Your Brain on Software Development

How cognitive biases affect your decisions. And your code.

WHO ARE YOU?

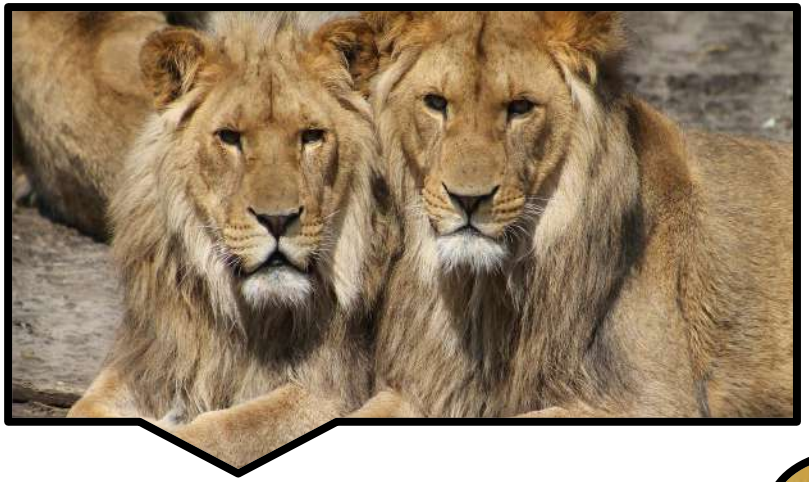
- FAHRAN WALLACE
- SENIOR CONSULTANT AT OPENCREDO
- EVOLVING SPECIALISM IN DATA ENGINEERING & ARCHITECTURE

Where are you going with this?

- Cognitive biases.
- A quick tour of the brain, and why it's biased.
- A spotter's guide to the biases of a developer
- What can we do about them?

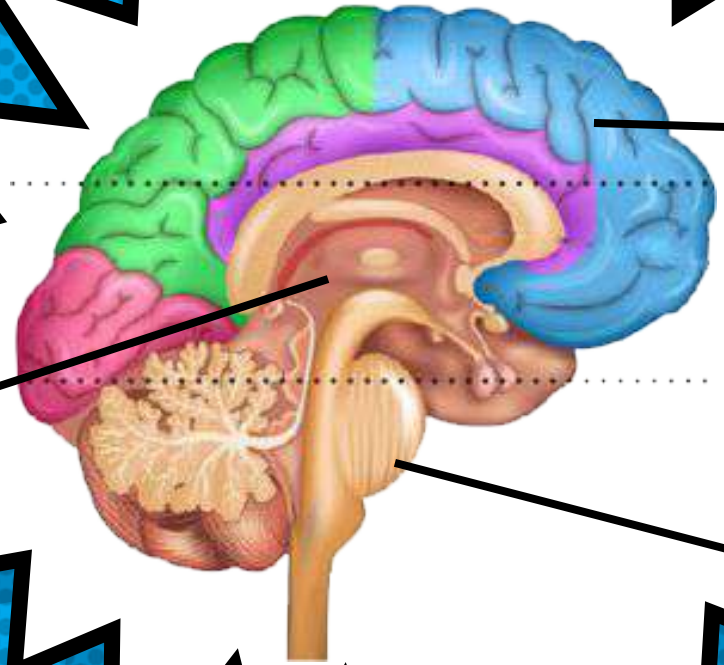
WHAT IS A COGNITIVE BIAS?

A SYSTEMATIC ERROR IN
YOUR BRAIN'S REASONING.



The Shining

BASIC BRAIN MODEL



NEOCORTEX

SLOW*

LIMBIC SYSTEM

FAST!

BRAIN STEM

FAST!

