

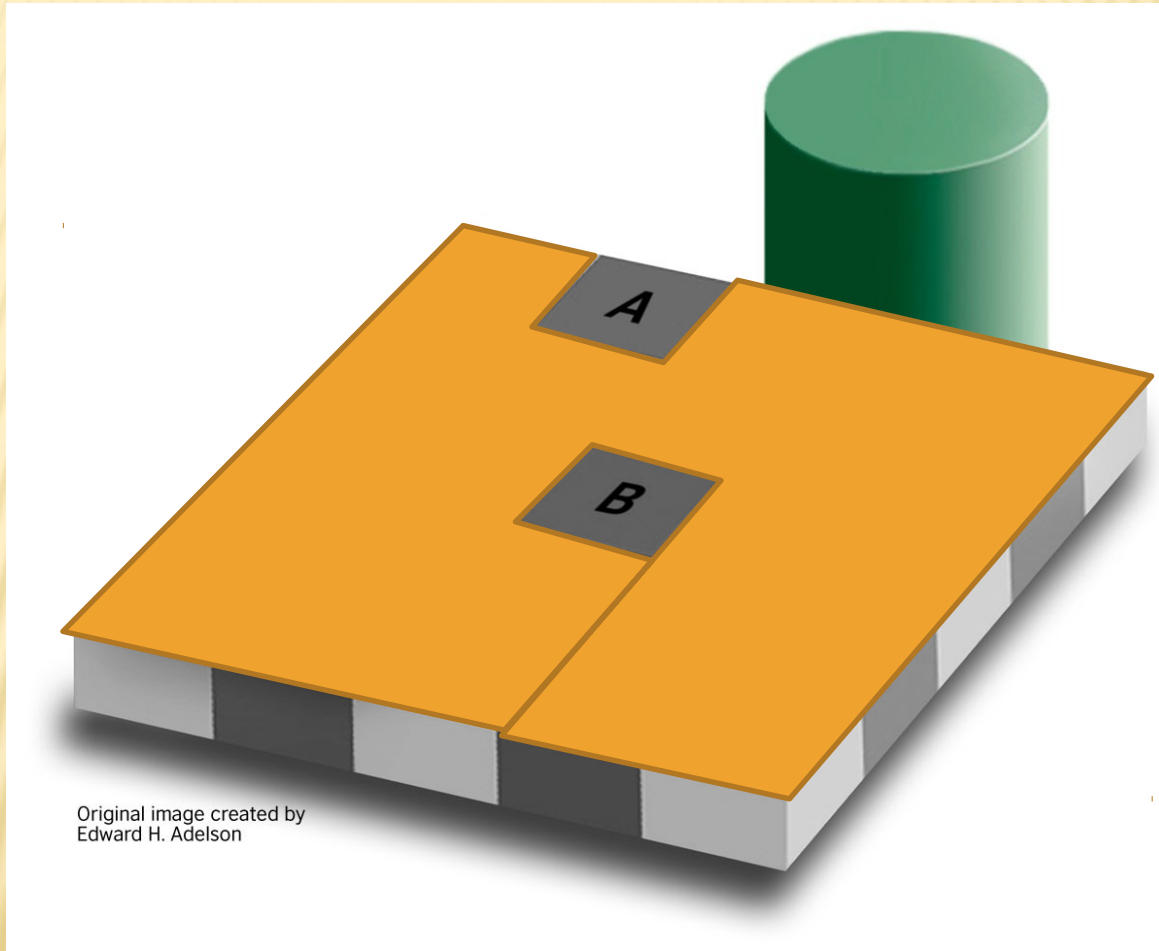
What they are and why they matter (also) in software development

COGNITIVE BIASES

COGNITIVE BIASES

- ✘ Systematic deviations from standard rationality or good judgment committed by our cognition.
- ✘ Predictable irrationality

AN EXAMPLE



ANOTHER EXAMPLE

- ✘ John has to drive 100 km to go to visit his girlfriend
 - ✘ He drives from home to his girlfriend at an average of 100 Km/h
 - ✘ Coming back, John drives at an average of 50Km/h
 - ✘ What is John's average speed?
- ✘ A 77,7 km/h B 75 km/h C 66,6 km/h

OUR BRAIN CAN TRICK US

- ✘ The human brain makes operations which solve cognitive tasks through ‘shortcuts’, that work well on some cases but fail in others.
- ✘ The cognitive modules that make those tasks are universals in the human species, how and where those shortcuts lead to mistakes are also regular.

