



The Responsibility of getting The Concept right

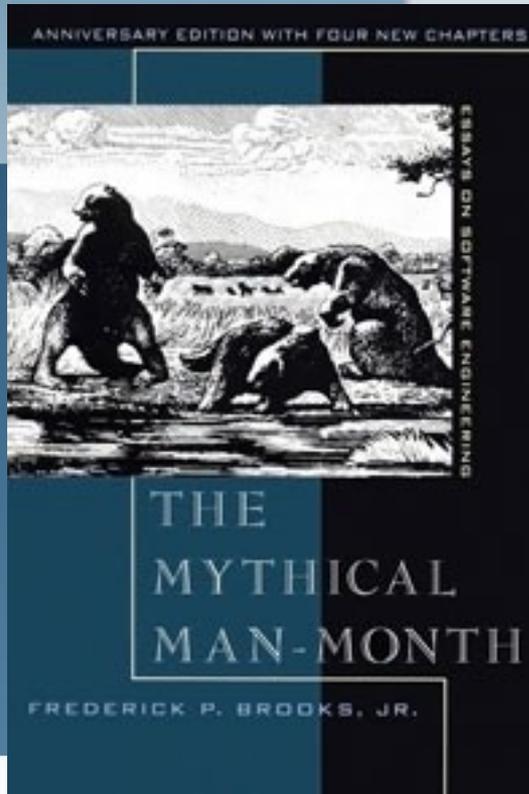
Jason Baragry

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"The programmer ... works only slightly removed from pure thought-stuff. He builds castles in the air, from air, creating by exertion of the imagination. Few media of creation are so flexible, so easy to polish and rework, so readily capable of realizing grand conceptual structures."



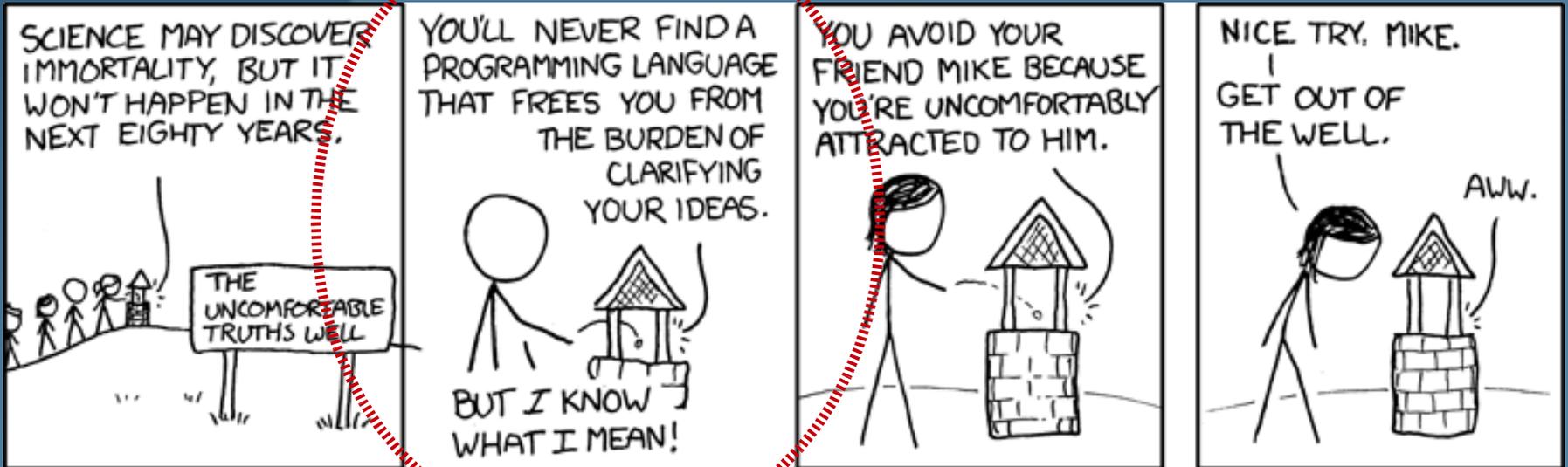
“I postulate that the difficulties with building software can be divided ... into the essence, which is the conceptual structure of the software itself, quite apart from any realization, and the accidents, ... the process of realizing the conceptual structure in executable form.