mattyhex @ DeviantArt
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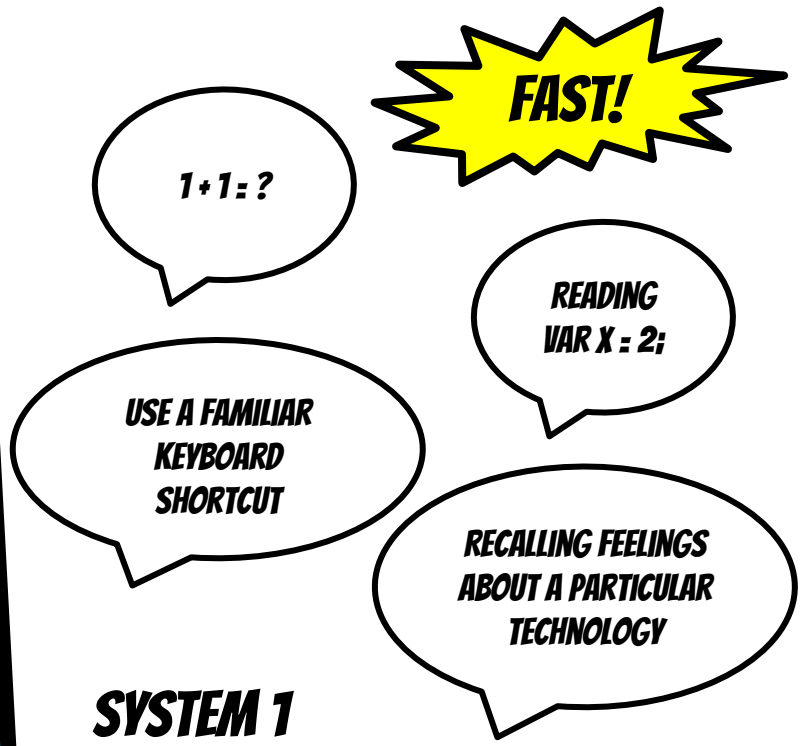
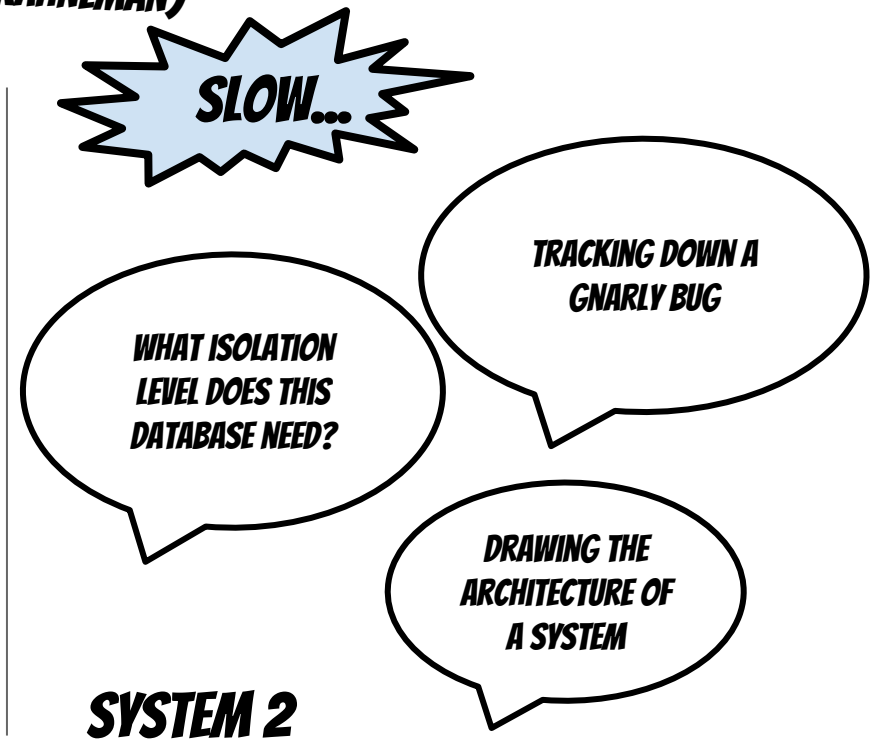
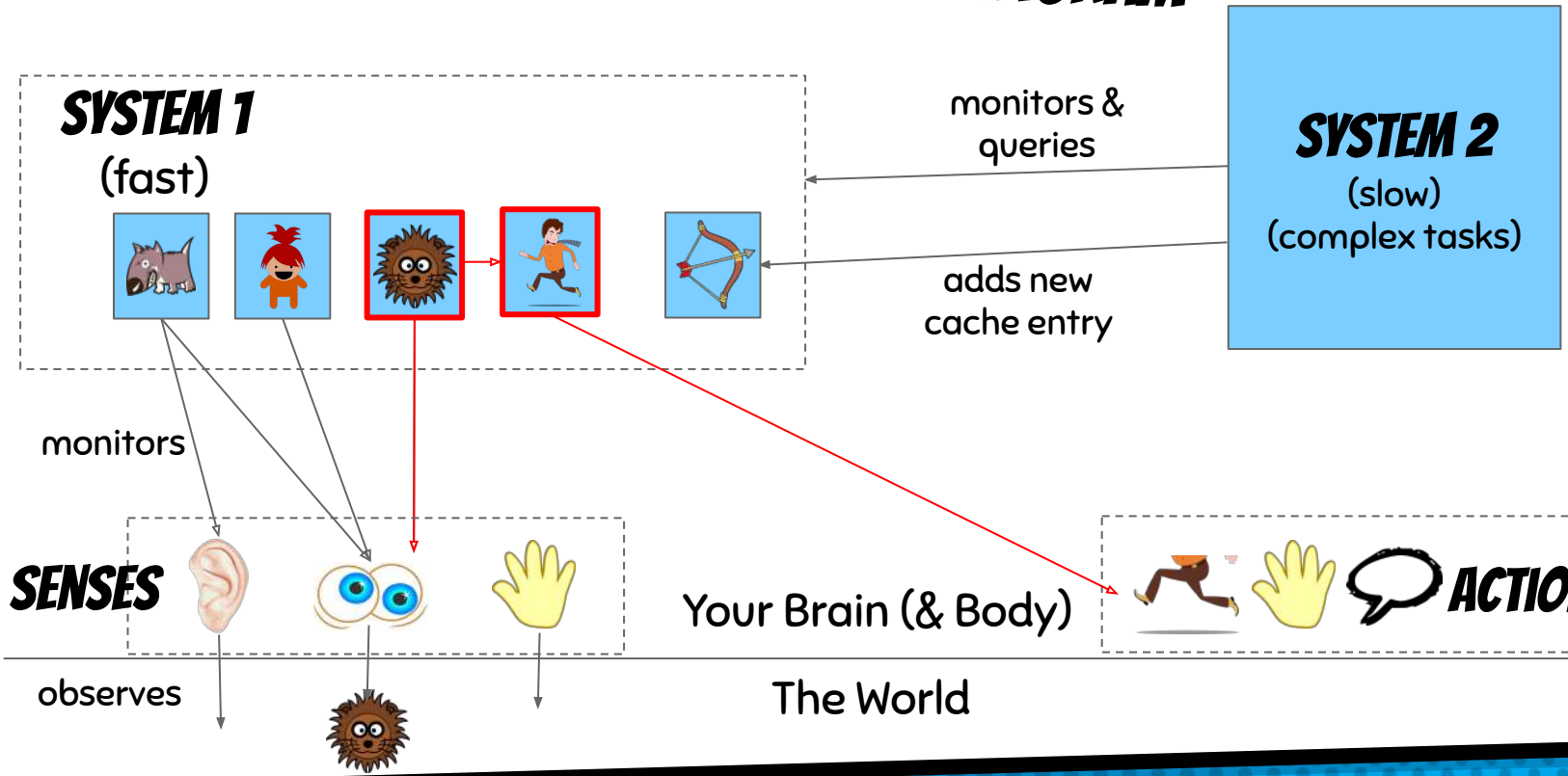
THINKING FAST AND SLOW (DANIEL KAHNEMAN)





THE HUMAN BRAIN - AN ARCHITECTURE DIAGRAM



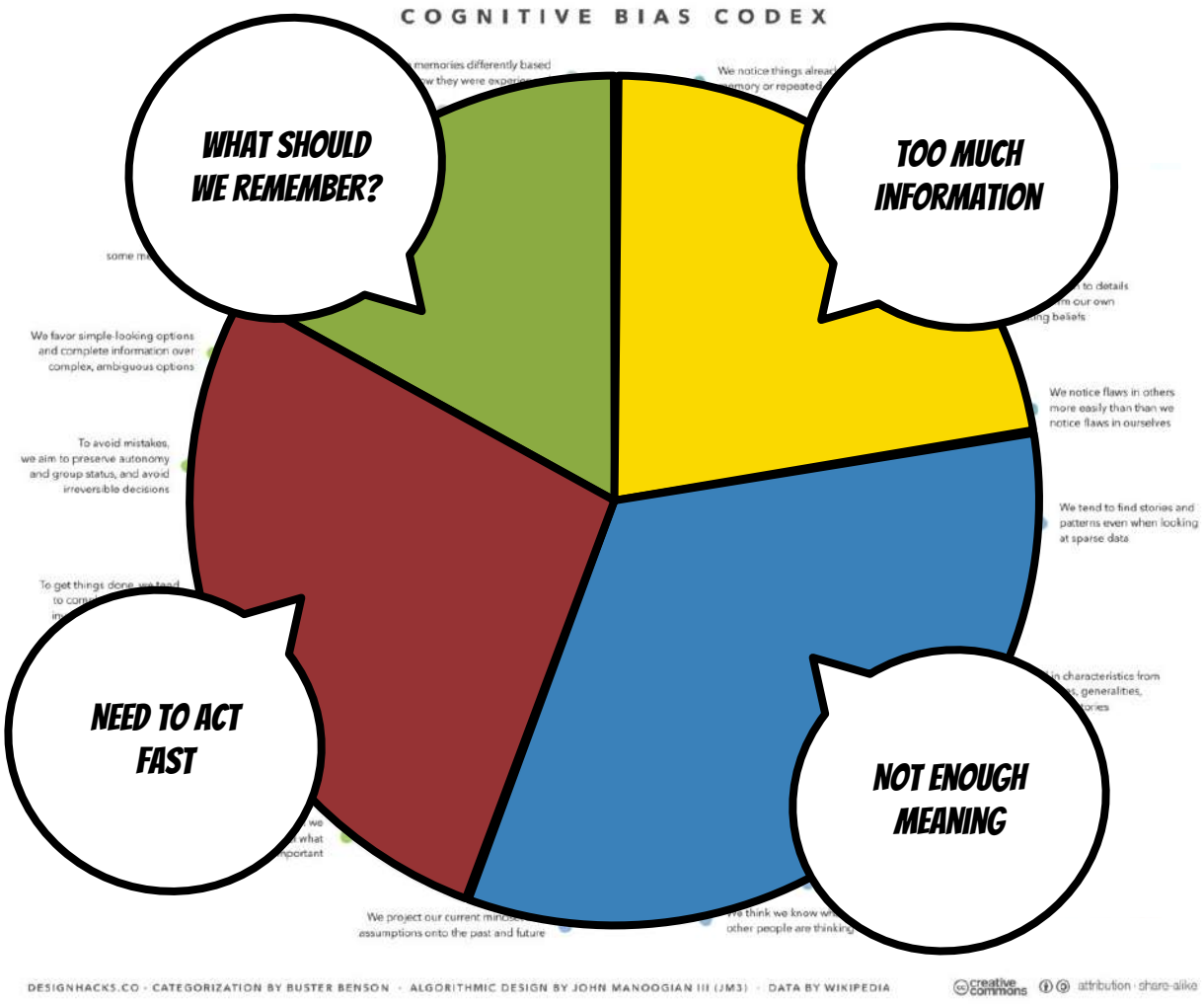
SYSTEM 1 IS CONSTANTLY PROVIDING INFORMATION, AND SUGGESTING ACTIONS. THESE SUGGESTIONS ARE REACTIVE, IMMEDIATE, AND SIMPLIFICATIONS OF REALITY.

