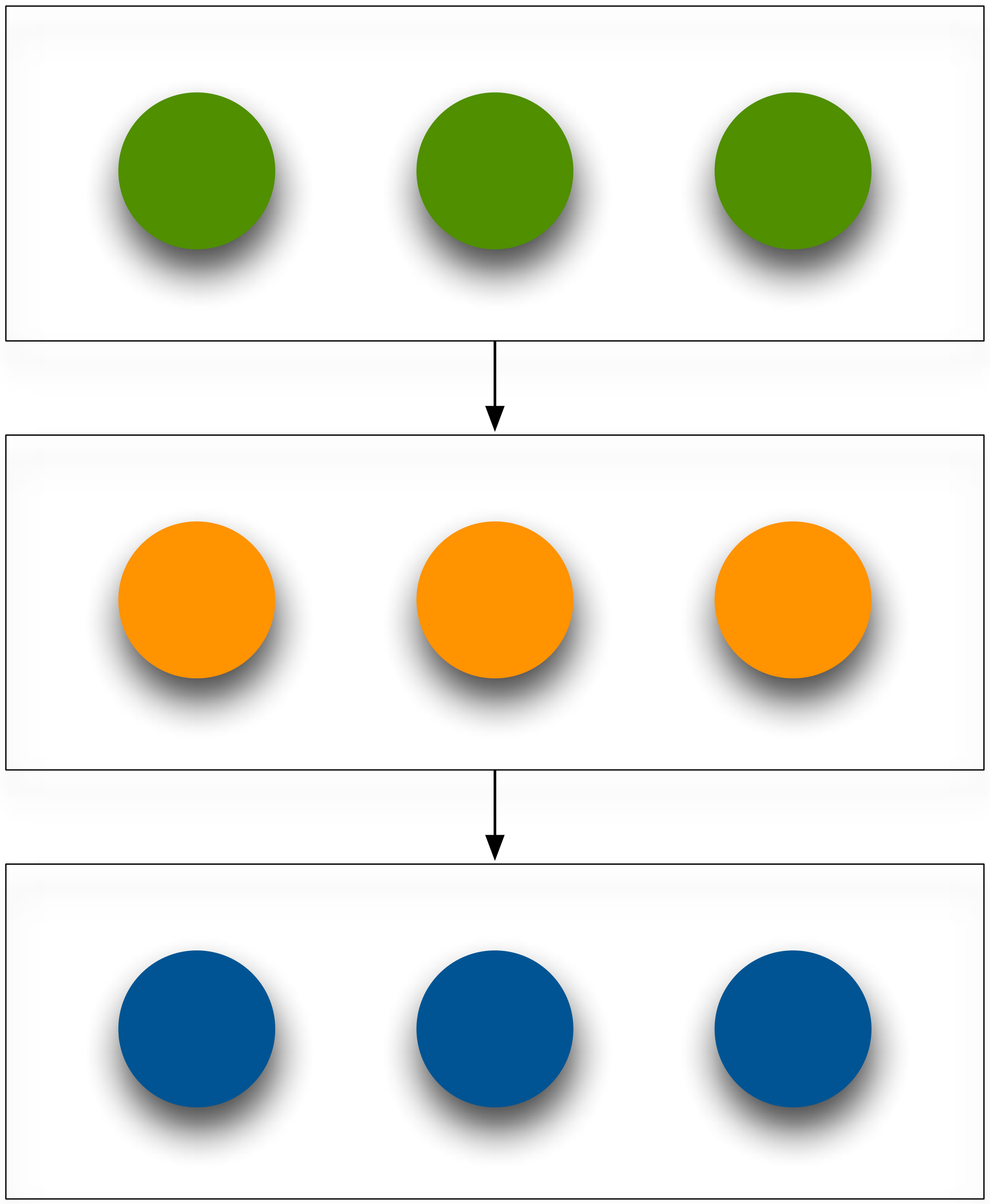
software studio

thoughts on software process

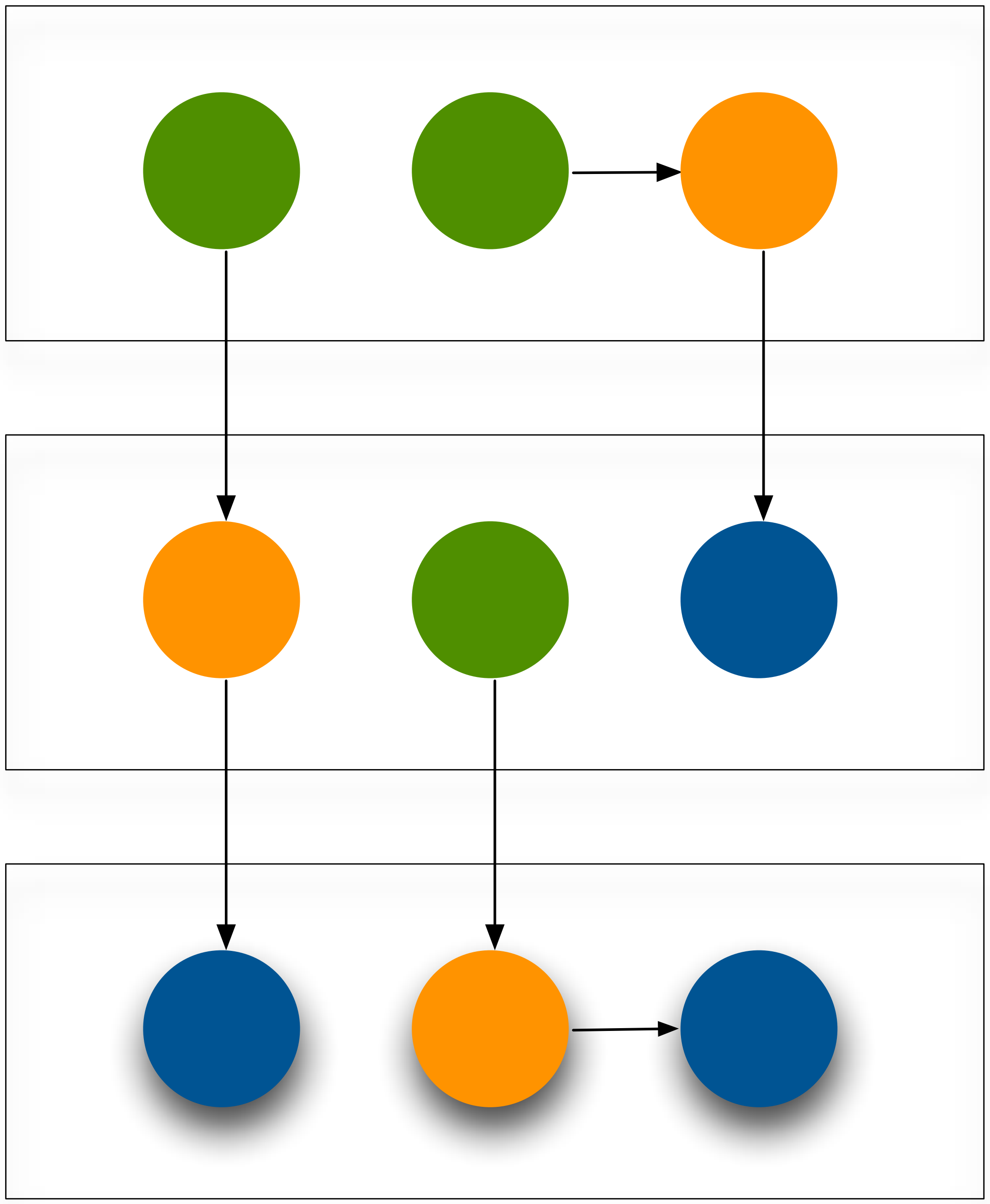
Daniel Jackson

process orderings

local vs global process



global ordering of phases



local ordering of phases

risks

risk-driven development

Risk = Prob(failure) x Cost(failure)

a strategy

- list failures & determine their risks
- devise a strategy to reduce highest risks

sample failures: how would you mitigate?

- performance is unacceptable
- product is unusable because its too complex
- customer changes mind about what product does
- developer solves the wrong problem