- Brooks, *No Silver Bullet Retrospective*

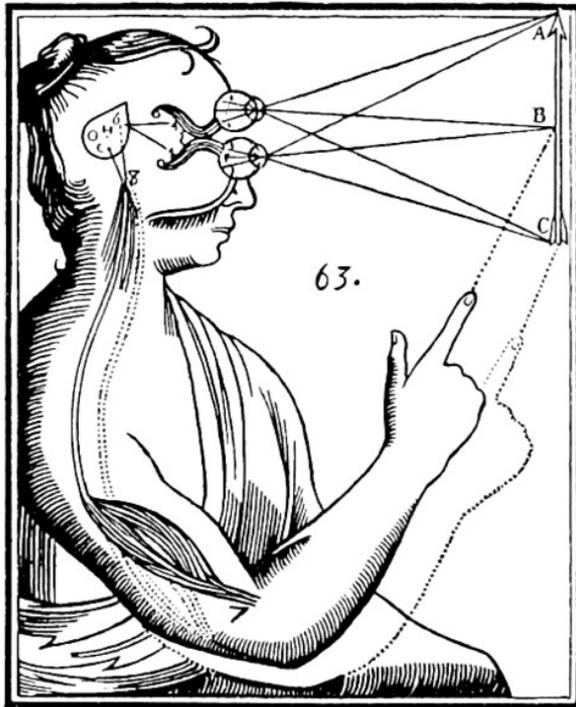


“I believe the hard part of building software to be the specification, design, and testing of this conceptual construct, not the labor or representing it and testing the fidelity of the representation. We still make syntax errors, to be sure; but they are fuzz compared with the conceptual errors in most systems.”

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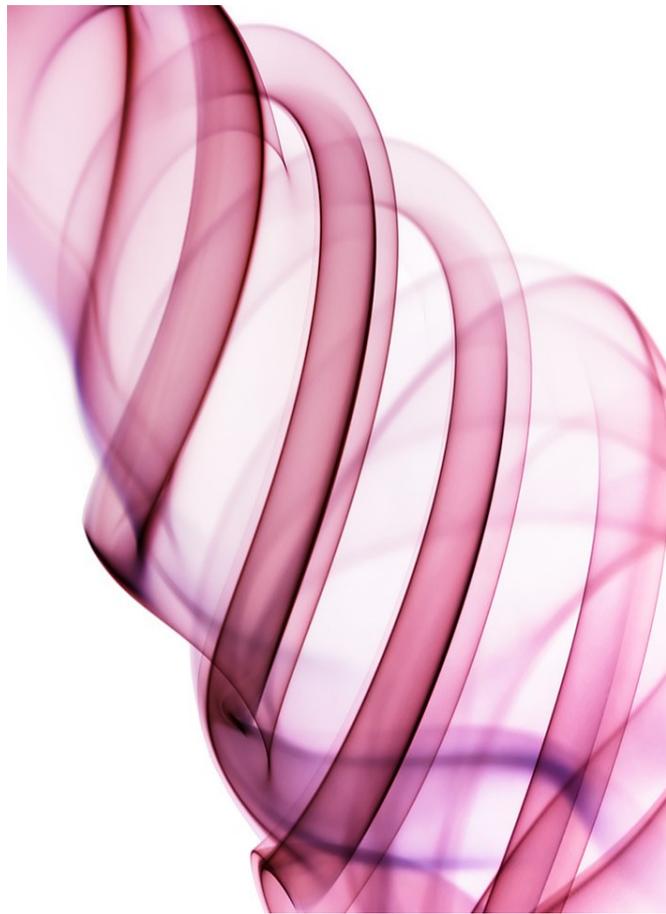


The Folk Psychology of Software Architecture



- We all experience the same reality.
- We conceptualise it using similar collections of distinct concepts and concept relationships.
- We can define those concepts and relationships in terms of essential attributes and represent them using constructs the implementation medium of our discipline.