SYSTEM 2 USES THOSE APPROXIMATIONS TO INFORM ITS SLOWER, MORE REASONED PROCESS.

WHEN SYSTEM 2 FORGETS IT'S RECEIVING SIMPLIFICATIONS, WE CAN EXPERIENCE COGNITIVE BIASES.

ARE WE... LOGICAL?

Mr Spock – Star Trek



OpenCredo @FAHR

TOO MUCH
INFORMATION

Pick a number. Any number.

WAS IT SEVEN?

Just kidding.

Pick another number, this time less than 5,000,000.

ANCHORING EFFECT

TOO MANY THINGS TO CHOOSE FROM?

THE FIRST SOLUTION YOU PICK WILL BE YOUR "FAVOURITE". YOUR "ANCHOR".

(AND THE SUNK-COST FALLACY MEANS YOU WON'T WANT TO CHANGE EITHER...)

AVAILABILITY HEURISTIC

TOO MUCH INFORMATION?

YOU RELY MORE ON YOUR CACHE (FAST SYSTEM 1).

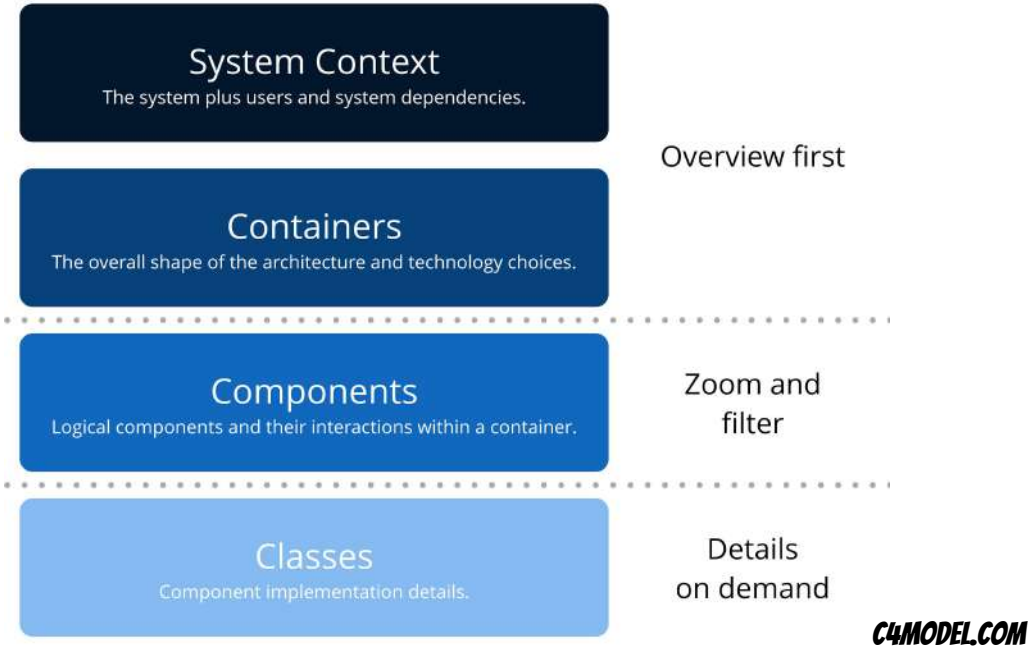
YOUR CACHE IS A SIMPLIFICATION OF REALITY.

INITIAL THOUGHTS ARE HARDER TO EVICT.

HOT ITEMS IN YOUR CACHE (EVEN IF THEY'RE HOT FROM AN ENTIRELY DIFFERENT CONTEXT) HAVE HIGHER PRIORITY.