- product fails in catastrophic way
- competitor beats you into marketplace
- product has reputation for bugs
- development runs out of time and money
- developers rely on platform that turns out bad

doing design

small design upfront

Agilistas deride “Big Design Upfront” (BDUF)

what about Small Design Upfront?

- what isn’t worth designing?
- can you recover from a bad design?
- what’s the cost of design?

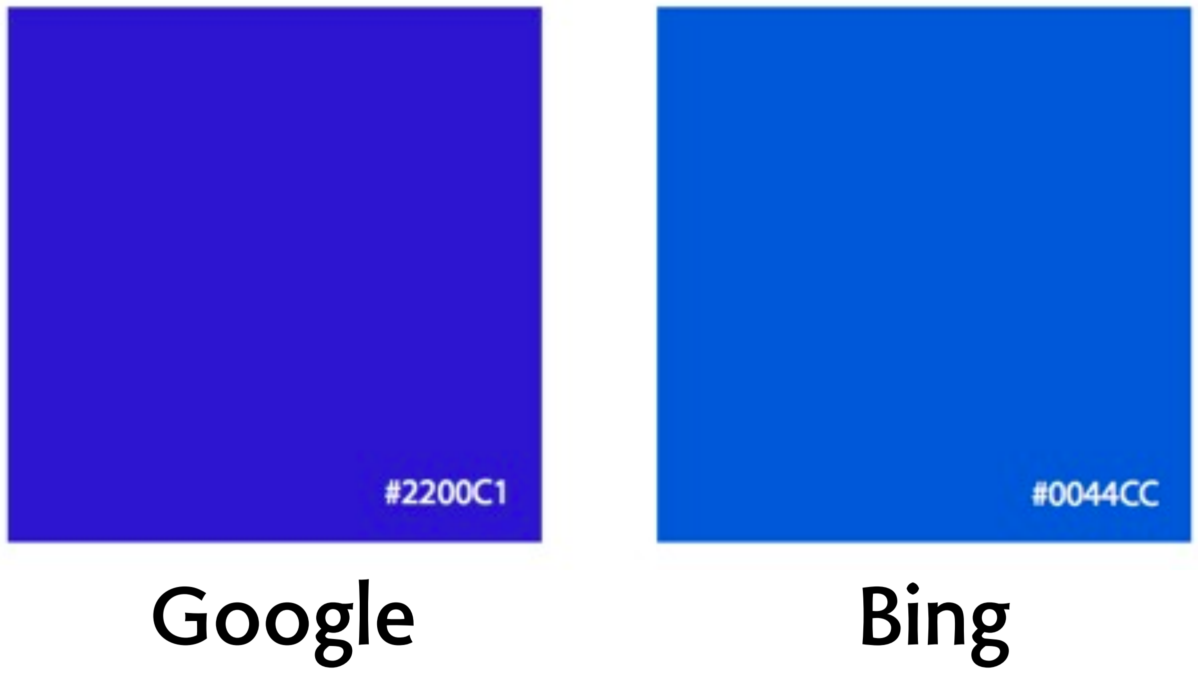
SDUF strategies

- precise but lightweight notations
- separate concerns & focus on risks
- avoid implementation bias

be like a beaver!