But CogPsych and Philosophy tell us

- 
- Everybody conceives the world differently.
 - Concepts are defined in terms of the roles they play within larger cognitive models about the world - not in terms of essential attributes
 - When cannot know if our conceptual constructs capture the world as it really is.
 - > We can only test whether they meet our needs for the purposes that we wish to use them

The Architect's Dilemma

Conceptual Construct		Software Systems
<p>Concepts and relationships cannot be precisely defined by essential attributes</p>		<p>Objects and relationships must be defined by essential features and specific functionality</p>
<p>The precise meaning of concepts and relationships is dependent on the context of the theory in which they are contained</p>		<p>The precise meanings of objects and relationships, their definitions, are independent of the system in which they are implemented.</p>
<p>Concepts and relationships are constrained only by the previous experience and imaginative ability of the stakeholders in the development process</p>		<p>Objects and relationships are constrained by the constructs provided by the implementation medium and the execution model of the virtual machine that executes it.</p>

We all conceive solutions differently

A multinational corporation advertises for a secretary. A golden retriever applies for the job, passes the typing test, and is granted an interview. The HR manager asks, “Do you speak any foreign languages?”

And the golden retriever says, “Meow”

> Cathcart & Klein, *Plato and a Platypus walk into a Bar...*

- The only way to overcome our conceptual differences is Interaction

Its hard to develop solution models

A blind man, a Lesbian, and a frog walk into a bar.
The barkeep looks at them and says,
“What is this – a joke?”

- The only solution is to Iterate

We produce the obvious solution and then criticize them, in order to find out why they do not work. In this way, we become acquainted with the problem, and may proceed from bad solutions to better ones – provided always that we have the creative ability to produce new guesses, and more new guesses. ...

> Popper, Conjectures and Refutations

Responsibilities

- Interact to overcome differences in understanding
 - > The architecture must come from “one mind”
- Iterate to determine if the solution works
 - > Agile dev and Agile Arch (e.g., ATAM)
- Have more than one hammer *before* encountering the problem
 - > Understand multiple solution types
 - > Arch Styles, Patternspatterns
 - > Understand the technology to know what is possible
 - > *Architect also Implements*, Coplien and Harrison



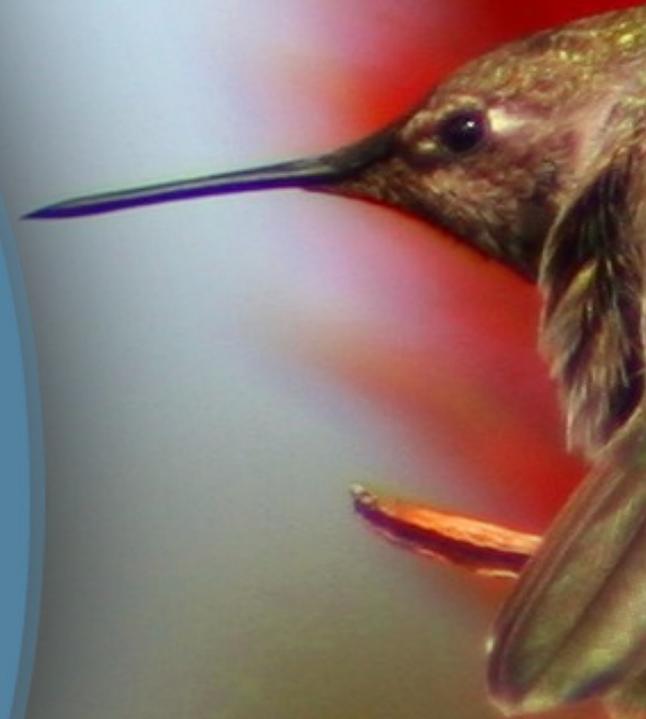
Thank You

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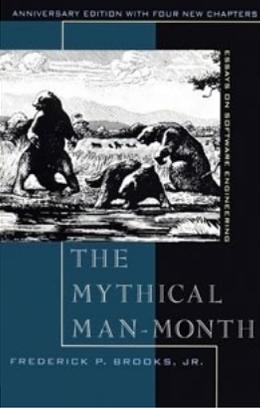
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ANNIVERSARY EDITION WITH FOUR NEW CHAPTERS



ESSAYS ON SOFTWARE ENGINEERING

THE MYTHICAL MAN-MONTH

FREDERICK P. BROOKS, JR.

"The programmer ... works only slightly removed from pure thought-stuff. He builds castles in the air, from air, creating by exertion of the imagination. Few media of creation are so flexible, so easy to polish and rework, so readily capable of realizing grand conceptual structures."