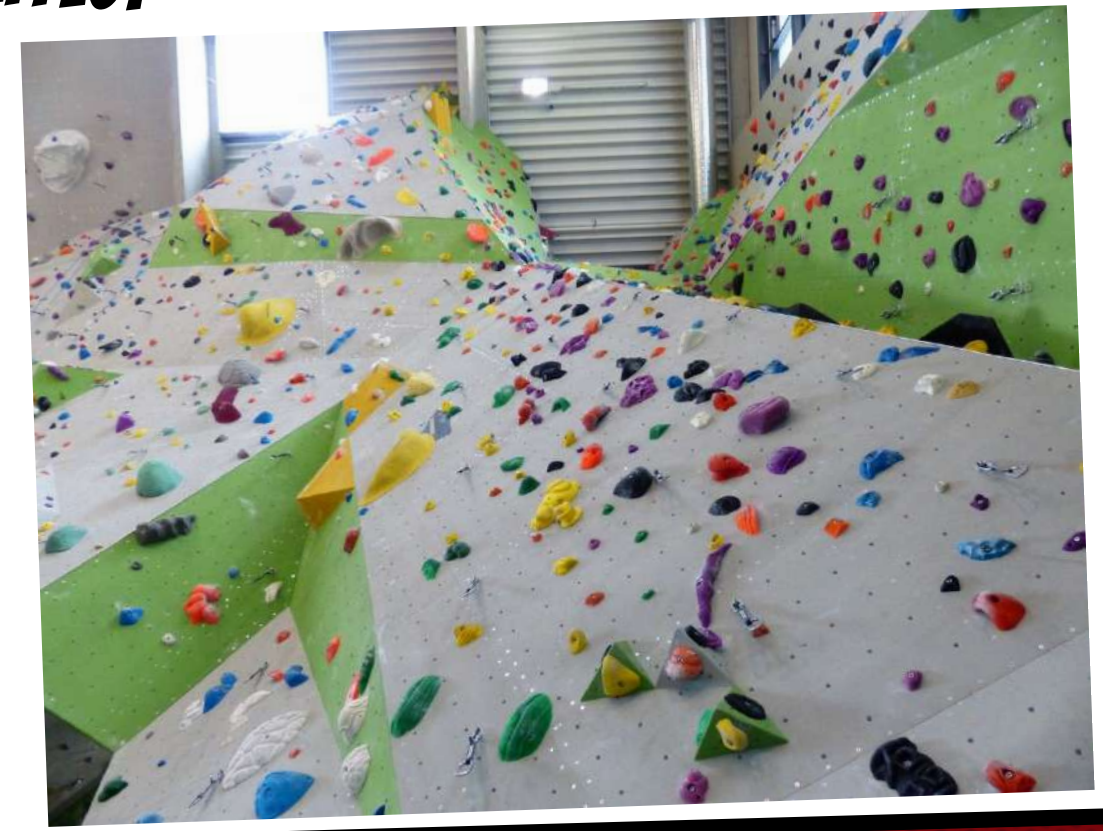
UNDERSTAND THE CONTEXT AND RESTRICTIONS OF YOUR SYSTEM, BEFORE CHOOSING TECHNOLOGIES.

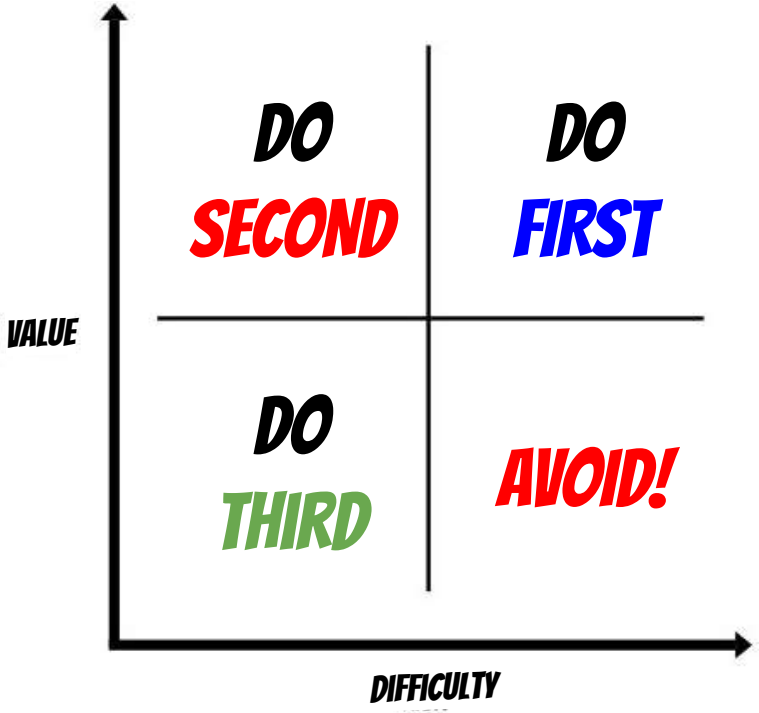
A HANDY TOOL: C4 DIAGRAMS



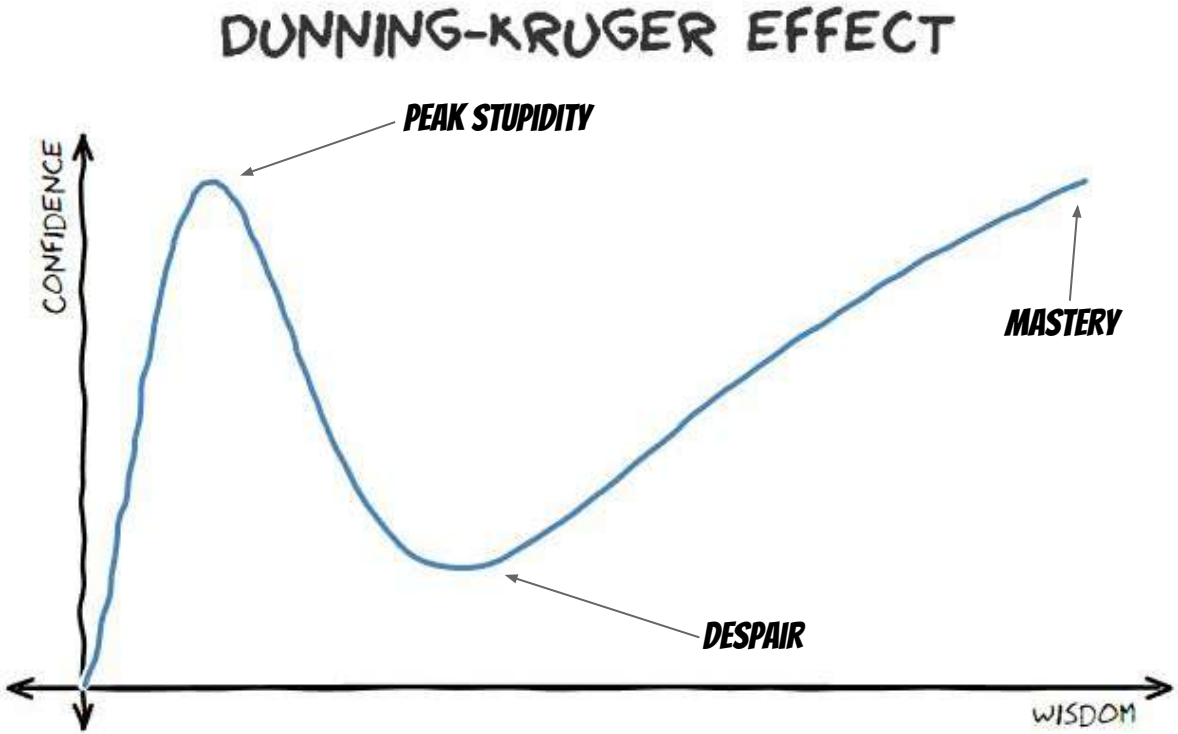
NEED TO ACT FAST

HARD-EASY EFFECT



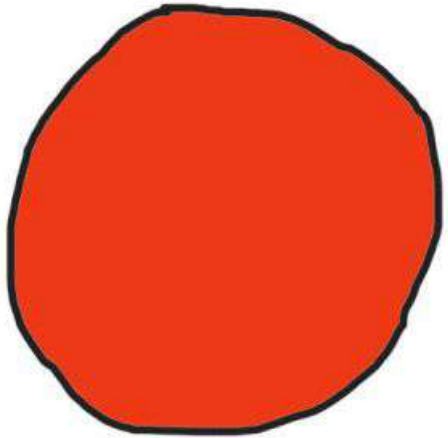


DO THE HARD STUFF FIRST!


