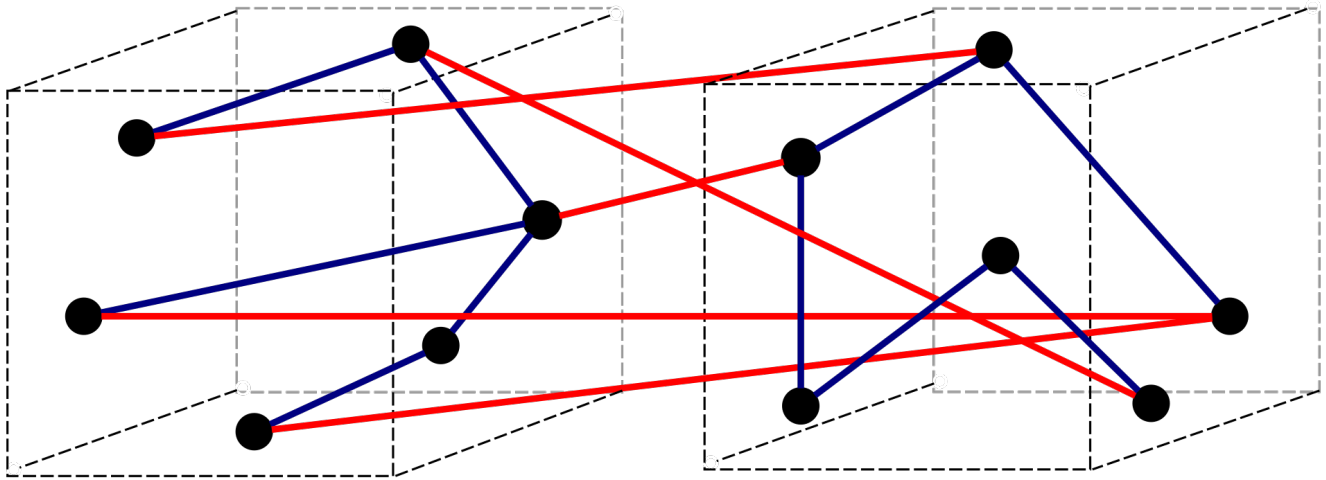
1974


STRUCTURED DESIGN
Fundamentals of a Discipline of Computer Program and Systems Design
Edward Yourdon
and
Larry L. Constantine

COUPLING VS COHESION



a) Good (loose coupling, high cohesion)



b) Bad (high coupling, low cohesion)

https://en.wikipedia.org/wiki/Coupling_%28computer_programming%29#/media/File:CouplingVsCohesion.svg

A LONG TRADITION OF CLEAN CODE

WHAT NEXT ?

https://venturebeat.com/ai/dont-quit-your-day-job-generative-ai-and-the-end-of-programming

GenAI as a new abstraction jump

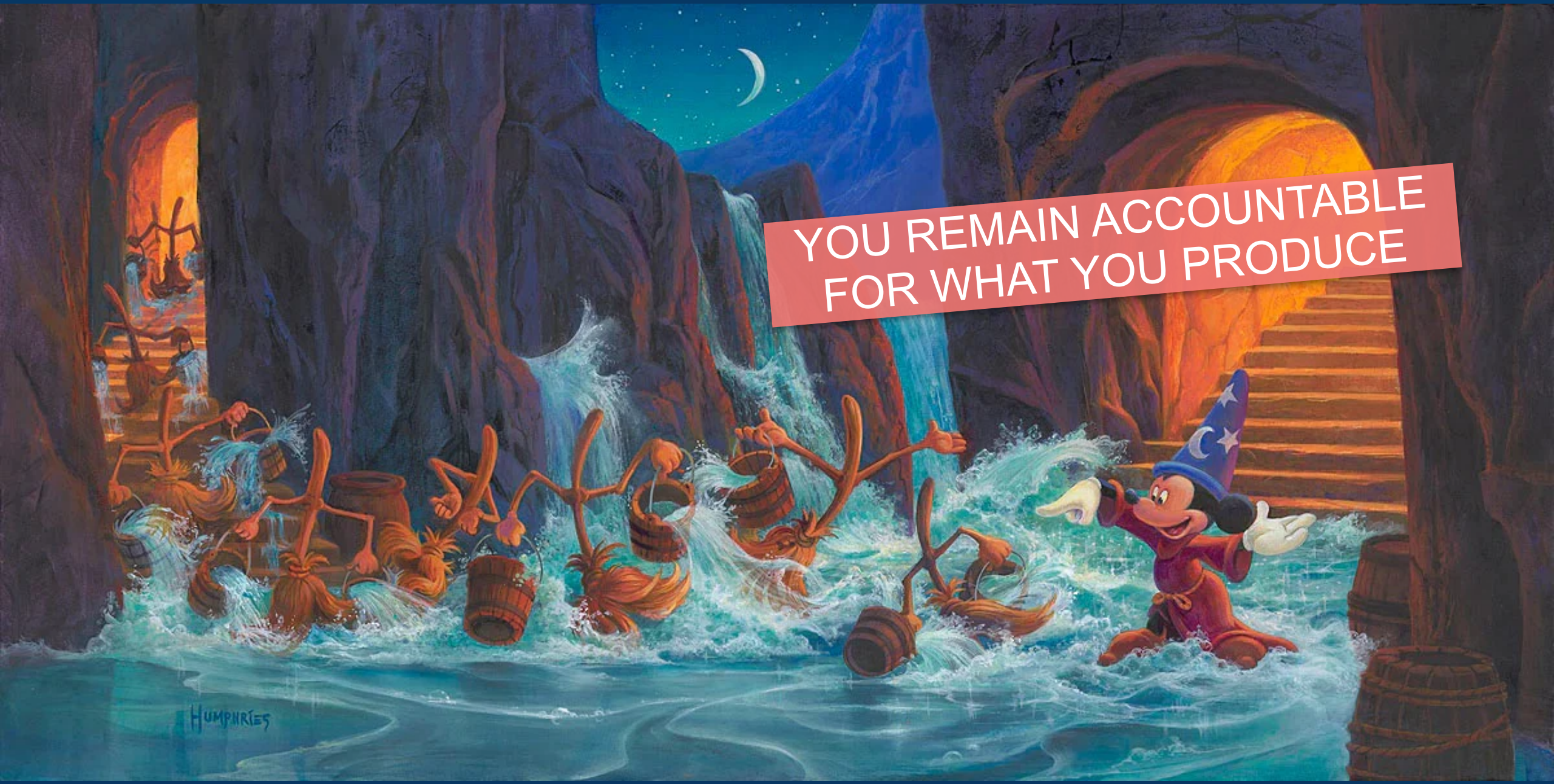
Control over Speed

Intention and prompting as part of the design

Can we do without code ?