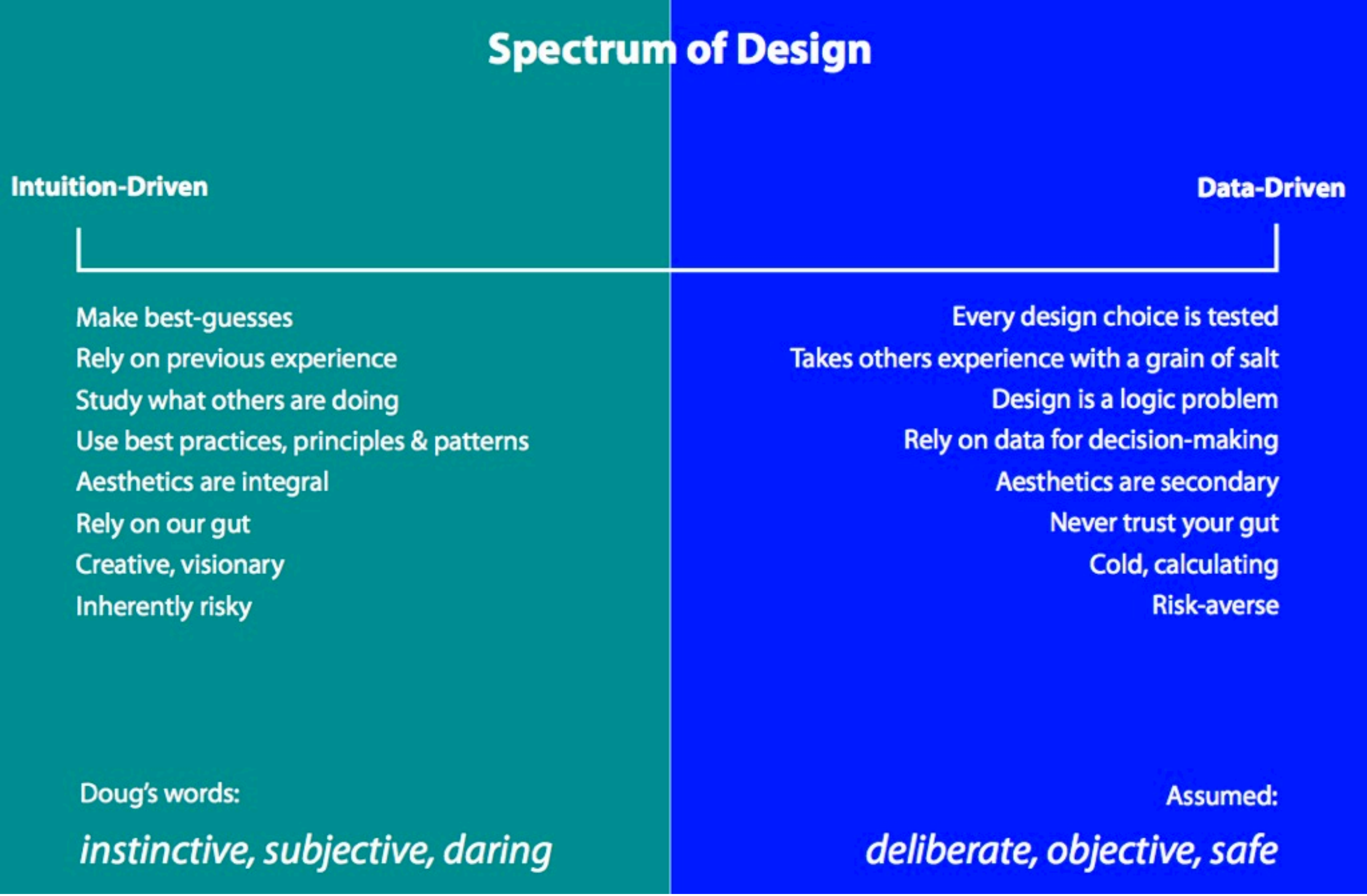
small nibbles, big outcome

intuitive vs data-driven design



Courtesy of Joshua Porter. Used with permission.

When a company is filled with engineers, it turns to engineering to solve problems. Reduce each decision to a simple logic problem. Remove all subjectivity and just look at the data. Data in your favor? OK, launch it. Data shows negative effects? Back to the drawing board. And that data eventually becomes a crutch for every decision, paralyzing the company and preventing it from making any daring design decisions. *Doug Bowman*



Spectrum of Design

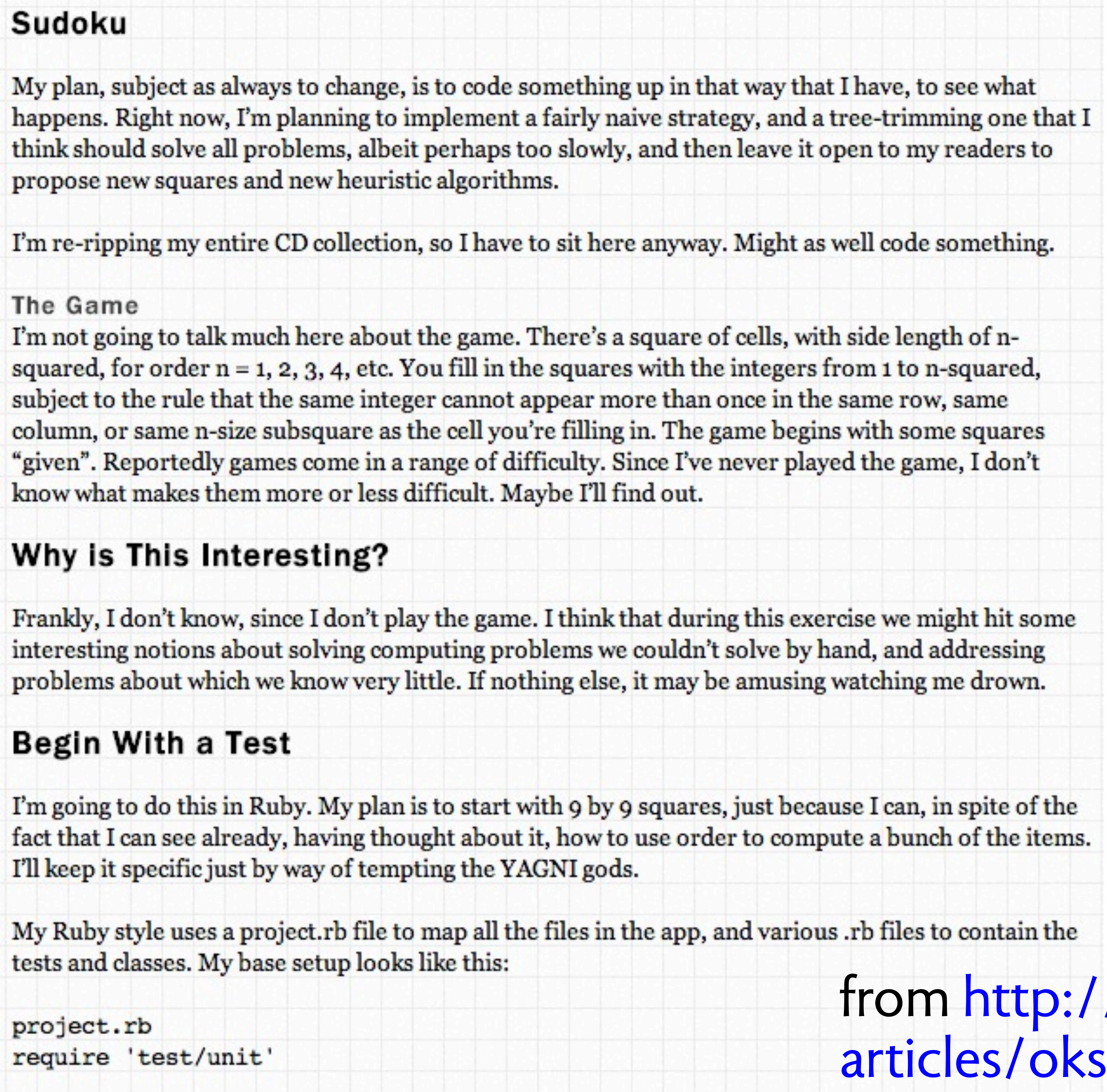
Intuition-Driven	Data-Driven
Make best-guesses	Every design choice is tested
Rely on previous experience	Takes others experience with a grain of salt
Study what others are doing	Design is a logic problem
Use best practices, principles & patterns	Rely on data for decision-making
Aesthetics are integral	Aesthetics are secondary
Rely on our gut	Never trust your gut
Creative, visionary	Cold, calculating
Inherently risky	Risk-averse
Doug's words:	Assumed:
instinctive, subjective, daring	*deliberate, objective, safe*