DUNNING-KRUGER EFFECT
PEAK STUPIDITY
CONFIDENCE
MASTERY
DESPAIR
WISDOM

IMPOSTER SYNDROME

TYPES OF PEOPLE WHO CAN HAVE IMPOSTOR SYNDROME:



- ALL THE SMART, SUCCESSFUL PEOPLE THAT YOU THINK HAVE THEIR [redacted] TOGETHER

WANT TO MOVE FAST?

BY ALL MEANS.

BUT WE ARE BAD AT ASSESSING HOW MUCH WE DON'T KNOW.

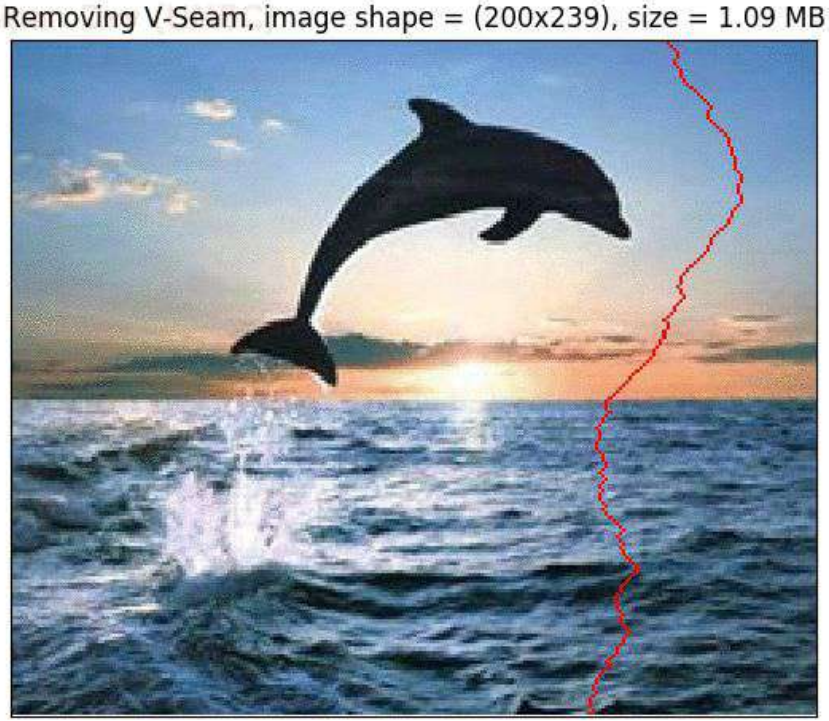
MAKE SURE UNKNOWN UNKNOWNS AREN'T GOING TO TRIP YOU.

DO THE HARD STUFF FIRST TO INCREASE YOUR RATE OF USEFUL LEARNING.

WHAT DO WE REMEMBER?

THE BRAIN'S COMPRESSION ALGORITHMS ARE IMPERFECT.

WE REMEMBER THE EMOTIONAL HIGH/LOW, AND THE END.

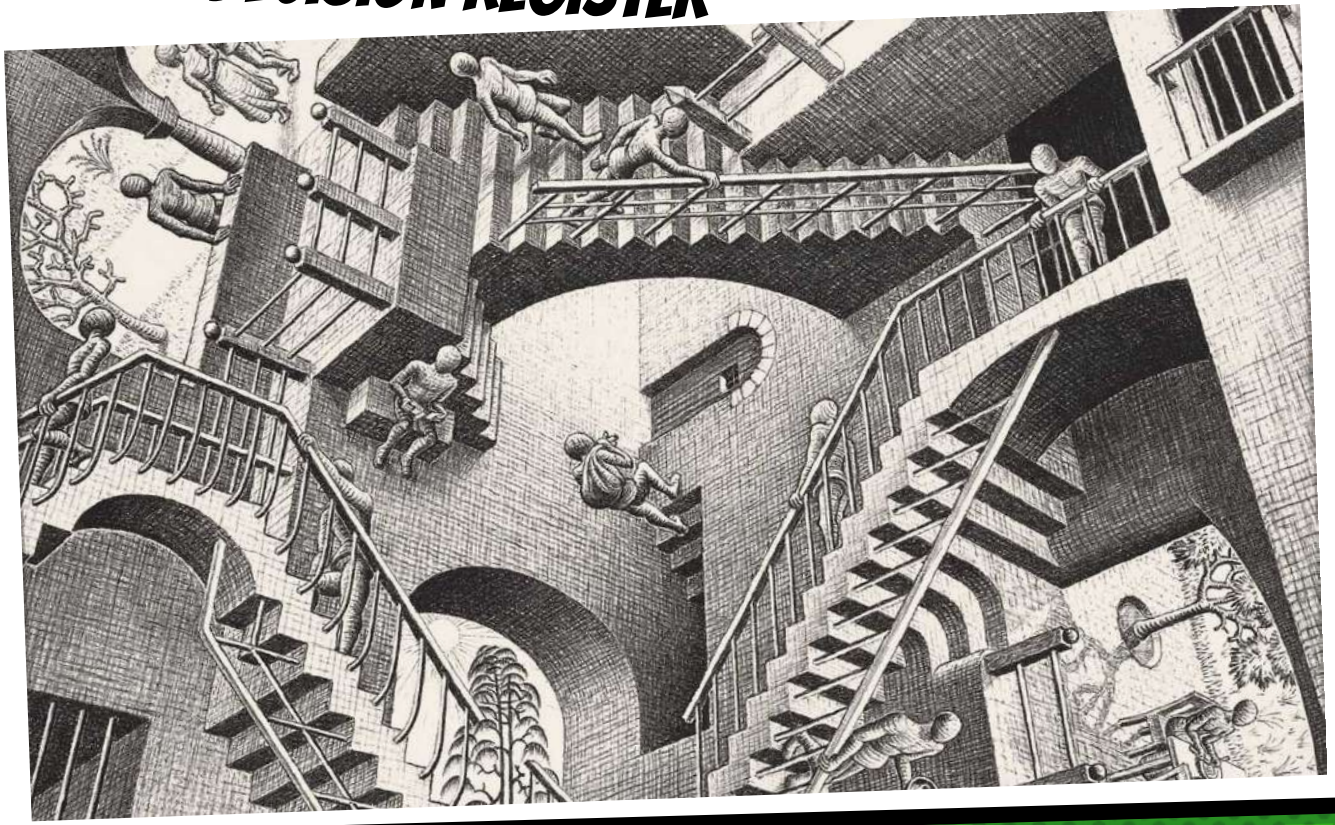


Sandipan Dey on datasciencecentral.com

We remember the emotional high/low, and the end.

