

please

Ask questions
through the app



Rate Session

Thank you!





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.***



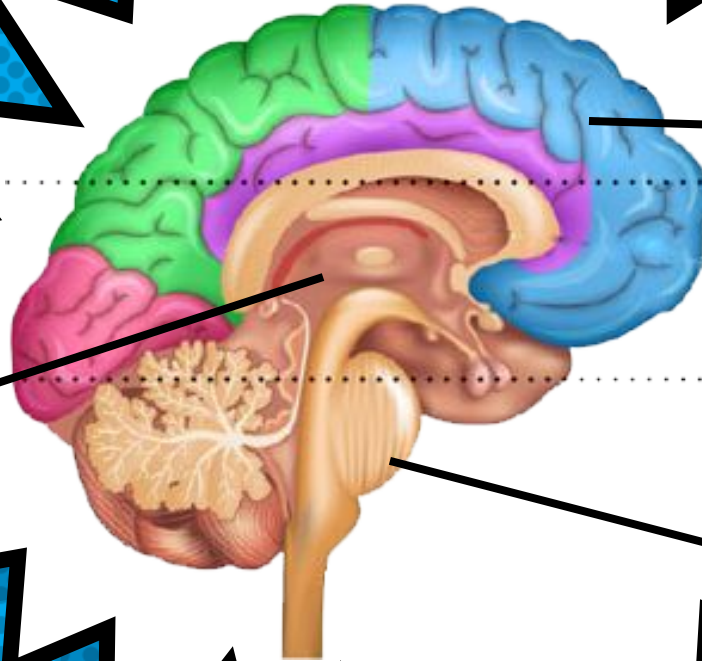
The Shining

BASIC BRAIN MODEL



**LIMBIC
SYSTEM**

FAST!



NEOCORTEX

SLOW*

FAST!

BRAIN STEM

mattyhex @ DeviantArt
(<https://creativecommons.org/licenses/by/3.0/>)

THINKING FAST AND SLOW (DANIEL KAHNEMAN)

FAST!

1+1=?

USE A FAMILIAR
KEYBOARD
SHORTCUT

READING
VAR X = 2;

RECALLING FEELINGS
ABOUT A PARTICULAR
TECHNOLOGY

SYSTEM 1

SLOW...

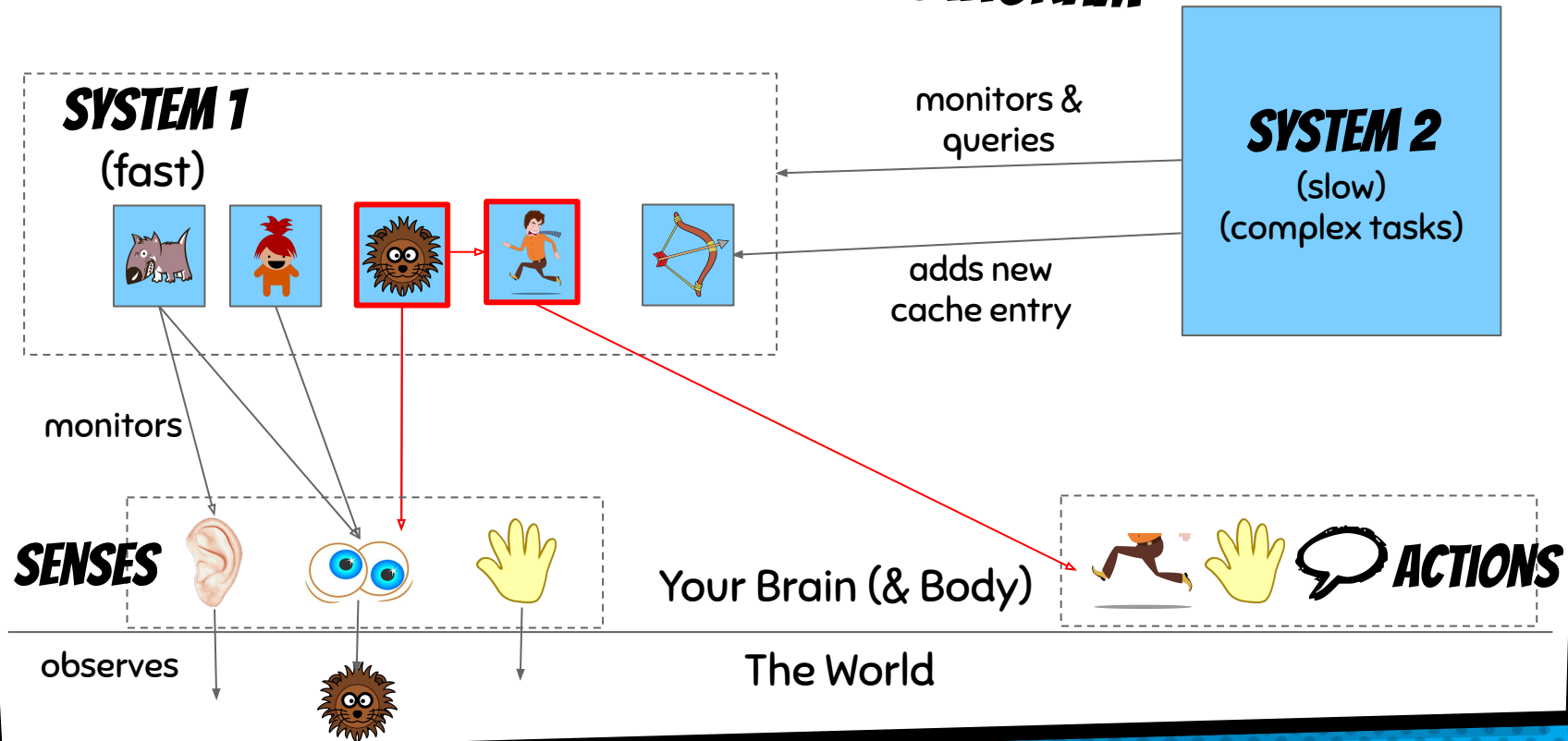
WHAT ISOLATION
LEVEL DOES THIS
DATABASE NEED?