Courtesy of Joshua Porter. Used with permission.

from Joshua Porter, bokardo.com

radical design

a TDD guru on sudoku



Sudoku

My plan, subject as always to change, is to code something up in that way that I have, to see what happens. Right now, I'm planning to implement a fairly naive strategy, and a tree-trimming one that I think should solve all problems, albeit perhaps too slowly, and then leave it open to my readers to propose new squares and new heuristic algorithms.

I'm re-ripping my entire CD collection, so I have to sit here anyway. Might as well code something.

The Game

I'm not going to talk much here about the game. There's a square of cells, with side length of n-squared, for order n = 1, 2, 3, 4, etc. You fill in the squares with the integers from 1 to n-squared, subject to the rule that the same integer cannot appear more than once in the same row, same column, or same n-size subsquare as the cell you're filling in. The game begins with some squares "given". Reportedly games come in a range of difficulty. Since I've never played the game, I don't know what makes them more or less difficult. Maybe I'll find out.

Why is This Interesting?

Frankly, I don't know, since I don't play the game. I think that during this exercise we might hit some interesting notions about solving computing problems we couldn't solve by hand, and addressing problems about which we know very little. If nothing else, it may be amusing watching me drown.

Begin With a Test

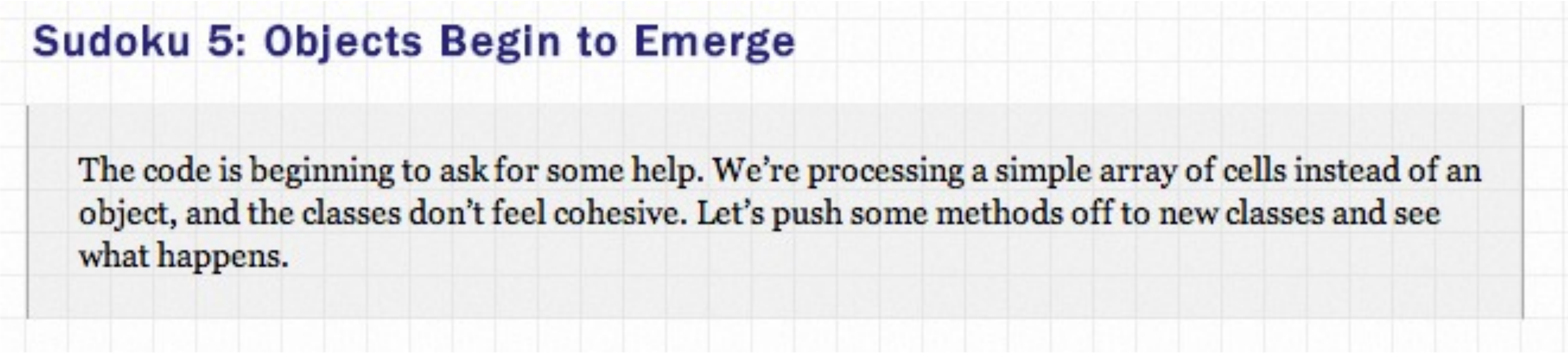
I'm going to do this in Ruby. My plan is to start with 9 by 9 squares, just because I can, in spite of the fact that I can see already, having thought about it, how to use order to compute a bunch of the items. I'll keep it specific just by way of tempting the YAGNI gods.

My Ruby style uses a project.rb file to map all the files in the app, and various .rb files to contain the tests and classes. My base setup looks like this:

```
project.rb
require 'test/unit'
```

from http://xprogramming.com/articles/oksudoku/

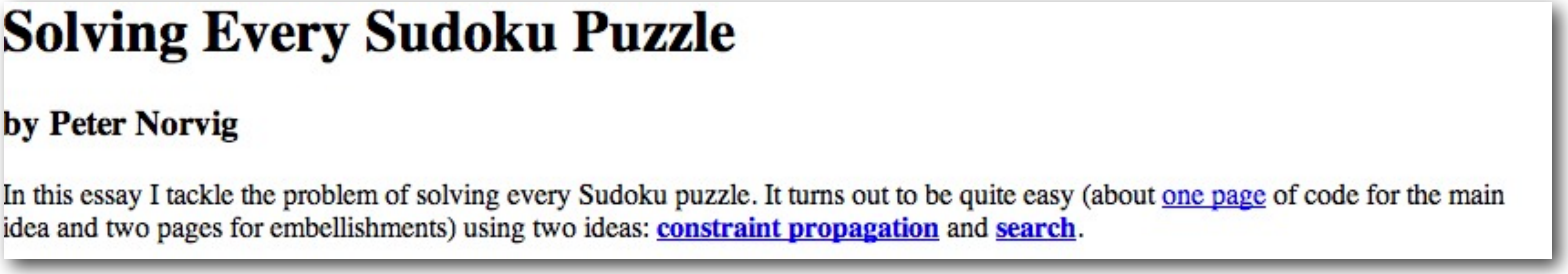
still going after five long blog posts…



Sudoku 5: Objects Begin to Emerge

> The code is beginning to ask for some help. We're processing a simple array of cells instead of an object, and the classes don't feel cohesive. Let's push some methods off to new classes and see what happens.