Sandipan Dey on datasciencecentral.com

ARCHITECTURAL DECISION REGISTER

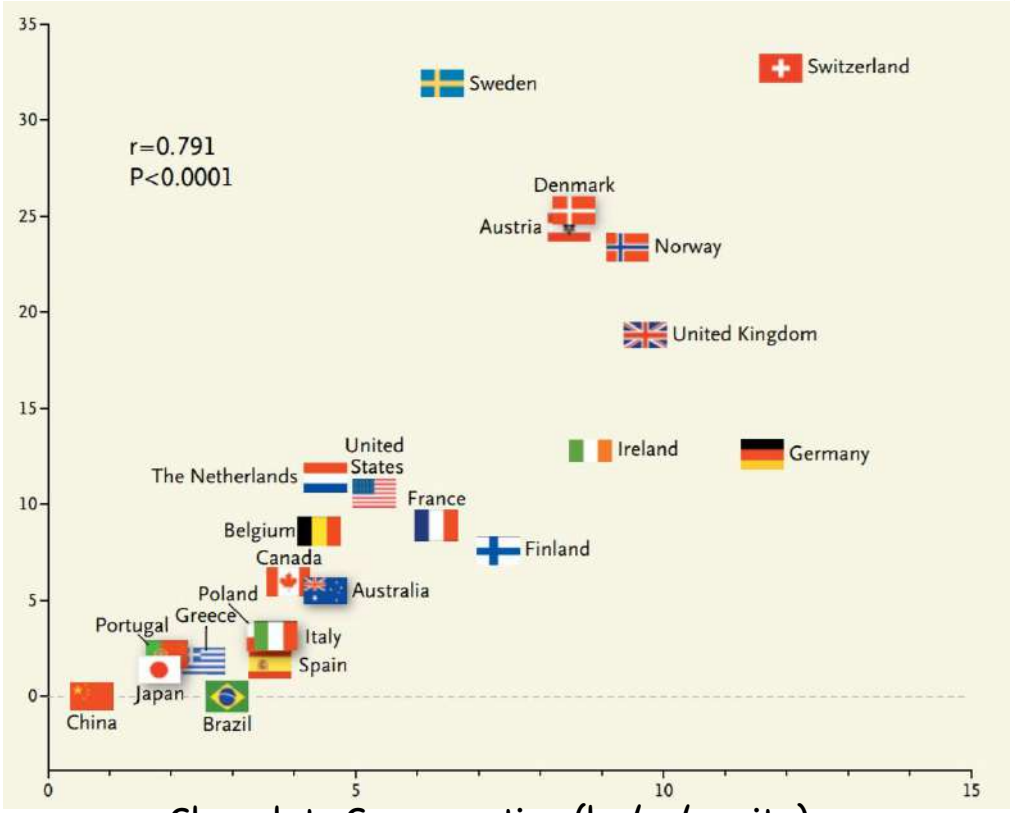


RELATIVITY
M.C. ESCHER

NOT ENOUGH MEANING

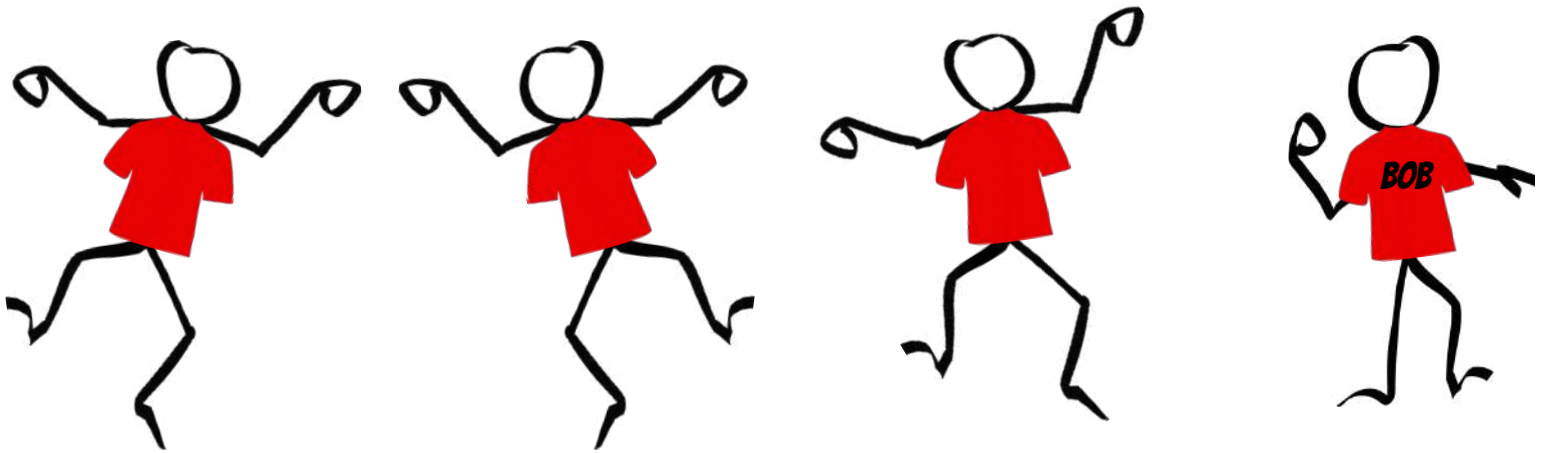
PATTERNS WHERE THERE ARE NONE?

Nobel Laureates per 10 Million Population

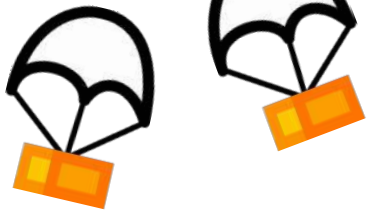


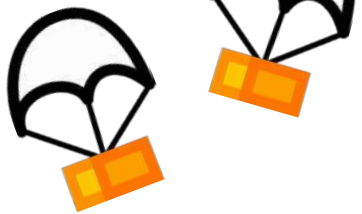
THE BRAIN LOVES A STORY.