POWER REQUIRES DISCIPLINE !

https://www.etsy.com/fr/listing/1350321541/poster-mickey-mouse-fantasia-apprenti



https://disneyartonmain.com/products/mickeys-march-of-the-brooms-limited-edition-by-michael-humphries

https://charlesscottgallery.com/products/mickey-mouse-sorcerers-apprentice-walt-disney-fine-art-jennifer-lanna-signed-limited-edition-of-50-on-canvas-enchanted-brooms

TIDYING VALUE

boy scout rule
as a mindset

baby steps

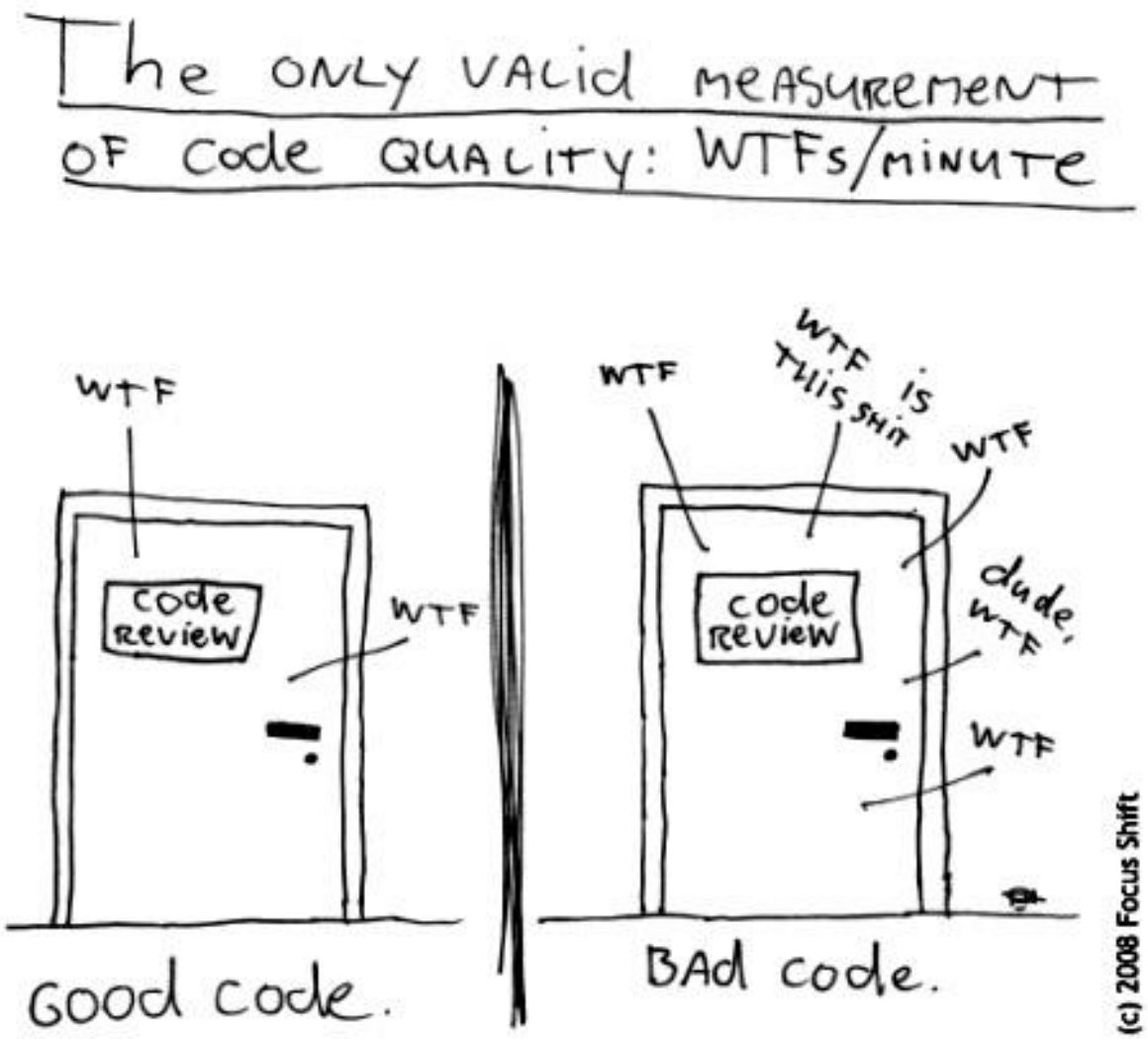
micro-refactoring

low-priced

easy to learn
easy to master
easy to apply

code hygiene enforcer

WHY DO WE NEED TIDYING ?



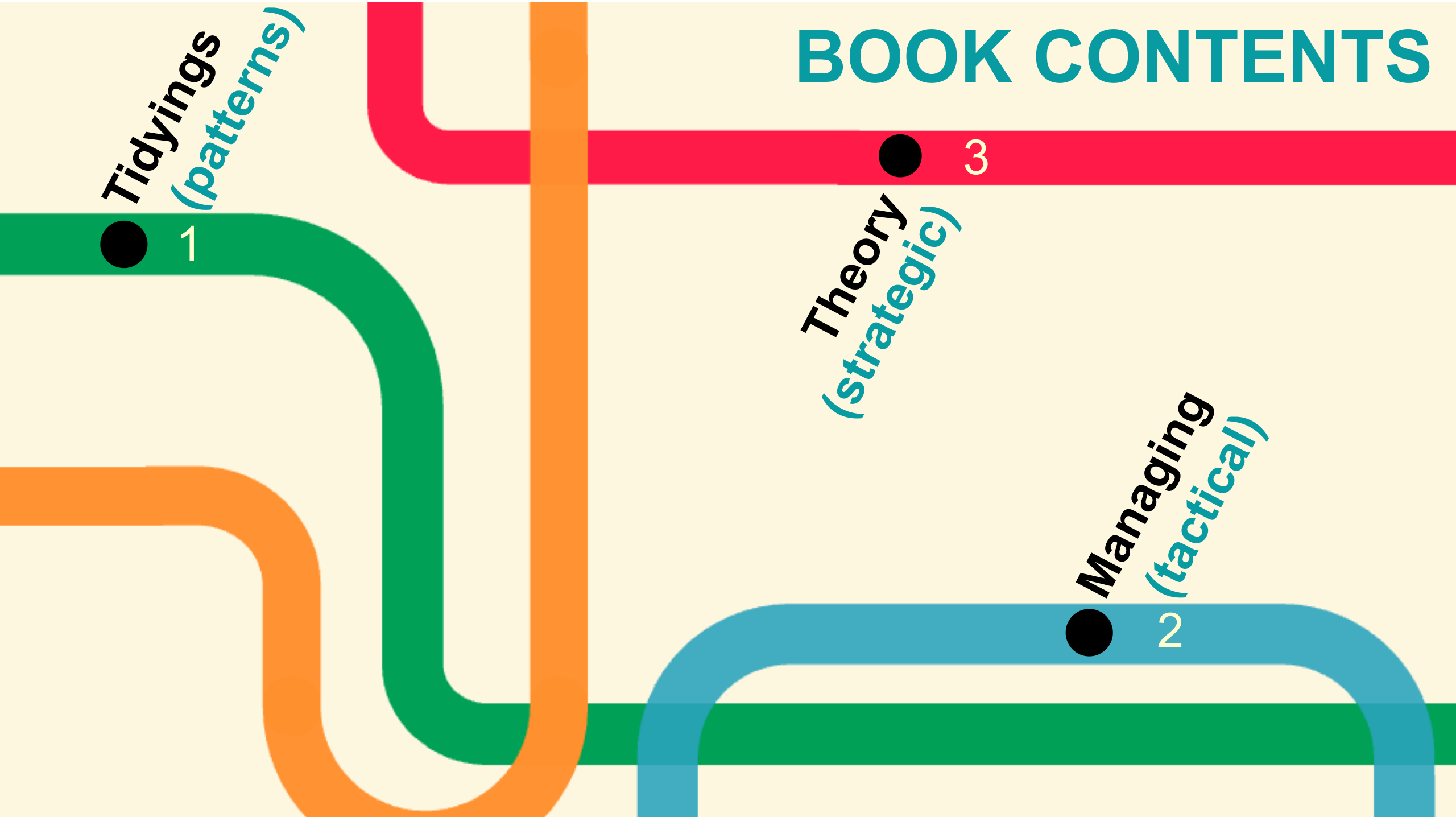
WHY DO WE NEED TIDYING ?