TRACKING DOWN A
GNARLY BUG

DRAWING THE
ARCHITECTURE OF
A SYSTEM

SYSTEM 2

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

COGNITIVE BIAS CODEX

TOO MUCH INFORMATION

- We notice things already in memory or repeated
- We tend to find stories and patterns even when looking at sparse data
- We notice flaws in others more easily than than we notice flaws in ourselves
- We project our current mindsets, assumptions onto the past and future
- We think we know what other people are thinking
- We have characteristics from stereotypes, generalities, stereotypes
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NOT ENOUGH MEANING

NEED TO ACT FAST

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WHAT SHOULD WE REMEMBER?

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TOO MUCH **INFORMATION**

PICK A NUMBER. ANY NUMBER.

***WAS IT
SEVEN?***

JUST KIDDING.

***PICK ANOTHER NUMBER, THIS TIME
LESS THAN 5,000,000.***

TOO MANY THINGS TO CHOOSE FROM?



cassandra



CouchDB
relax



MySQL®



PostgreSQL



Cockroach



DynamoDB

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

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

ANCHORING EFFECT



AVAILABILITY HEURISTIC

WAIT!
HAMMER
NO!

QUIET
NAIL.



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.

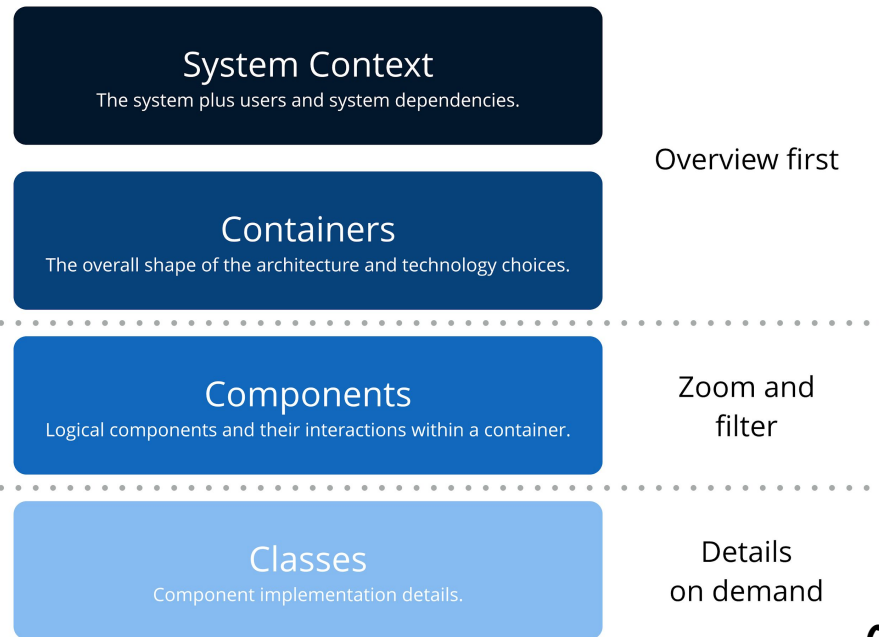
YOU MIGHT BE EXPERIENCING...

**THE DESIGN STARTED OFF GREAT; BUT IS SLOWLY STARTING TO CREAK
UNDER THE WEIGHT OF *THINGS YOU DIDN'T INITIALLY THINK OF.***