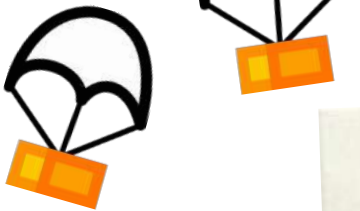
STEREOTYPING



CARGO CULTS



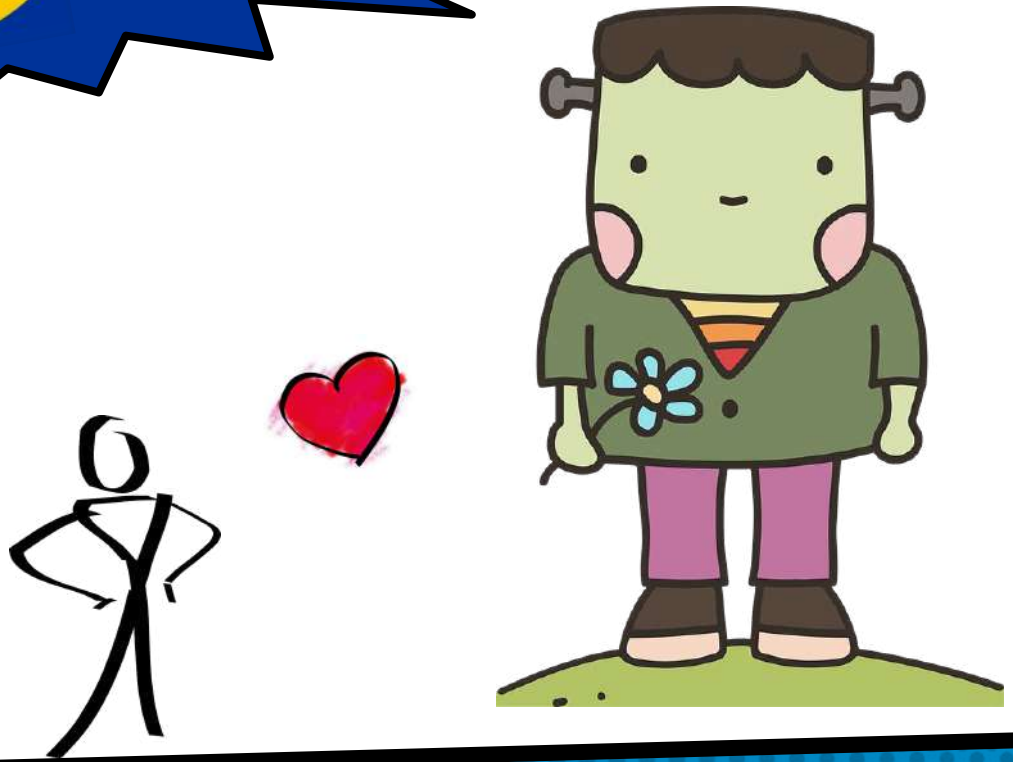




CARGO CULTS

Wenger 16999 Swiss Army Knife

IKEA EFFECT



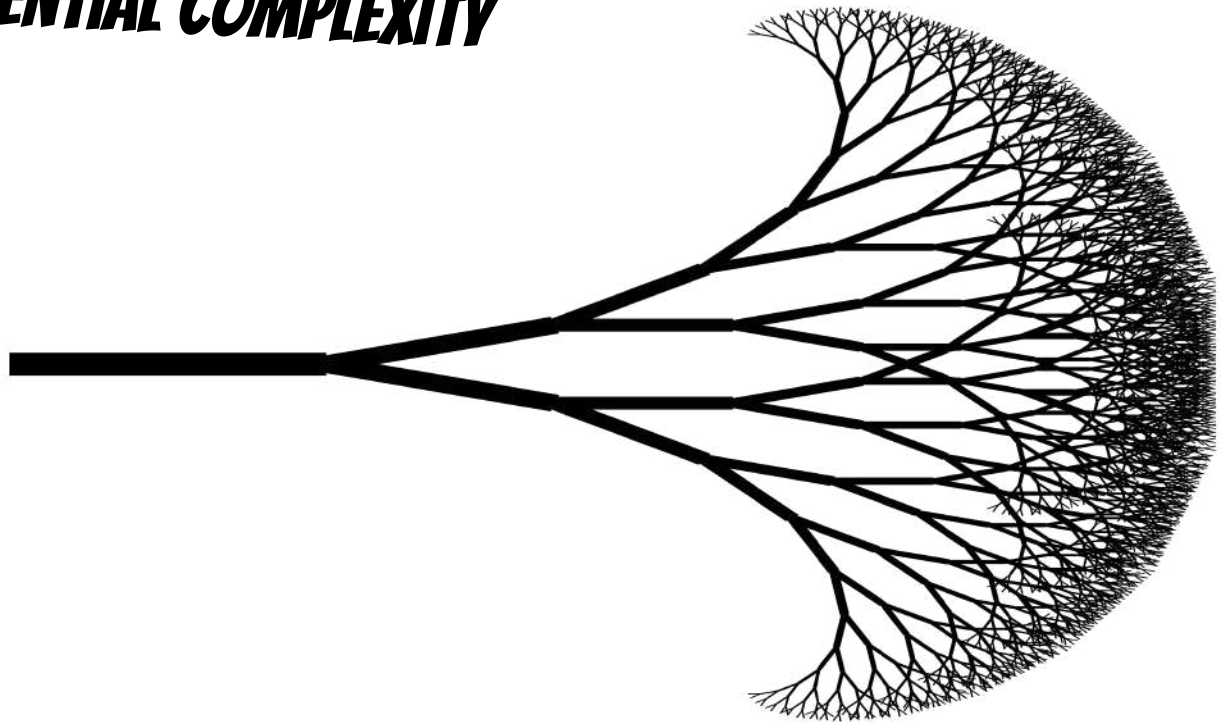
ESTIMATION

OF TIME AND COMPLEXITY

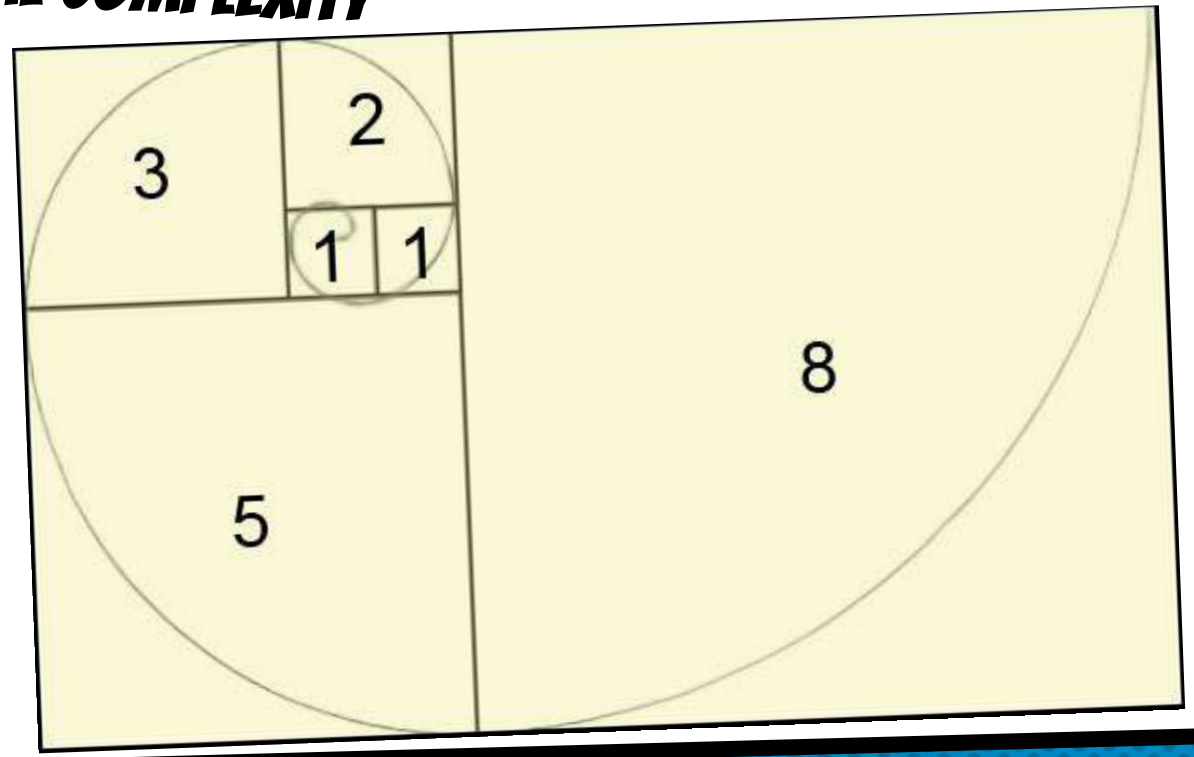
TL;DR

WE ARE REALLY BAD AT IT!

EXPONENTIAL COMPLEXITY



EXPONENTIAL COMPLEXITY



AND POSSIBLY THE MOST DANGEROUS OF THEM ALL...

YOUR BRAIN

NEW CONCEPT

THEOATMEAL.COM
(GO READ THE FULL CARTOON - IT'S FANTASTIC)

THE BACKFIRE EFFECT

NOT ENOUGH MEANING?

BEWARE THE STORIES YOUR BRAIN TELLS ITSELF.

IT WILL BELIEVE THEM AUTOMATICALLY.

LET YOUR REACTION HAVE ITS MOMENT, AND THEN REVALUATE.

PRESENT NEW IDEAS TO OTHERS IN WAYS THAT COMPLEMENT THEIR EXISTING VIEWS.

What just happened?

- There's too much information

  We use heuristics to discard some

- We need to move fast

  Feel overconfident, and focus on quick wins