Peter Norvig solves in one:



Solving Every Sudoku Puzzle

by Peter Norvig

In this essay I tackle the problem of solving every Sudoku puzzle. It turns out to be quite easy (about one page of code for the main idea and two pages for embellishments) using two ideas: **constraint propagation** and **search**.

see http://norvig.com/sudoku.html

lessons?

risk

- Ron Jeffries focuses on class design
- but real risk is algorithmic?

Norvig's advantage

- he knows AI: applies standard solution

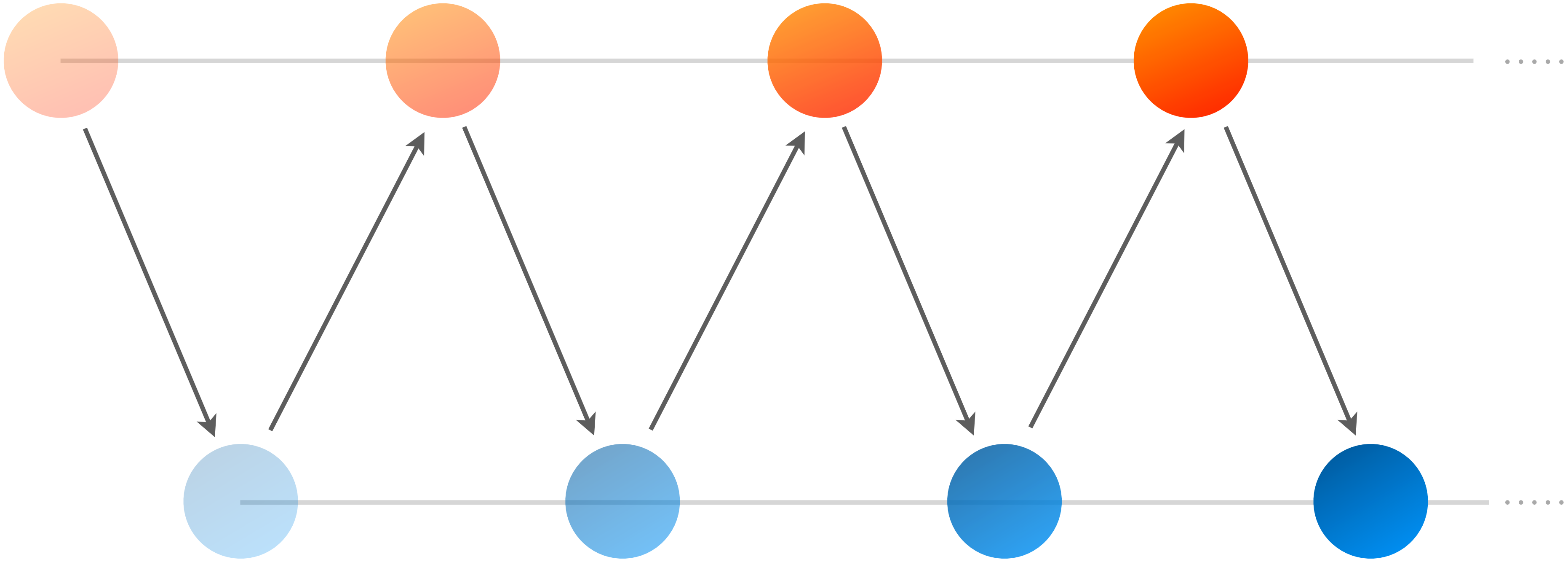
Walter Vincenti's dichotomy

- normal design: tweaking parameters
- radical design: never done this before

co-evolution

co-evolution

problem space

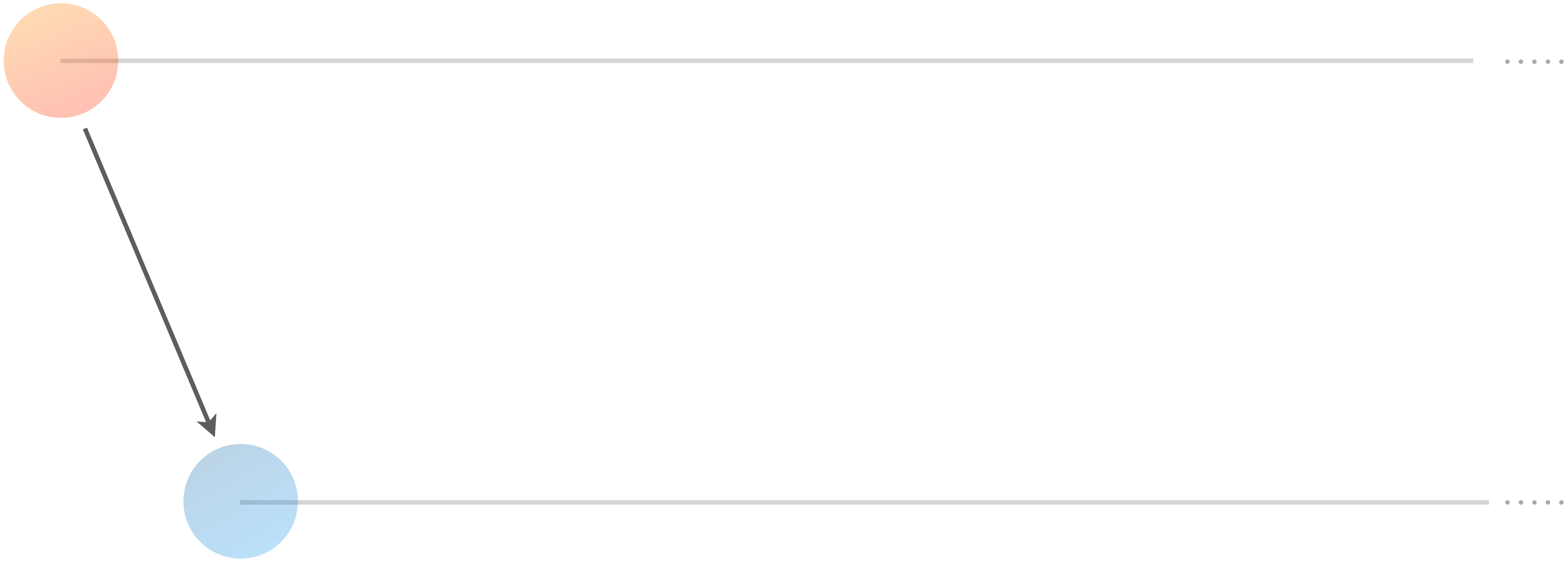


solution space

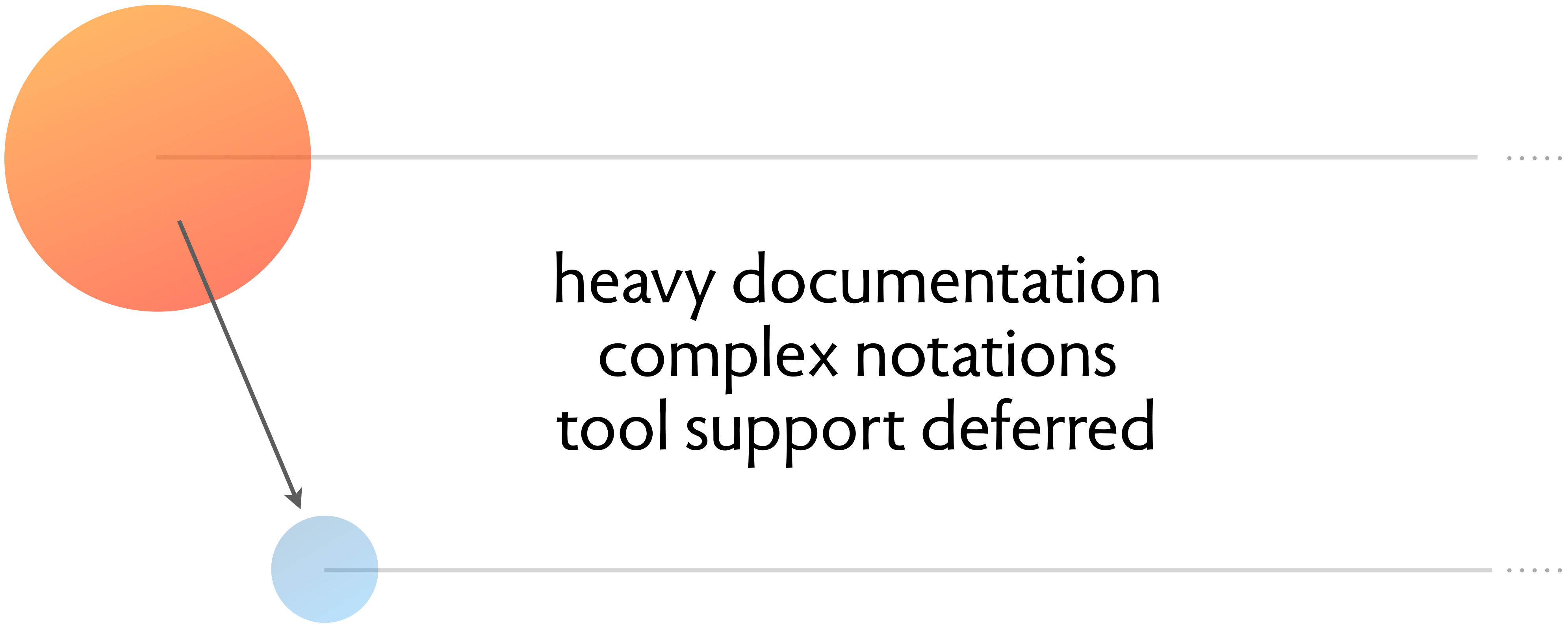
UML

Image of UML diagrams removed due to copyright restrictions.
Reference: Illustration by Kishorekumar 62 on Wikimedia Commons.