**A COMPONENT THAT DOESN'T SATISFY REQUIREMENTS PARTICULARLY
WELL, BUT IT'S *THE ONE WE ALWAYS USE.***

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

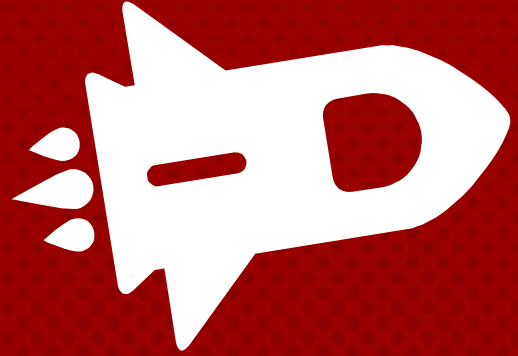
A HANDY TOOL: C4 DIAGRAMS



C4MODEL.COM

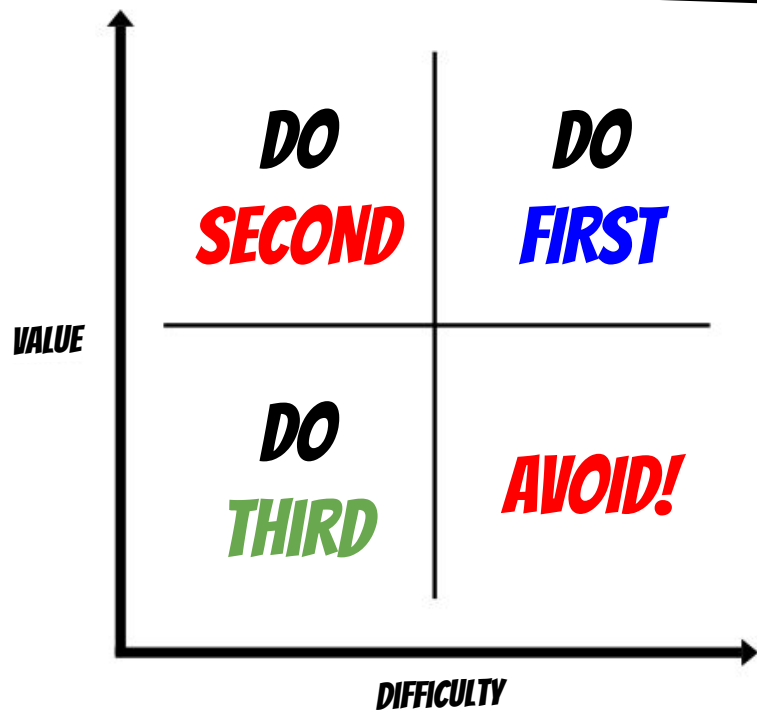
NEED TO

ACT FAST



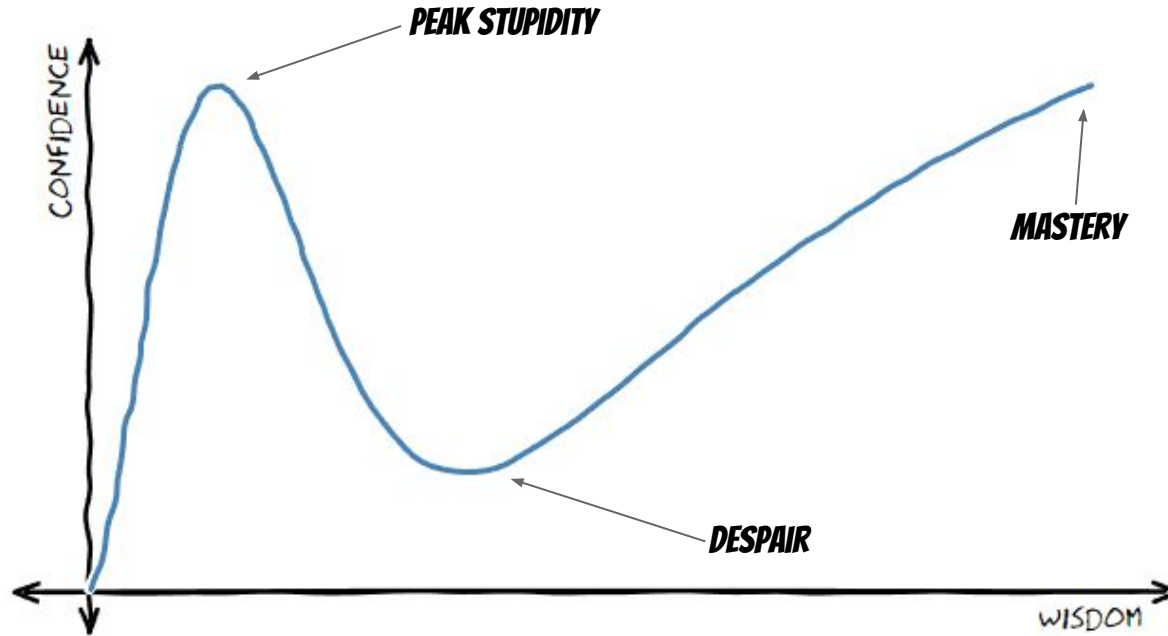
HARD-EASY EFFECT





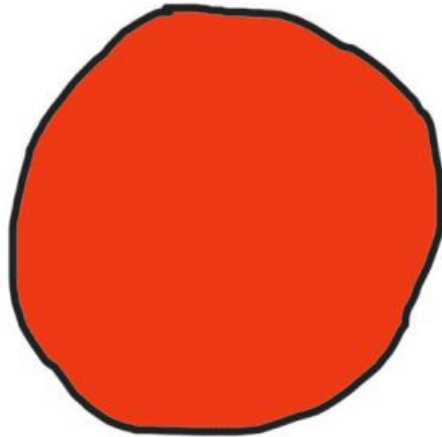
DO THE HARD STUFF FIRST!