“The biggest cost of code is the cost of reading and understanding it, not the cost of writing it.”

(from *Tidy First ?* By Kent Beck)

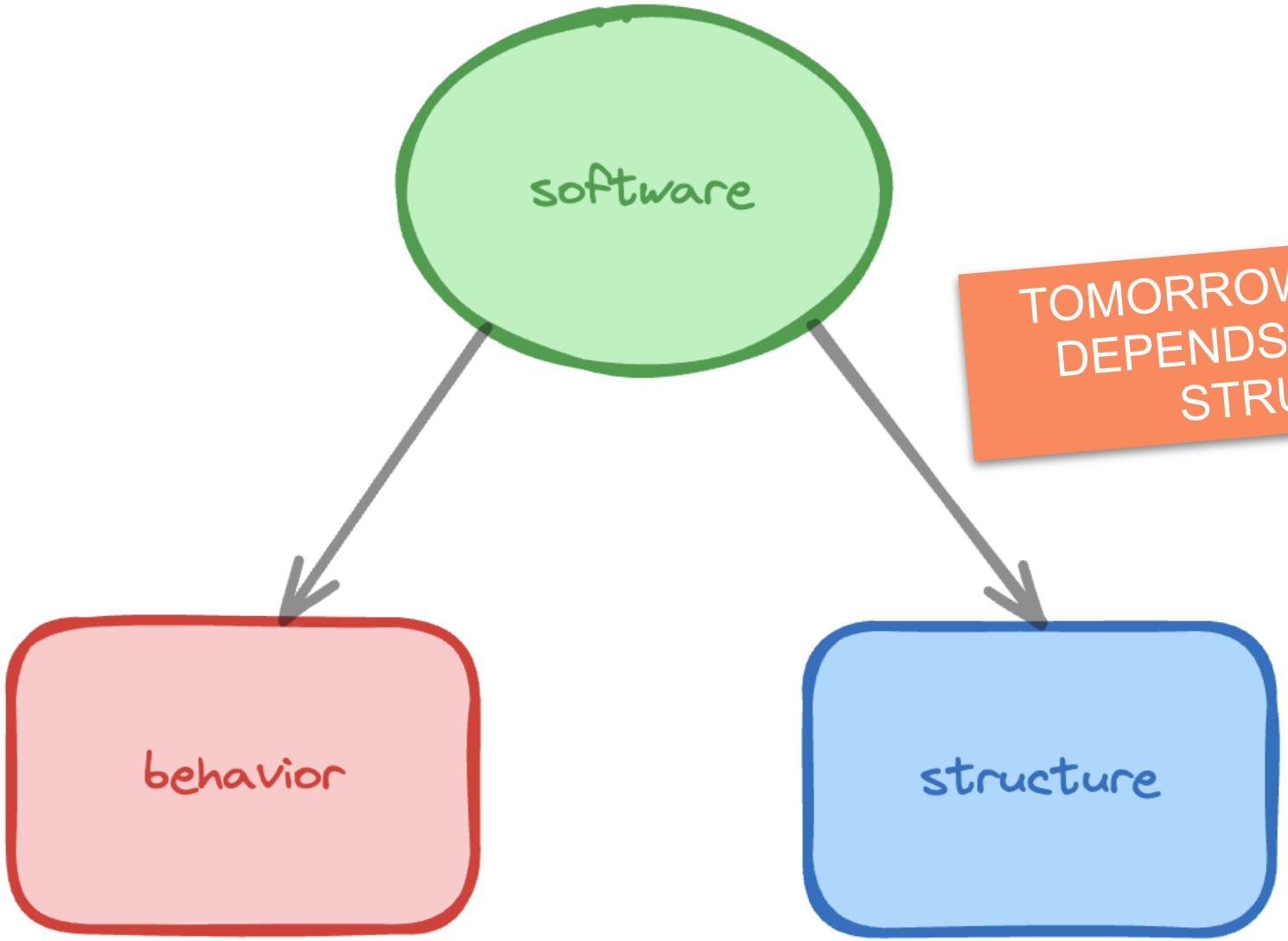
O'REILLY
Tidy First?
A Personal Exercise in Empirical Software Design
Kent Beck
Foreword by Larry Constantine