co-evolution in UML



co-evolution in UML



heavy documentation
complex notations
tool support deferred

the cost of complex tools

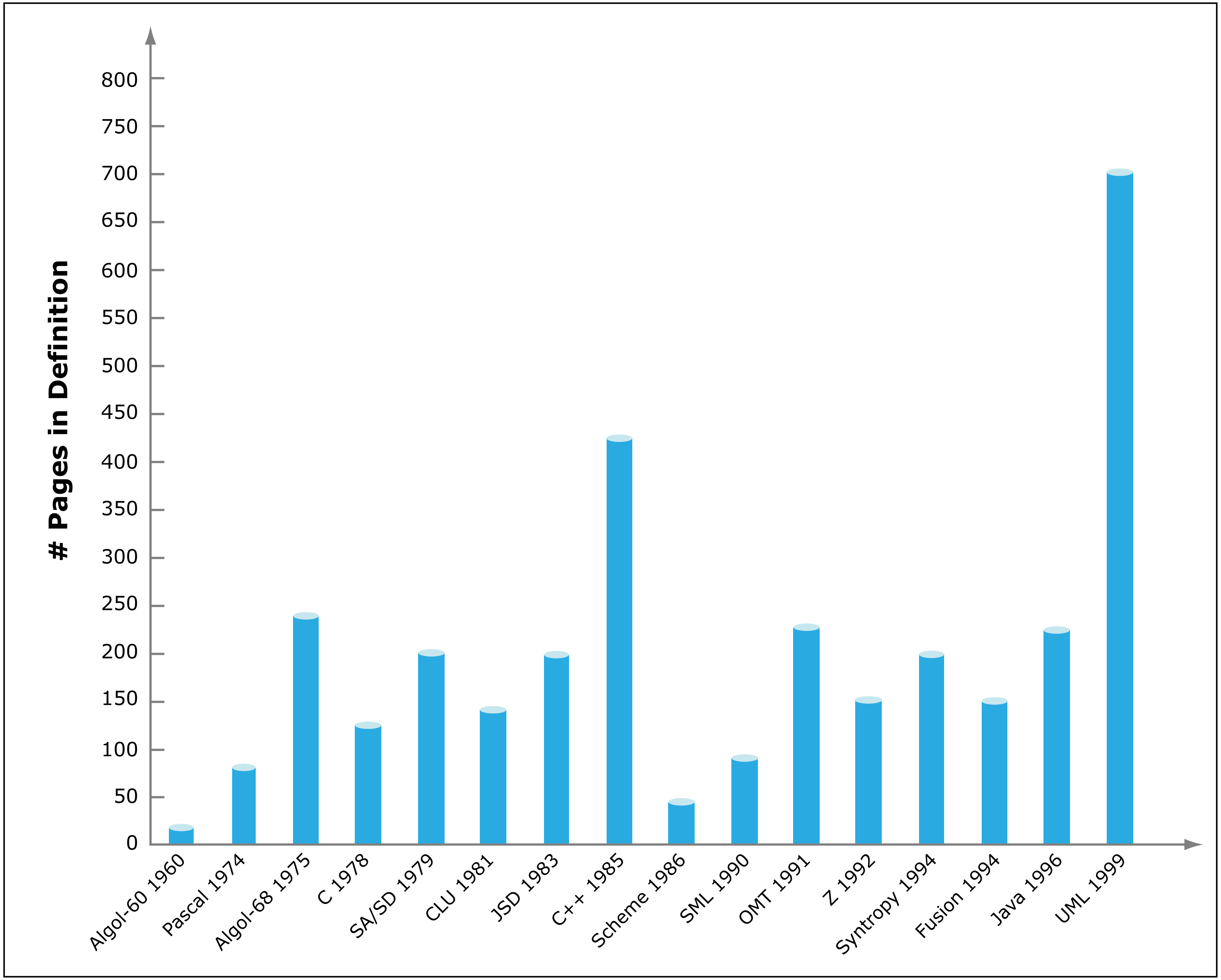
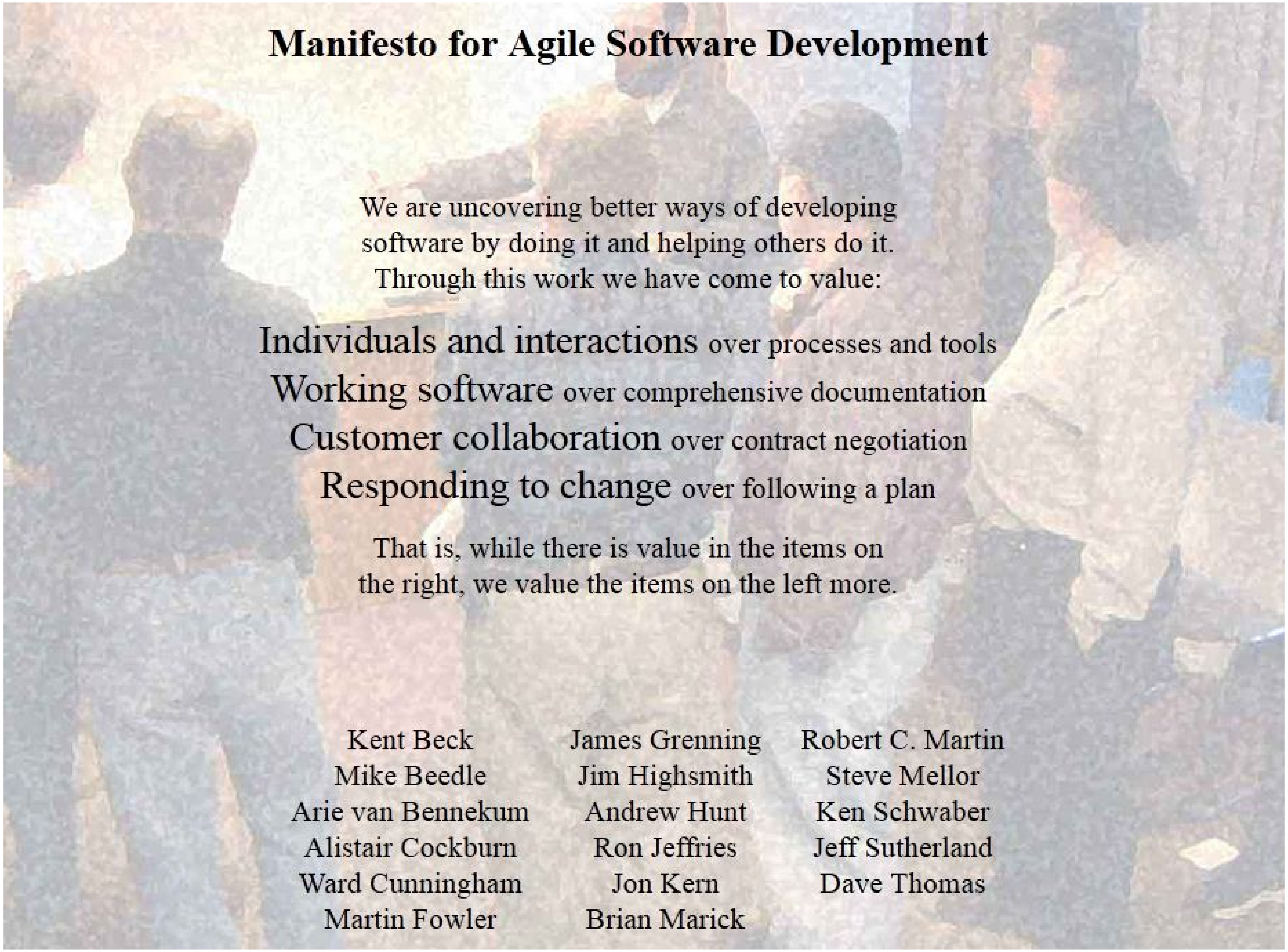


Image by MIT OpenCourseWare.

agile



Manifesto for Agile Software Development

We are uncovering better ways of developing
software by doing it and helping others do it.
Through this work we have come to value:

Individuals and interactions over processes and tools
Working software over comprehensive documentation
Customer collaboration over contract negotiation
Responding to change over following a plan