DUNNING-KRUGER EFFECT

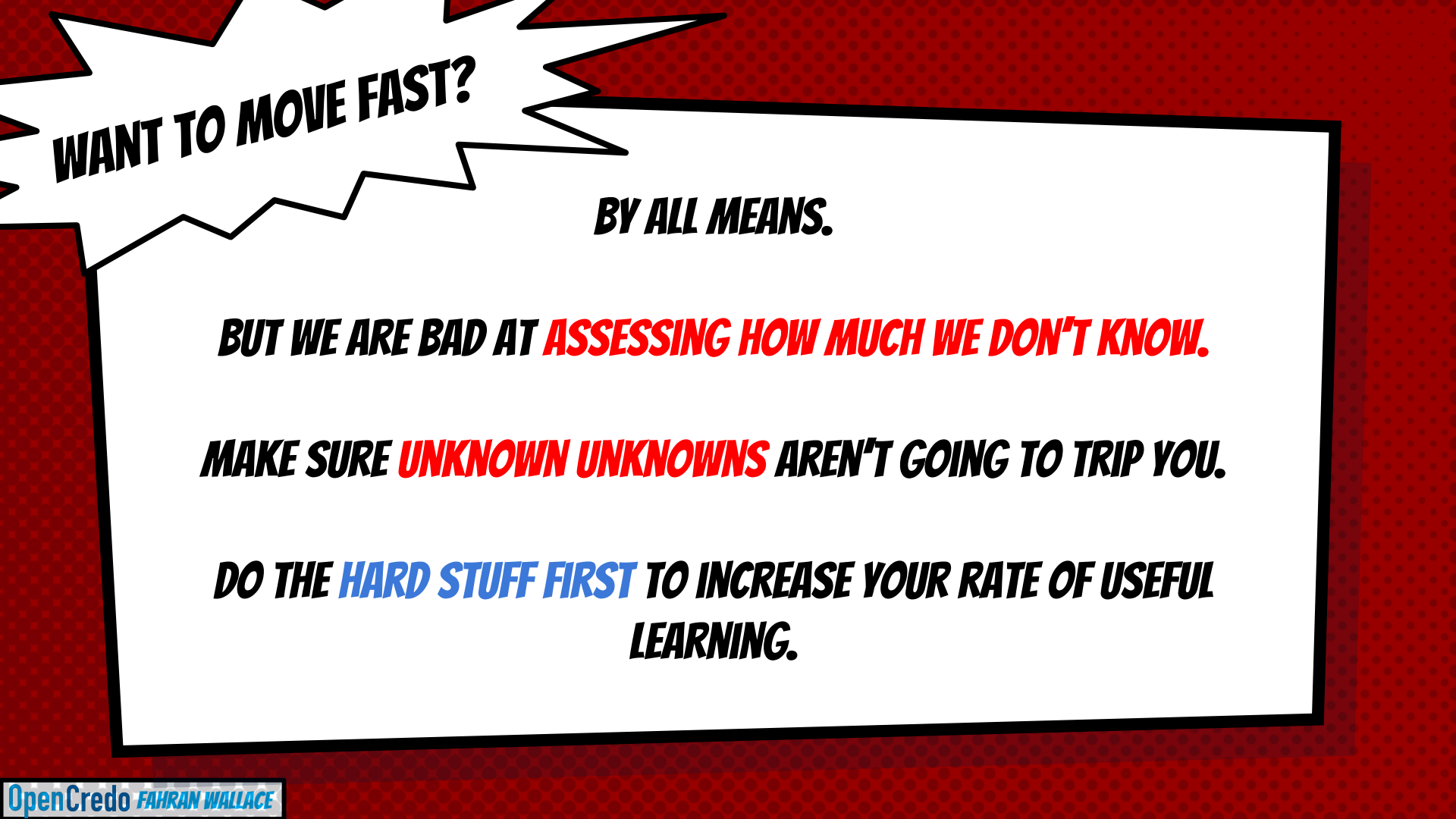


IMPOSTER SYNDROME

TYPES OF PEOPLE WHO CAN
HAVE IMPOSTOR SYNDROME:



- ALL THE SMART, SUCCESSFUL
PEOPLE THAT YOU THINK
HAVE THEIR ■ TOGETHER



WANT TO MOVE FAST?

BY ALL MEANS.

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

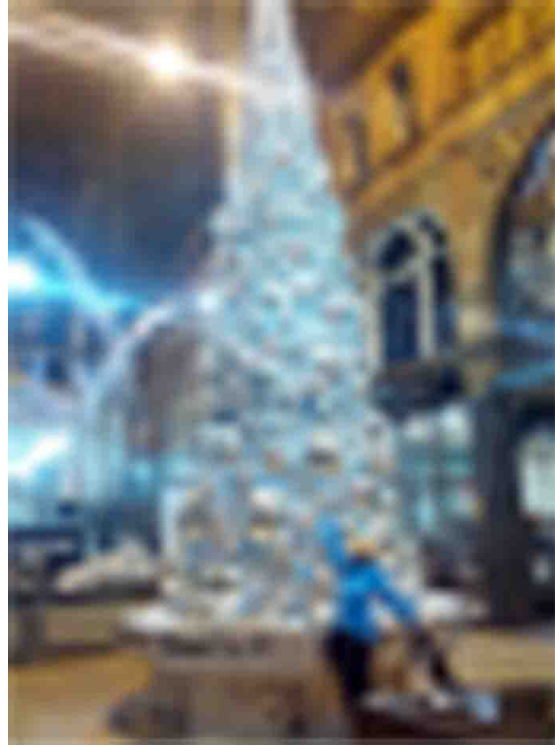
MAKE SURE *UNKNOWN UNKNOWN* AREN'T GOING TO TRIP YOU.