OUR BRAIN CAN TRICK US

- ✘ We do not think “well”
- ✘ We do not think enough

- ✘ A **heuristic** is a quick, intuitive strategy for reasoning or decision making, as opposed to more formal methods.

LIST OF COMMON BIASES AFFECTING SW DEV

- ✘ Survivor(ship) bias
- ✘ Ambiguity effect
- ✘ Confirmation bias
- ✘ Attentional bias
- ✘ Hindsight Bias
- ✘ Conjunction fallacy
- ✘ Status quo bias
- ✘ Sunk cost fallacy

- ✘ Literature documents about 100 biases

SURVIVORSHIP BIAS

- ✘ You should focus on the successful if you wish to become successful.
- ✘ When failure becomes invisible, the difference between failure and success may also become invisible

SURVIVORSHIP BIAS

- ✘ Focus on the problem reports may distract from the problems that steer away users from our software
- ✘ **Abraham Wald**



- + (Hungarian: *Wald Ábrahám*,
October 31, 1902 – December 13, 1950)

AMBIGUITY EFFECT

- ✘ Tendency to avoid options for which missing information makes the probability seem "unknown."
- ✘ If the only tool you have is a hammer, it is tempting to treat everything as if it were a nail.

AMBIGUITY EFFECT

- ✘ Do we always take the time to choose the best language/framework/tool for the job?
- ✘ Who has not written from scratch a class/library even if there is one available that could serve the purpose?

CONFIRMATION BIAS

- ✘ Defined as the tendency of people to verify their hypotheses rather than refuting them.
- ✘ Due to the tendency towards positive tests, most of the software defects remain undetected, which in turn leads to an increase in software defect density.
- ✘ A little test

CONFIRMATION BIAS EXPERIMENT

- ✘ You are asked to reverse engineer a protocol
- ✘ The protocol consist of a sequence of integer numbers
- ✘ The first reading is:

2 4 6

- ✘ You are asked to provide me other sequences to verify your understanding of the protocol

CONFIRMATION BIAS EXPERIMENT

- ✗ Well the protocol is:
 - + The sequence must not decrement
- ✗ Most of the people propose only sequences that are meant to confirm their assumptions

ATTENTIONAL BIAS

- ✘ Tendency to pay attention to emotionally dominant stimuli in one's environment and to neglect relevant data when making judgments of a correlation or association.

ATTENTIONAL BIAS

- ✘ Developers show the prototype of a GUI, the customers expect that the product is almost ready

HINDSIGHT BIAS

- ✘ Once you know something it seems obvious
- ✘ People underestimate how much new information affect them
- ✘ Once a bug is solved the solution looks most of the times trivial
- ✘ This leads us to systematically underestimate the time we will need to fix the next bug...

CONJUNCTION FALLACY

- ✘ The tendency to assume that specific conditions are more probable than general ones.
- ✘ A little test...

CONJUNCTION FALLACY TEST

- ✘ Last test cycle highlighted that 80 of the bugs were introduced by Ioannis
- ✘ Ioannis has in the meanwhile coded other three modules **D**, **E** and **G**
- ✘ Is it more probable that:
 - + There will be bugs in all three modules
 - + There will be bugs in two of the three modules
 - + There will be bugs in one of the three modules

STATUS QUO BIAS

- ✘ People tend to prefer the current status/baseline over a new one
- ✘ This affects managers, developers and even the users
- ✘ Loss aversion, Omission bias

STATUS QUO BIAS

- ✘ Why the users do not use the latest version of my software?
- ✘ Changing team composition is going to affect negatively the team's productivity

SUNK COST FALLACY (AKA “THE CONCORDE FALLACY”)

- ✘ The more you invest in something the harder it becomes to abandon it.

WHAT CAN WE DO

- ✘ Awareness of the bias has no effect
- ✘ Actually *smart* people tend to be more biased than others

CONCLUSION, LAST BIAS

- ✘ Bias blind spot
- ✘ the tendency to see oneself as less biased than other people, or to be able to identify more cognitive biases in others than in oneself.
- ✘ That's why I am warning you about these biases
- ✘ Because I am not affected by any of them