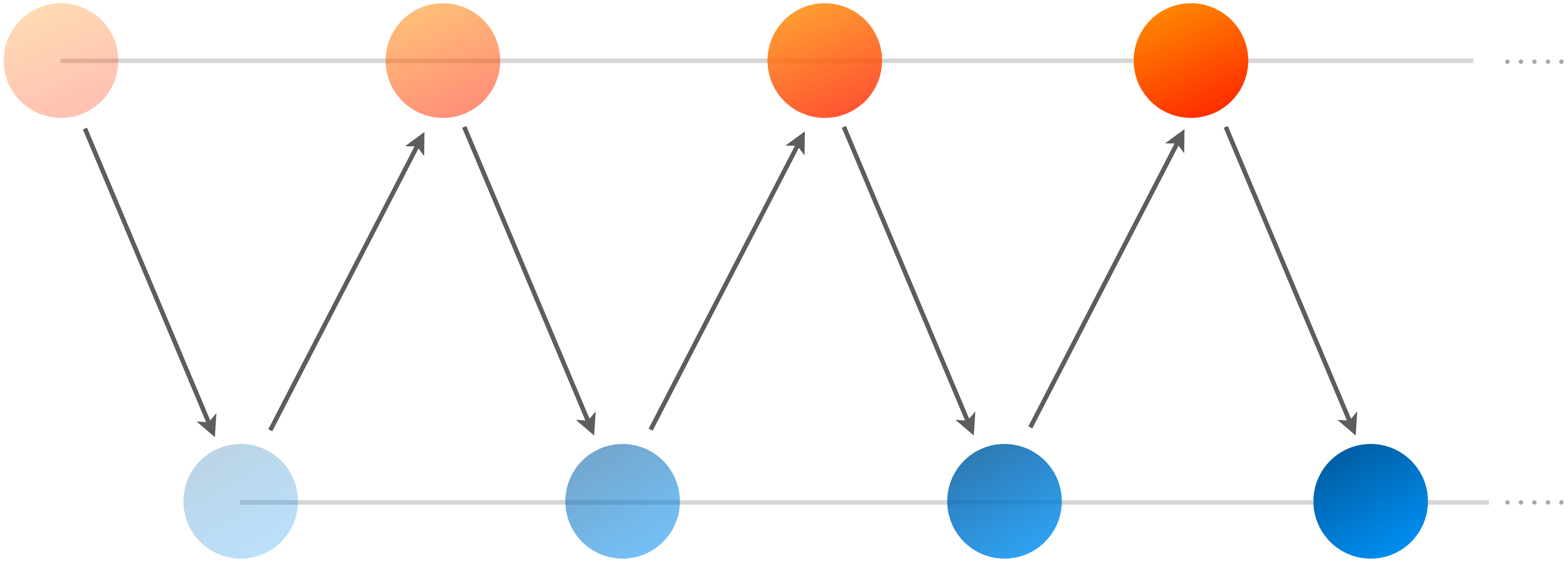
That is, while there is value in the items on
the right, we value the items on the left more.

Kent Beck
Mike Beedle
Arie van Bennekum
Alistair Cockburn
Ward Cunningham
Martin Fowler

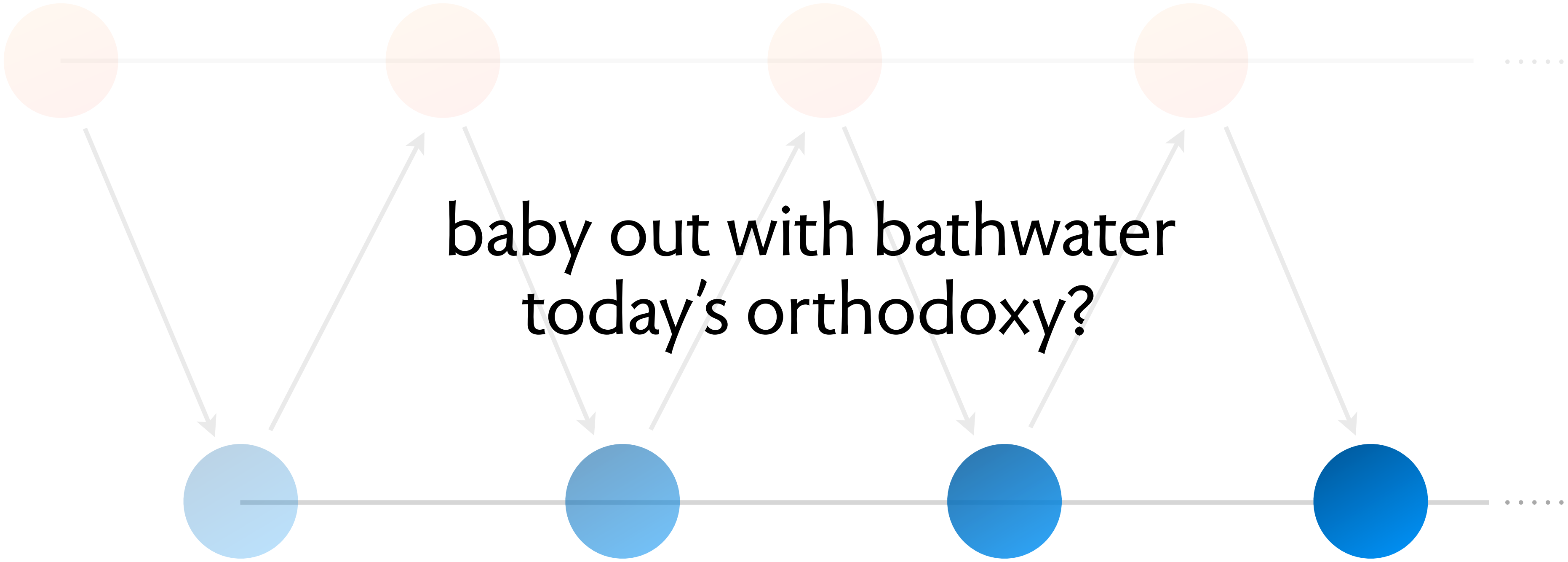
James Grenning
Jim Highsmith
Andrew Hunt
Ron Jeffries
Jon Kern
Brian Marick

Robert C. Martin
Steve Mellor
Ken Schwaber
Jeff Sutherland
Dave Thomas

co-evolution in agile



co-evolution in agile



baby out with bathwater
today's orthodoxy?

unused

descartes's four rules

The first was never to accept anything for true which I did not clearly know to be such; that is to say, carefully to avoid precipitancy and prejudice, and to comprise nothing more in my judgment than what was presented to my mind so clearly and distinctly as to exclude all ground of doubt.

The second, to divide each of the difficulties under examination into as many parts as possible, and as might be necessary for its adequate solution.

The third, to conduct my thoughts in such order that, by commencing with objects the simplest and easiest to know, I might ascend by little and little, and, as it were, step by step, to the knowledge of the more complex; assigning in thought a certain order even to those objects which in their own nature do not stand in a relation of antecedence and sequence.

And the last, in every case to make enumerations so complete, and reviews so general, that I might be assured that nothing was omitted.

leibniz on descartes's second rule

"This rule of Descartes is of little use as long as the art of dividing remains unexplained... By dividing his problem into unsuitable parts, the inexperienced problem-solver may increase his difficulty."

—Leibniz, *Philosophical Writings*, ed. C.I. Gerhardt; Vol. 4, p.331, 1857-1890

norvig on sudoku

Screenshot of Peter Norvig's webpage removed due to copyright restrictions.