**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.

Sand Removing V-Seam, image shape = (200x239), size = 1.09 MB



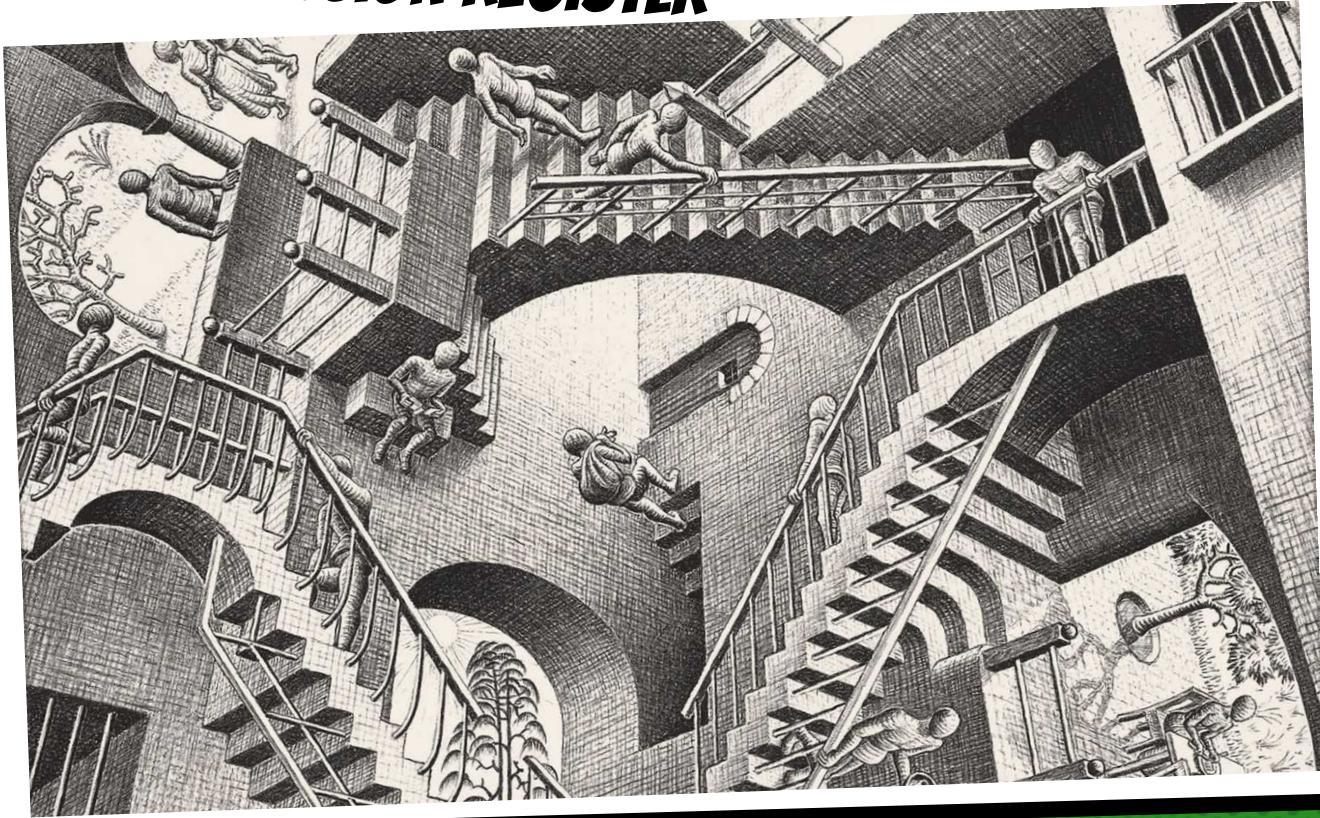
Sandipan Dey on datasciencecentral.com

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



Sandipan Dey on datasciencecentral.com