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- our job is to model solutions in our minds and then get them realised using the technology of our discipline.
- regardless of whether you are an enterprise architect, BU architecture, or enterprise architect

Rest of the quote:

“Yet the program construct, unlike the poet's words, is real in the sense that it moves and works, producing visible outputs separate from the construct itself. It prints results, draws pictures, produces sounds, moves arms. The magic of myth and legend has come true in our time. One types the correct incantation on a keyboard, and a display screen comes to life, showing things that never were nor could be.

Programming then is fun because it gratifies creative longings built deep within us and delights sensibilities we have in common with all men."



“I postulate that the difficulties with building software can be divided ... into the essence, which is the conceptual structure of the software itself, quite apart from any realization, and the accidents, ... the process of realizing the conceptual structure in executable form.

- Brooks, *No Silver Bullet Retrospective*

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- At the heart of the argument is the distinction between accidental complexity and essential complexity. Accidental complexity relates to problems that we create on our own and can be fixed—for example, the details of writing and optimizing assembly code or the delays caused by batch processing. Essential complexity is caused by the problem to be solved, and nothing can remove it—if users want a program to do 30 different things, then those 30 things are essential and the program must do those 30 different things. (silver bullet on wikipedia)
- its the essential complexity that interests the solution architect. Getting the concept right
- No Silver Bullet Retrospective. OOPSLA 2007
- <http://www.infoq.com/articles/No-Silver-Bullet-Summary>
- See Fowler in the Werewolf suit:
- <http://www.youtube.com/watch?gl=AU&hl=en-GB&v=Z-1X3duvryA>



“I believe the hard part of building software to be the specification, design, and testing of this conceptual construct, not the labor or representing it and testing the fidelity of the representation. We still make syntax errors, to be sure; but they are fuzz compared with the conceptual errors in most systems.”

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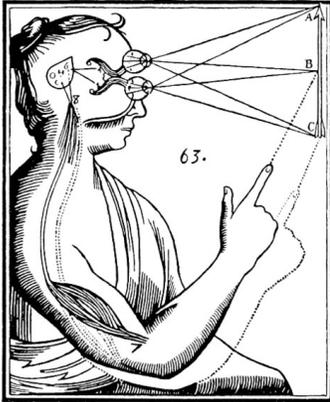
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- For me, this is the main responsibility of the SW Architect – getting the Essential Complexity correct – the Conceptual Construct
- there are other responsibilities to be sure, but the consequences of getting them wrong are insignificant compared to getting this one wrong.



Brooks' for Gen Y?

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- wikipedia on Folk Psychology: Folk psychology (also known as common sense psychology, naïve psychology or vernacular psychology) is the set of assumptions, constructs, and convictions that makes up the everyday language in which people discuss human psychology. Folk psychology embraces everyday concepts like "beliefs", "desires", "fear", and "hope".

- This is the basis of the objective view of reality and the Classical Theory of Concepts
- <http://plato.stanford.edu/entries/concepts/#ClThe>

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Concepts and relationships are constrained only by the previous experience and imaginative ability of the stakeholders in the development process		Objects and relationships are constrained by the constructs provided by the implementation medium and the execution model of the virtual machine that executes it.

- The way we understand the world – the concepts and models – cannot be precisely defined.
- But when we implement these models, they must be precisely defined
- how we create our solution models is heavily influenced by what we already know about solutions

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- The only way to overcome our conceptual differences is Interaction

- There will exist differences between the customer's way of seeing the problem and our own.
- There will exist differences between other designers' ways of seeing both the problem and solution, and our own.

Its hard to develop solution models

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- Many different concepts exist at different levels of granularity and different levels of 'fuzzyness'.

- impossible to say which is the “correct” model. Can only falsify it to check if it is useful.

“To understand a problem means to understand its difficulties; and to understand its difficulties means to understand why it is not easily soluble – why the more obvious solutions do not work. We produce the obvious solution and then criticize them, in order to find out why they do not work. In this way, we become acquainted with the problem, and may proceed from bad solutions to better ones – provided always that we have the creative ability to produce new guesses, and more new guesses. ... If we have been working on a problem long enough, and intensively enough, we begin to know it, to understand it, in the sense that we know what kind of guess or conjecture or hypothesis will not do at all, because it simply misses the point of the problem, and what kind of requirements would have to be met by any serious attempt to solve it. We begin to see the ramifications of the problem, its subproblems, and its connections with other problems.”

- Popper, *Objective Knowledge*

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