BOOK CONTENTS



STRATEGIC TIDYING

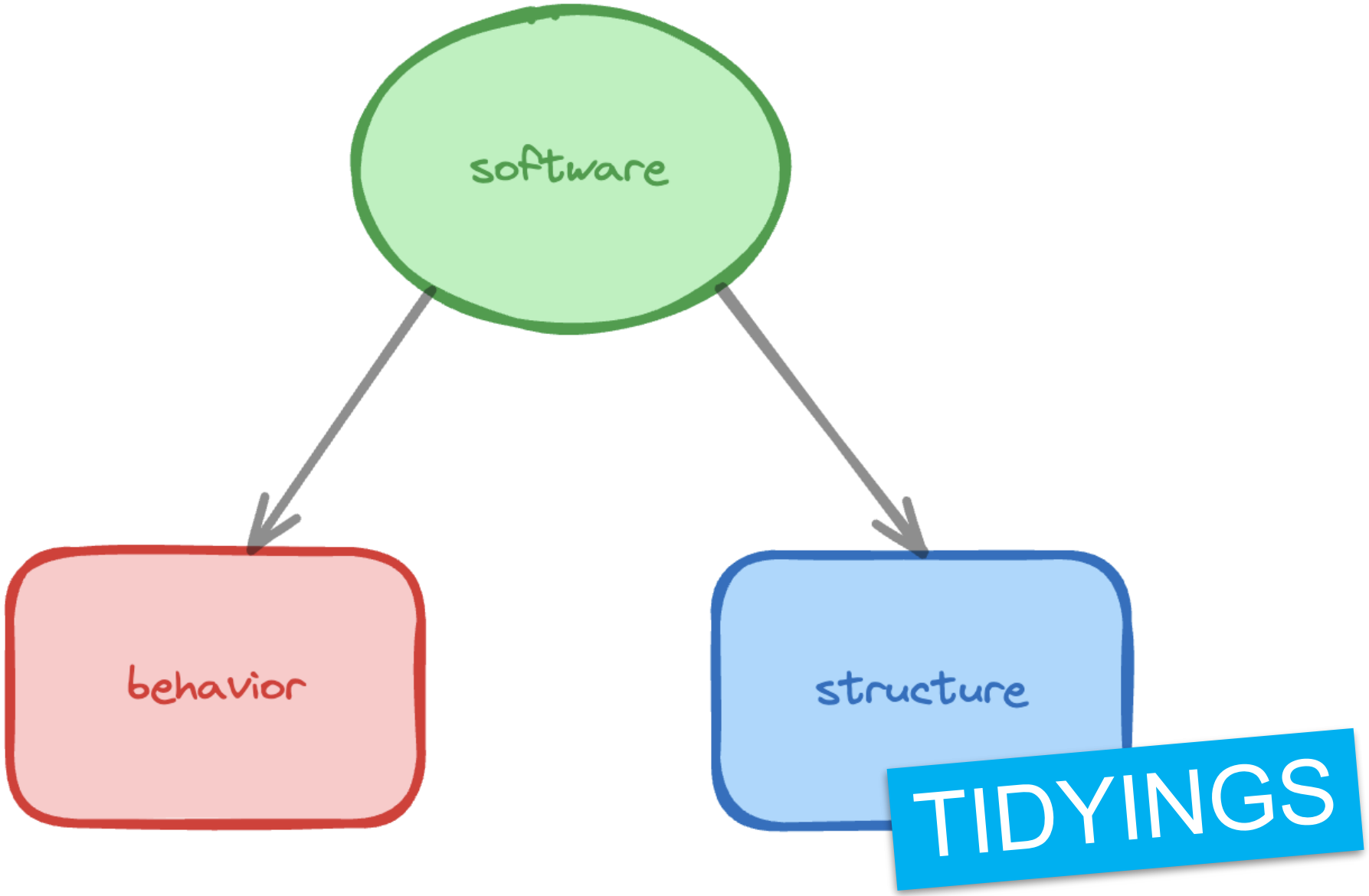
VALUE OF SOFTWARE



TOMORROW'S BEHAVIOR DEPENDS ON TODAY'S STRUCTURE

FLEXIBILITY
MODULARITY

REVERSIBILITY


software
behavior
structure
TIDYINGS

TIME VALUE OF MONEY

1€ today > 1€ tomorrow

OPTIONS

underlying (with price)

option premium

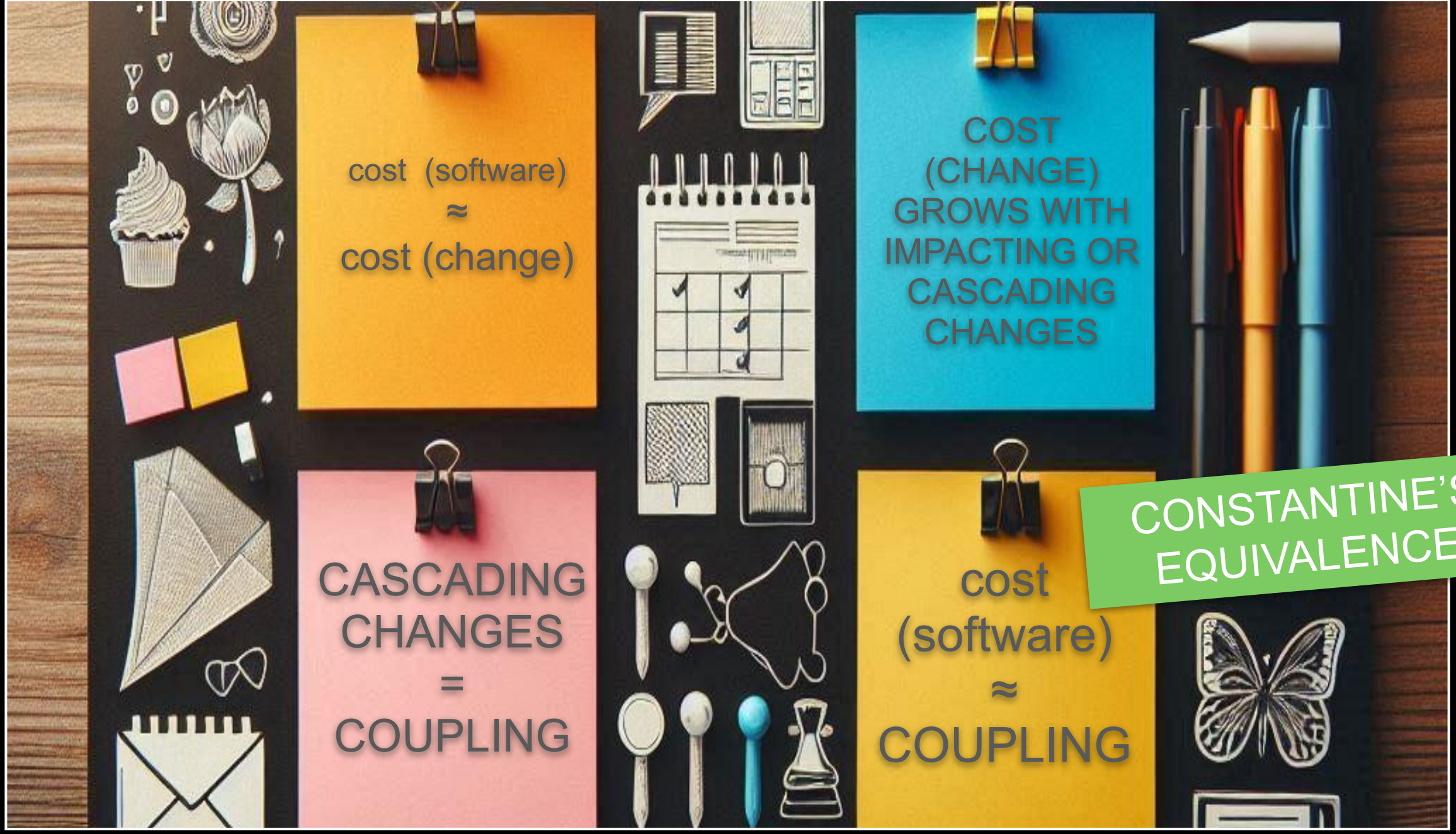
OPTIONALITY IN SOFTWARE

software design = preparation for change (of behavior)