ARCHITECTURAL DECISION REGISTER



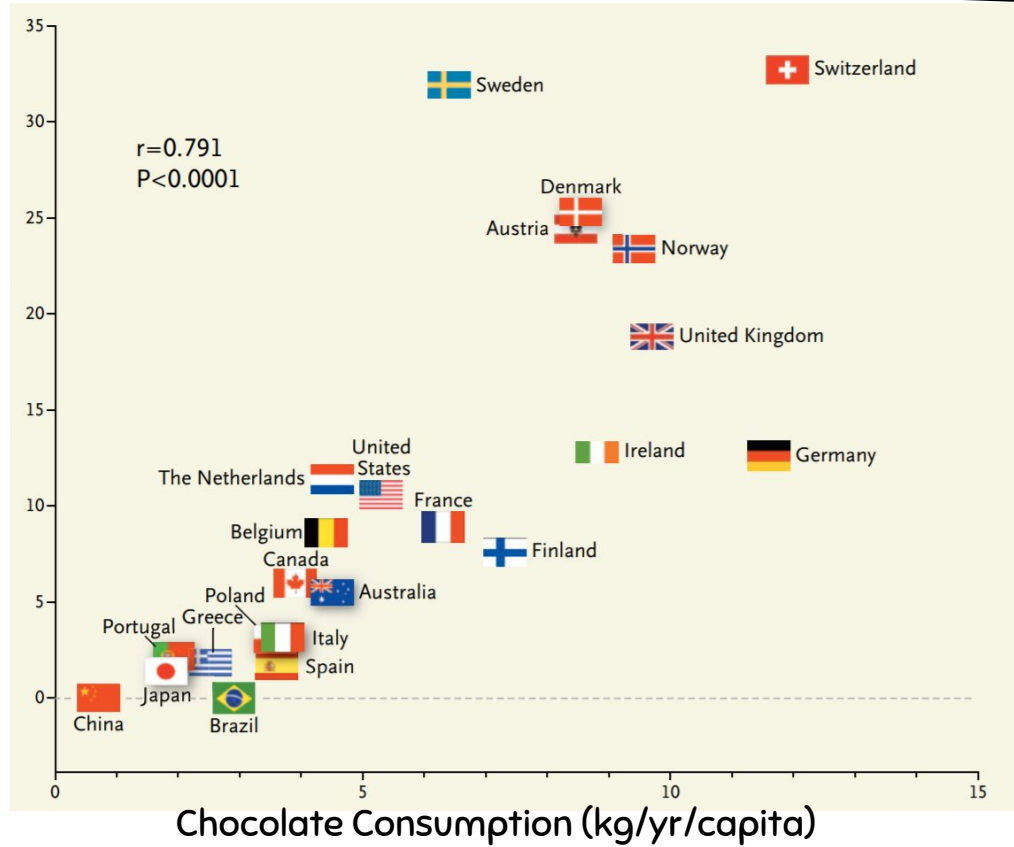
RELATIVITY
M.C. ESCHER

***NOT ENOUGH
MEANING***

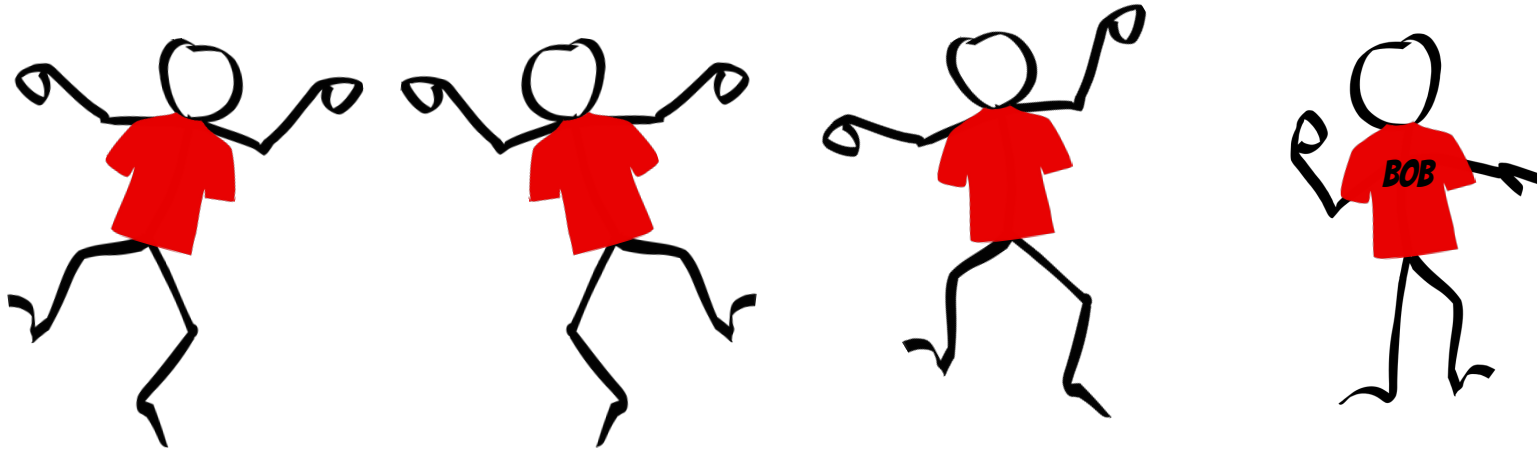
PATTERNS WHERE THERE ARE NONE?

Nobel
Laureates
per 10 Million
Population

THE BRAIN LOVES A STORY.