- Memory is finite

  Remember the emotional highlights, not detail

- There's not enough meaning

  The brain tells stories, and believes them

What can we do about it?

Get enough sleep & avoid making decisions under stress!

- There's too much information

  Engage your logical brain. Break down the problem.

- There's not enough meaning

  Validate your gut instincts. Be mindful if your cache doesn't match reality.

- We need to move fast

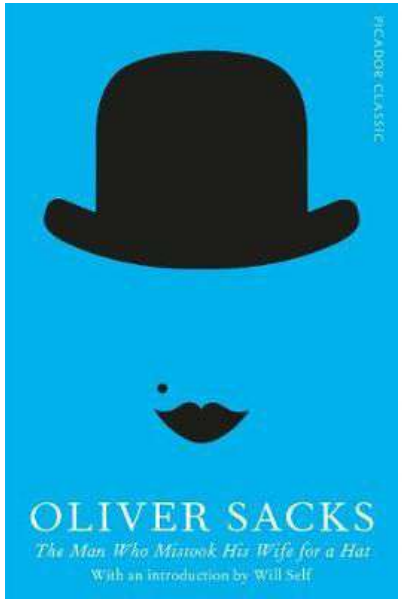
  Do the difficult, high value items early.

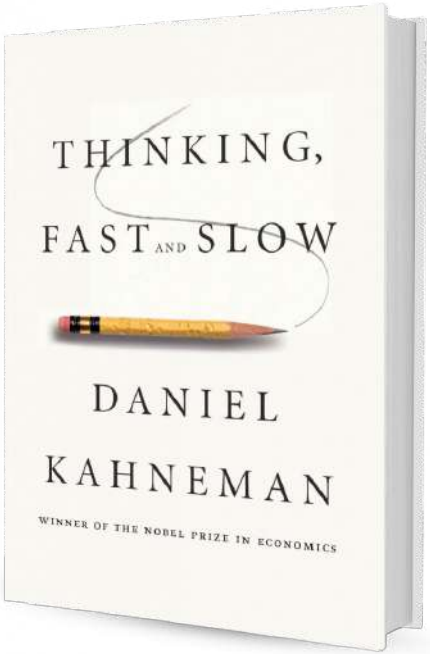
- We need to remember our reasoning

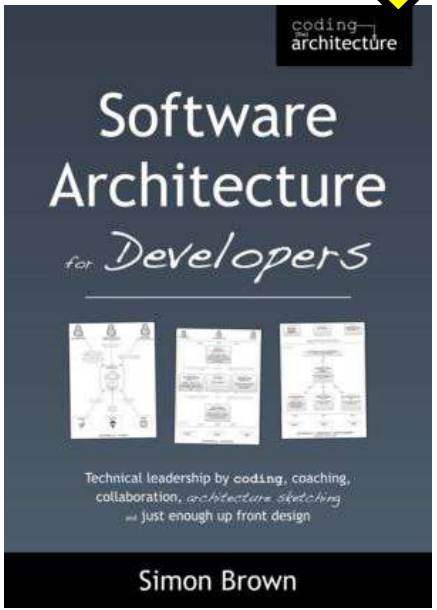
  Document and reflect on your decisions.

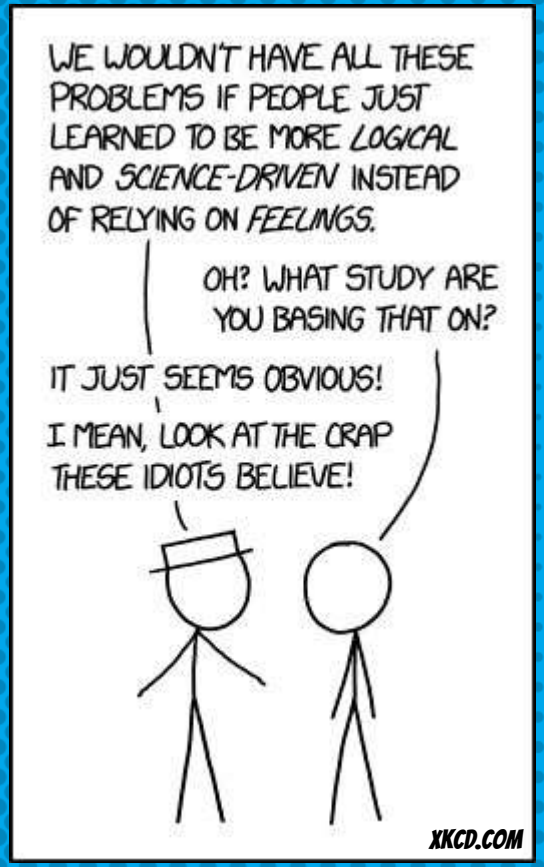
WHAT CAN I DO ABOUT ALL OF THIS?

http://theoatmeal.com/comics/believe









THANKS FOR LISTENING!

@FahranWallace

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