behavior change (tomorrow) = option underlying

structure change (today) = option premium

STRUCTURE BUYS FREEDOM

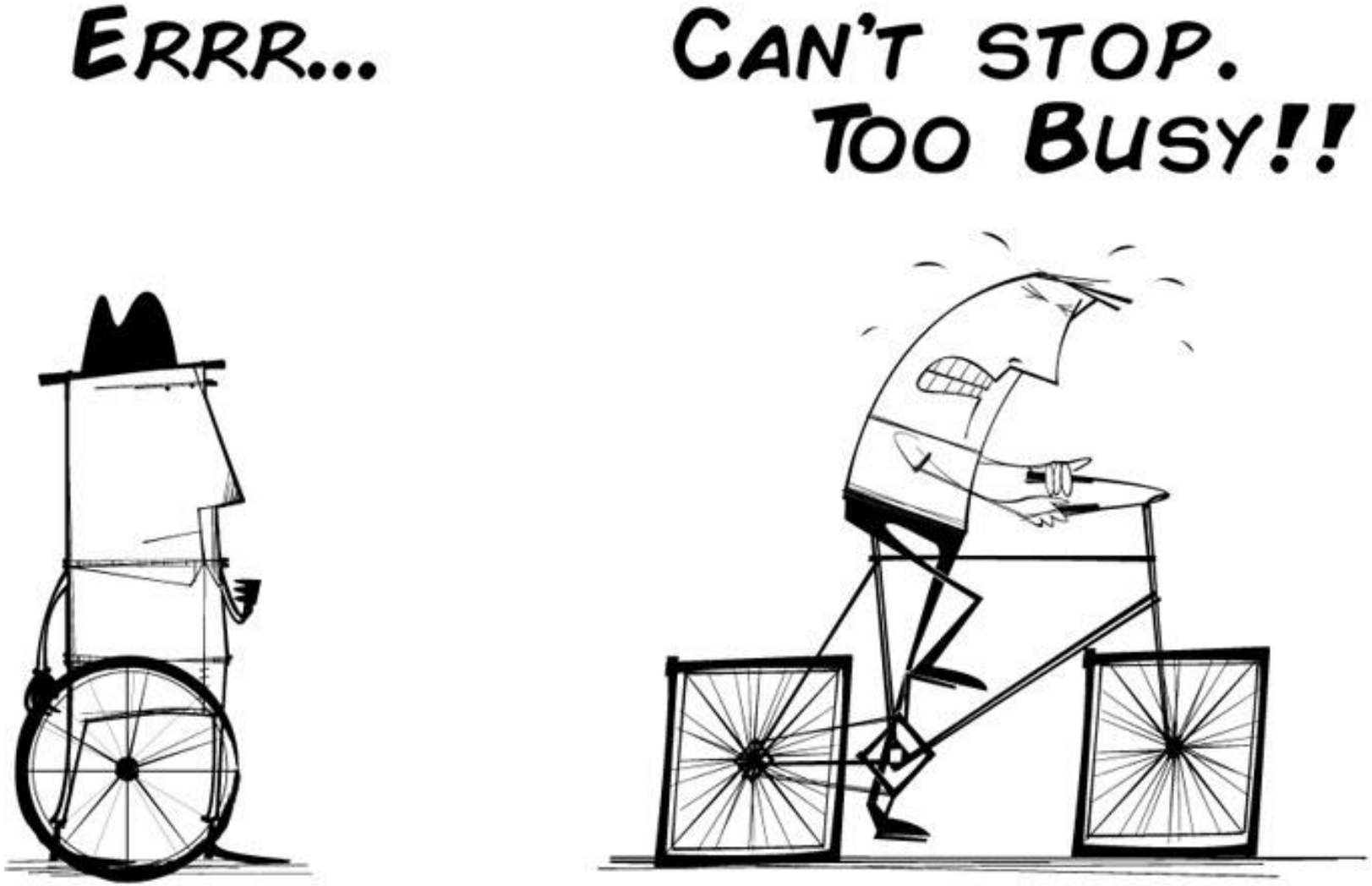


COST OF SOFTWARE

COUPLING VS DECOUPLING

excruciating pain !!!