STEREOTYPING



CARGO CULTS

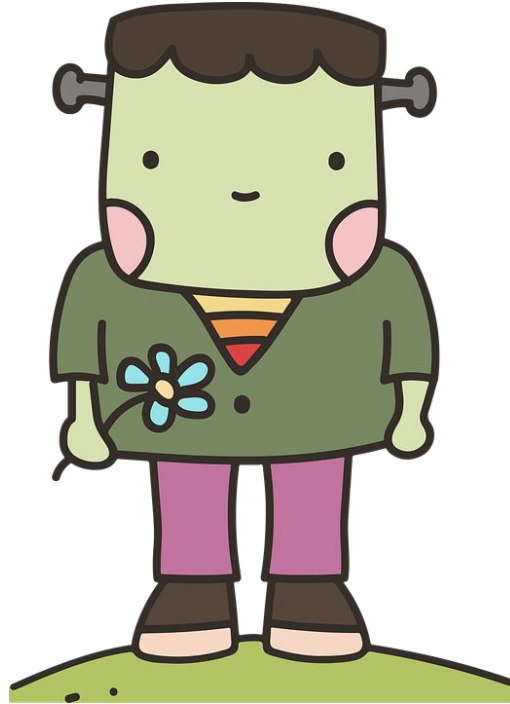
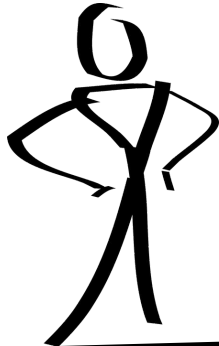