TECHNICAL DEBT

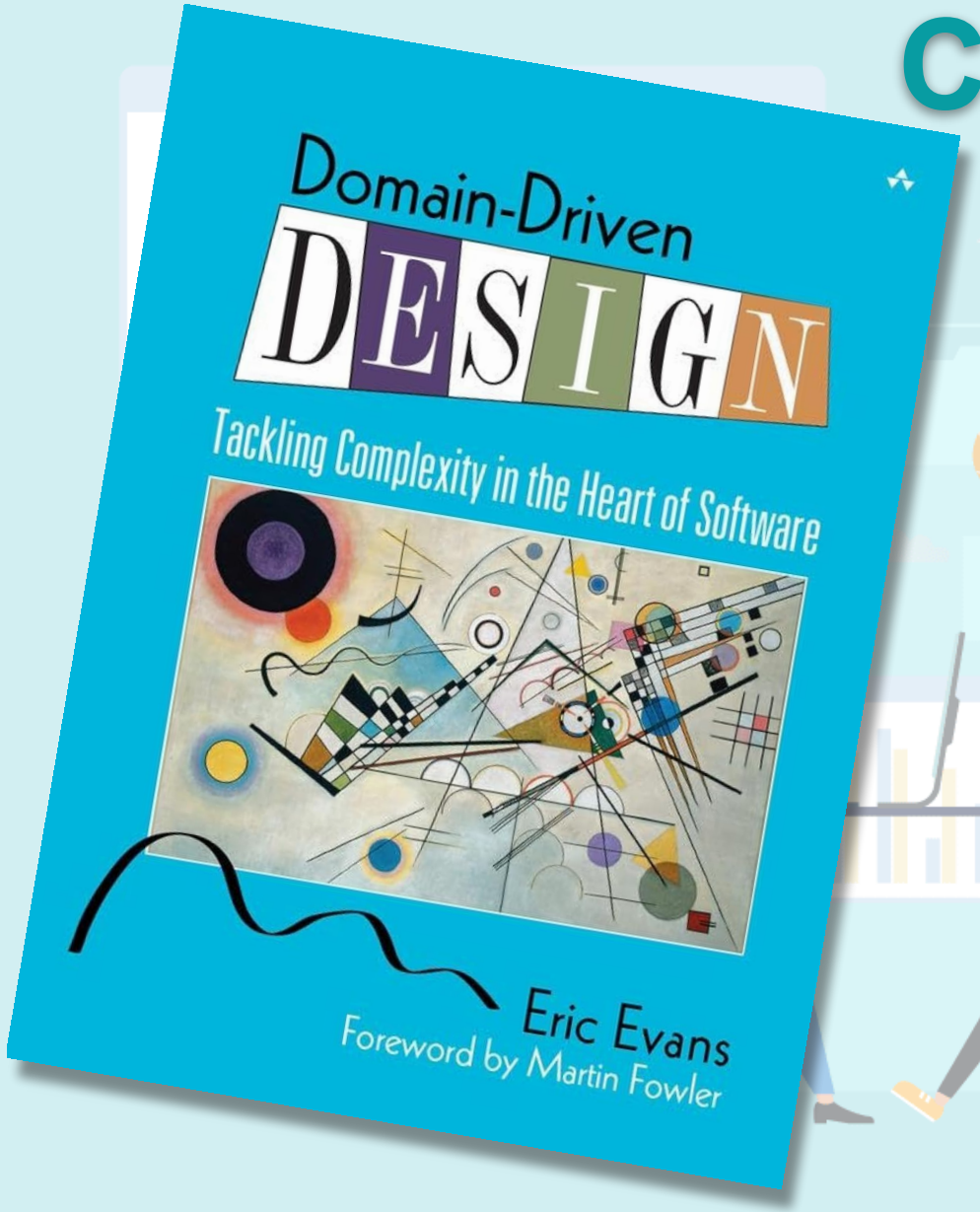


https://jamesreynolds.github.io/devops/2019/02/14/an-empirical-measurement-of-technical-debt.html

THE DEBTASTIC FOUR
B
E
REGULATIONS
RECKLESS SPENDER
BUREAUCRATICA
CAPTAIN EVERYWHERE
THE ULTIMATE AVERAGE

IMPROVING OPTIONALITY

CHOOSING THE RIGHT UNDERLYING



TACTICAL TIDYING

TIDYING PATTERNS

TIDYING PATTERNS

PRESENTATION AND READABILITY

- Chunk statements
- Normalize symmetries
- Dead code
- Reading order

KNOWLEDGE AND DOCUMENTATION

- Explaining variables/ explaining constants
- Explaining comments
- Delete redundant comments

DESIGN IMPROVEMENT

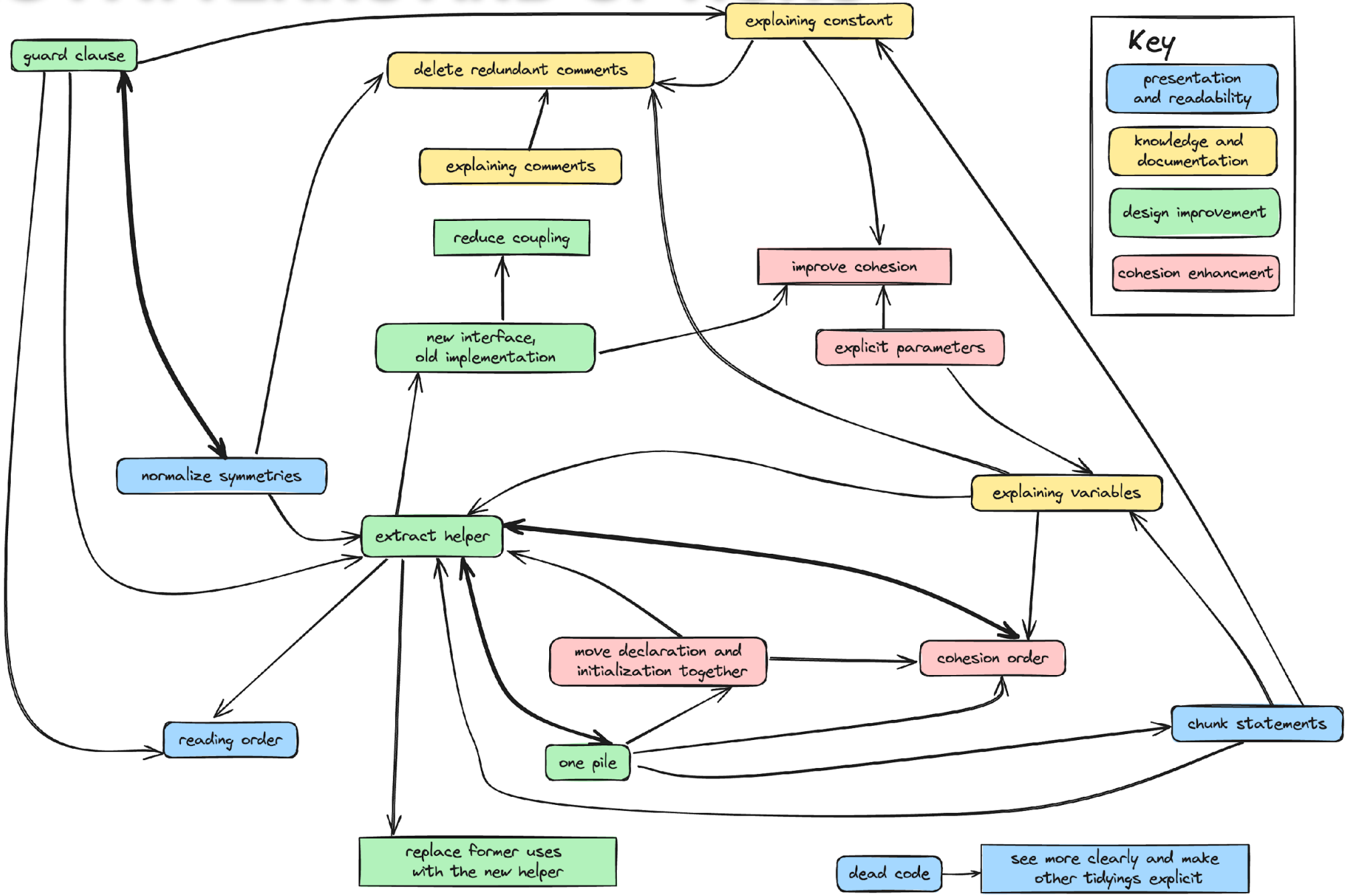
- Guard clause
- Extract Helper
- One pile (inline)
- New interface, old implementation

COHESION ENHANCEMENT

- Cohesion order
- Move declaration and initialization together
- Explicit parameters

LIVE CODING

TIDYING PATTERNS AND OPTIONS

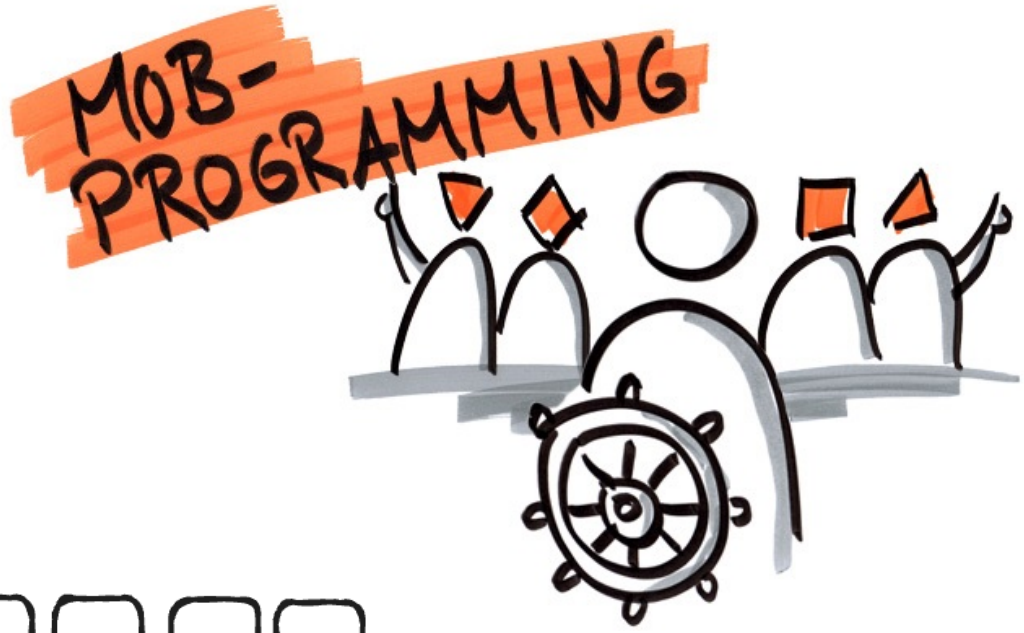


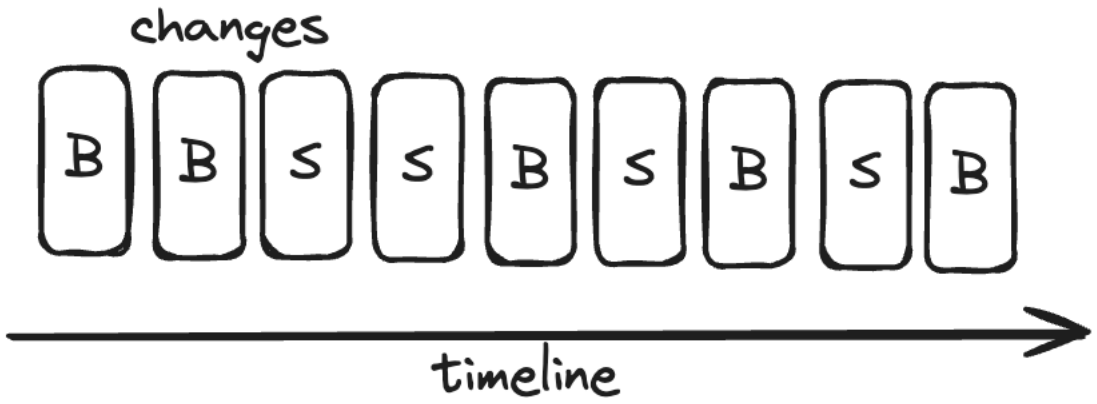
https://github.com/athiefaine/tidying_patterns/blob/main/
tidying_patterns_options.excalidraw

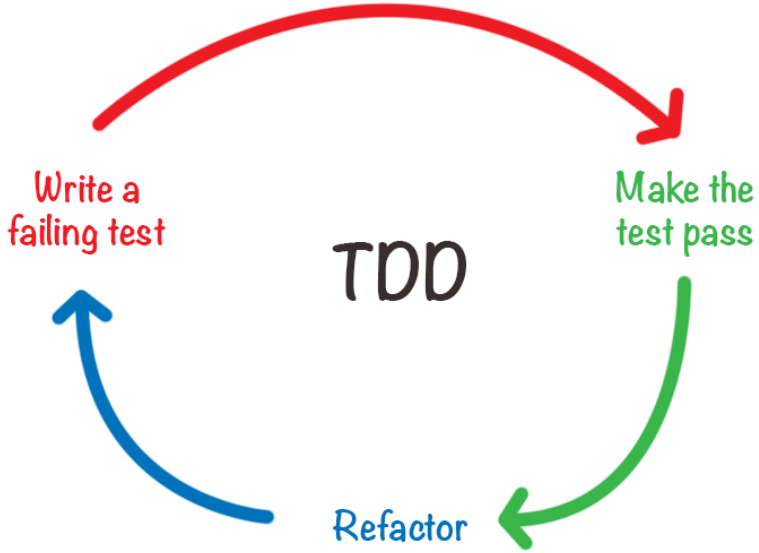
MANAGING TIDYING DAILY

FLOW OF TIDYING

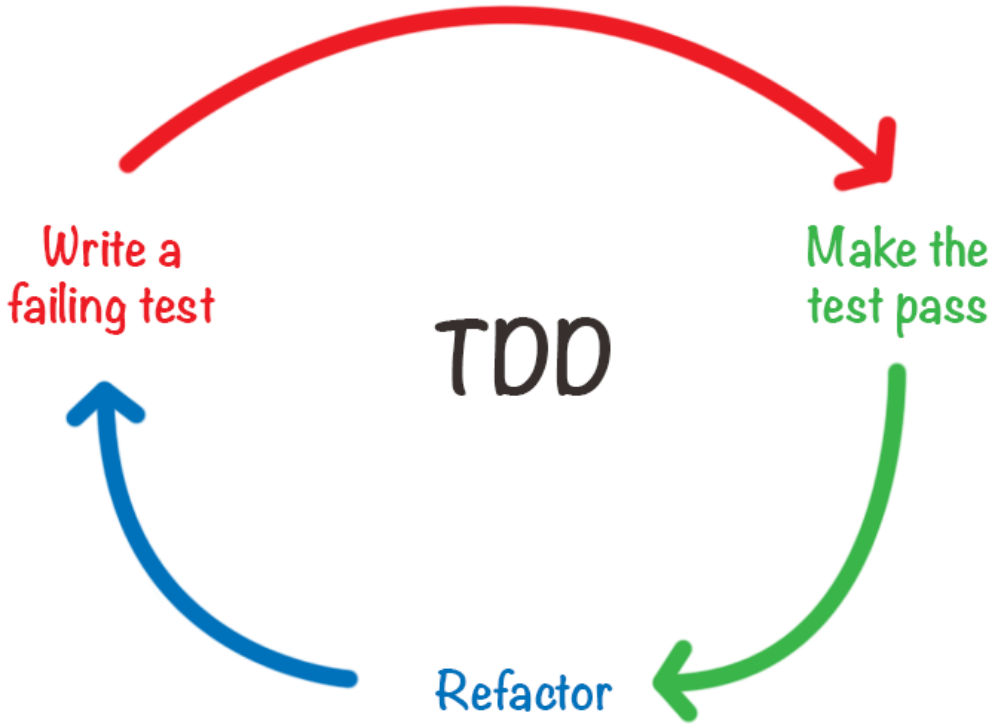
https://softwareevolutivo.com.ec/mob-programming-el-arte-de-colaborar-con-el-equipo/