CARGO CULTS



Wenger 16999 Swiss Army Knife

IKEA EFFECT



ESTIMATION

OF TIME AND COMPLEXITY



TL:DR

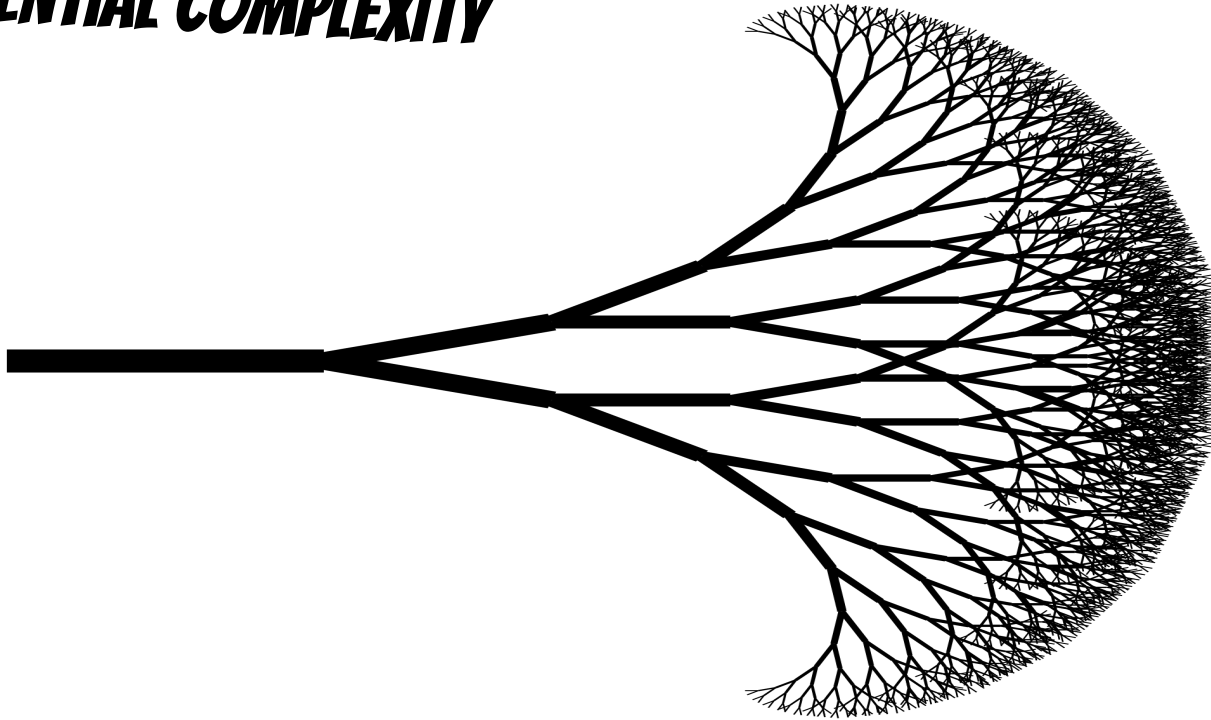
WE ARE

REALLY

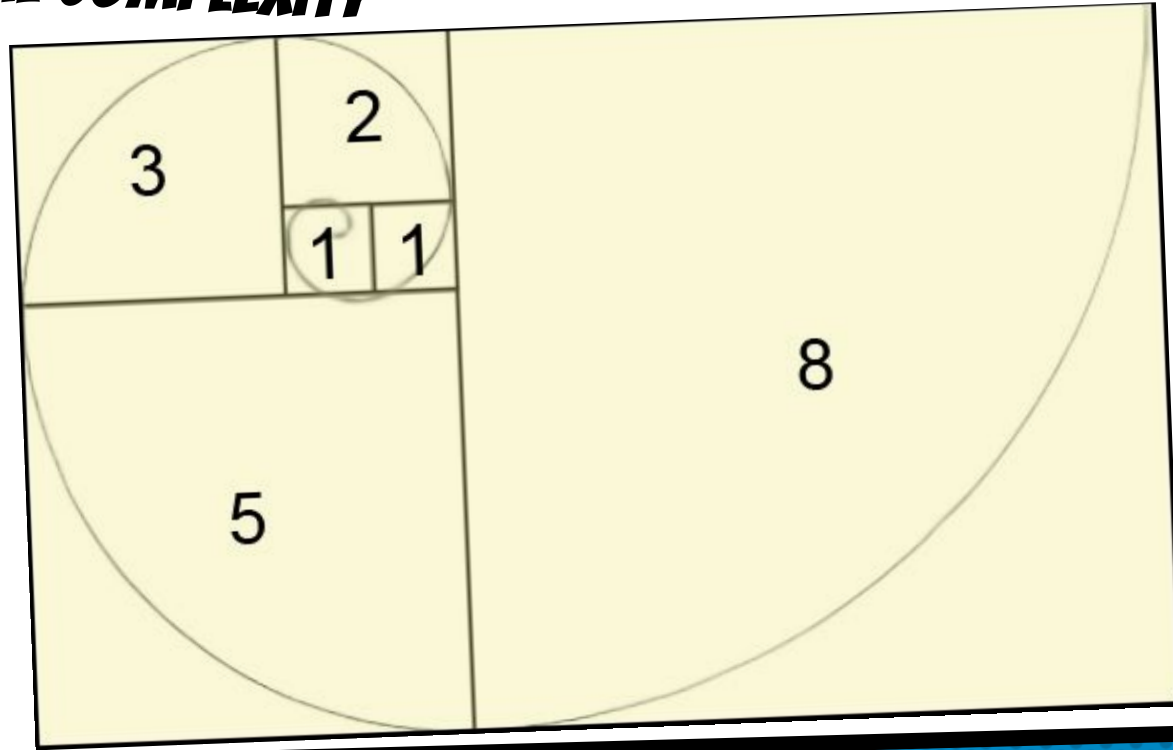
BAD AT IT!



EXPONENTIAL COMPLEXITY



EXPONENTIAL COMPLEXITY



AND POSSIBLY THE MOST DANGEROUS OF THEM ALL...

NEW CONCEPT



YOUR BRAIN

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 REEVALUATE.

***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



FAST!



SLOW...

- ***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

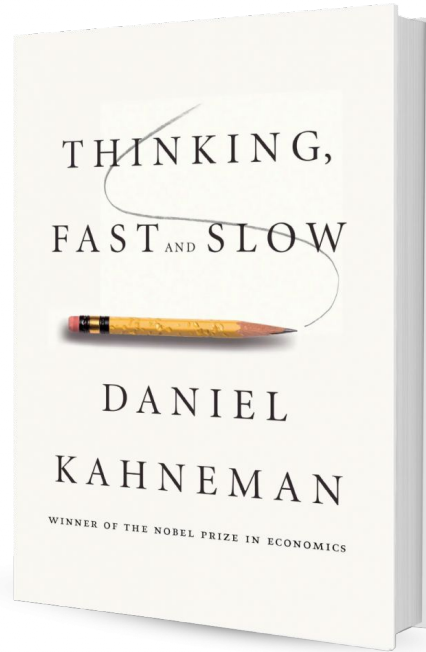
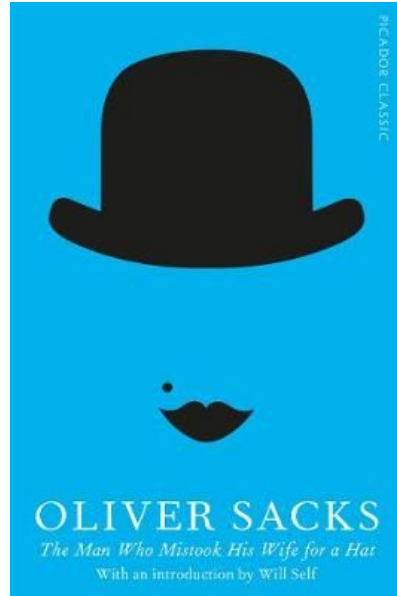
WHAT CAN WE DO ABOUT IT?

- ***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.***

***GET ENOUGH SLEEP & AVOID
MAKING DECISIONS UNDER
STRESS!***

WHAT CAN I DO ABOUT ALL OF THIS?

<http://theoatmeal.com/comics/believe>

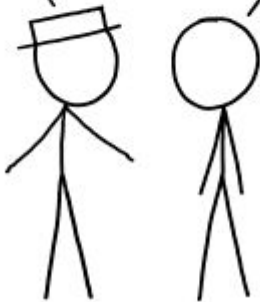


WE WOULDN'T HAVE ALL THESE PROBLEMS IF PEOPLE JUST LEARNED TO BE MORE LOGICAL AND SCIENCE-DRIVEN INSTEAD OF RELYING ON FEELINGS.

OH? WHAT STUDY ARE YOU BASING THAT ON?

IT JUST SEEMS OBVIOUS!

I MEAN, LOOK AT THE CRAP THESE IDIOTS BELIEVE!



XKCD.COM

THANKS FOR LISTENING!

@FahranWallace

opencredo.com | fahran.net

Please

**Remember to
rate this session**

Thank you!