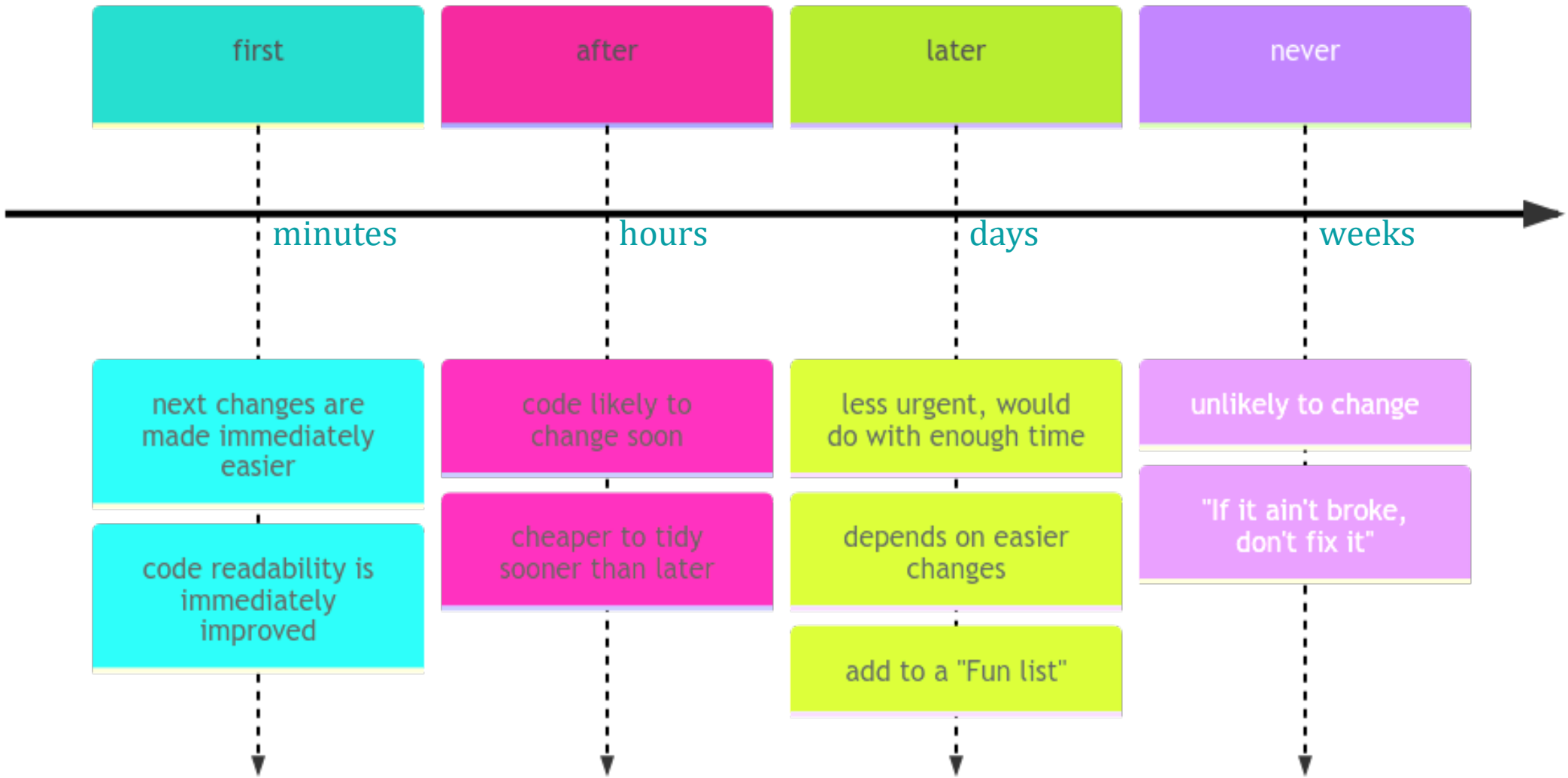
With Test-Driven Development, Kent Beck didn't just tell us **how** *to refactor. He also told us* **when**.



WHEN TO TIDY ?
A: FIRST
B: AFTER
C: LATER
D: NEVER

WHEN TO TIDY ?
A: FIRST
B: AFTER
C: LATER
D: NEVER

WHEN TO TIDY ?



https://github.com/athiefaine/tidying_patterns/blob/main/tidy_when.md

REFACTOR WITH DISCERNEMENT

not by principle not because it’s fun

not more, not less

BUT

at the right time

when it creates useful options

at an acceptable cost (and risk)

WHY TIDY FIRST? MATTERS

Another major (or baby 😋?) step in clean code/ software engineering history

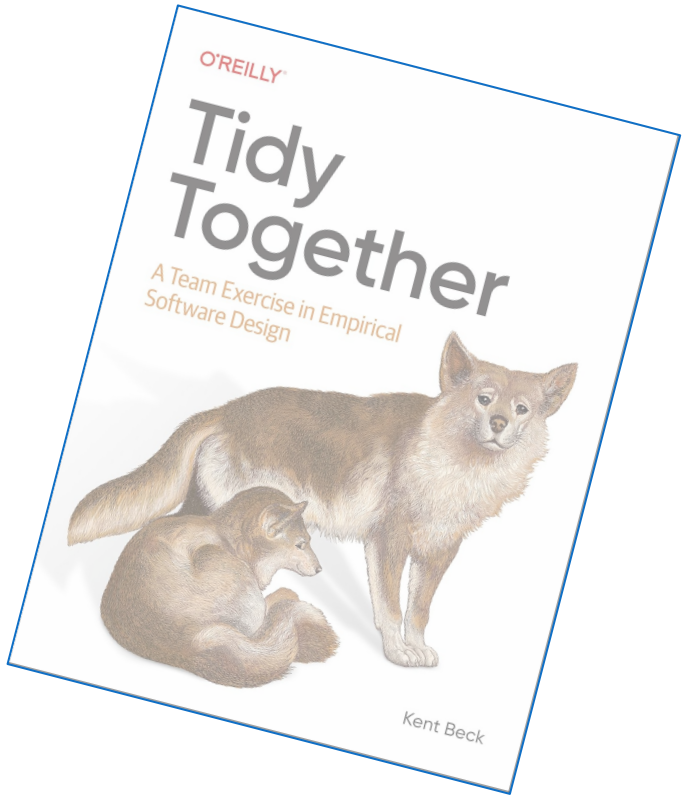
Optionality for the win

(freedom and choice over pressure and guilt)

N
Behavior
Strategical
(why)
Tactical
(how, when)
Structure

TO BE CONTINUED …

individual developer



developer in a team

developer in an organization

Feedback ↓
BRETZEL CRAFT
2026
QUESTIONS ?
A: FIRST
B: AFTER
C: LATER
D: NEVER

Thanks!

Feedback ↓

@arnaudthiefaine

athiefaine

arnaudthiefaine

And thanks to Flavio Palacin for his participation as the bad audience guy !

REMOVED SCENES