

Software correctness

or: you can't write good code, and, even if
you could, you'd still be screwed

You live by Max's rules now

- we *will* get philosophical
- you *will* like it
- participate or die

DISCUSSION QUESTION

What does it mean for software to be correct?

Type your answer, but wait for our cue to send it.

no bugs

a bug is a line that can't get no love from me

DISCUSSION QUESTION

What is a bug?

Type your answer, but wait for our cue to send it.

“

A software bug is an error, flaw or fault in a computer program or system that causes it to produce an incorrect or unexpected result, or to behave in unintended ways.

”

—Wikipedia

What is expected behavior?

- Specification, formal or informal
- Homework assignment
- Vague notion of what you want your code to do

Why do you care if your code deviates from the spec?

- We tricked rocks into thinking
- Code doesn't really matter anyway
- Your professor has docked you points

DISCUSSION QUESTION

Why does it matter if your code deviates from a spec?

Type your answer, but wait for our cue to send it.

Why do you care (but for real)?

Computers are supposed to help people. Software has invaded every part of life. Billions of people rely on it every day, sometimes for life-critical functions.

You might care if your radiation therapy machine kills you.

...or if you go to jail due to bad facial recognition "AI."

...or your flights get delayed.

...or if you or your company are bleeding money.

...or your personal project is very frustrating.

Kinds of bugs

- Race condition
- Undefined behavior
- Memory error
- Unhandled exceptional case (leading to crashes)
- Being wrong about your problem domain
- Typos
- ...

we're screwed

right?

Minimizing the number of bugs

You are not going to squash them all

- Programming language choice
- Using library code
- Prove it
- Test it
- Bop it
- Have good engineering practices
- ...and more

Use your judgement



Gary Bernhardt

@garybernhardt



A lot of programming advice has a missing "...usually". Don't test third party systems... usually. But if your business relies on Stripe's proration behavior, you want to test that. Neither you nor the next dev have perfect knowledge of Stripe, and billing code is high-risk.

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Falsehoods Programmers Believe About X

- [Addresses](#)
- [Language](#)
- [Gender](#)
- [Names](#)
- [Time](#)

<https://github.com/kdeldycke/awesome-falsehood>

Other assumptions

- Assumption: integers are unbounded
 - See: Boeing plane restarts
- Assumption: floating point is good for all math and maybe even money
 - See: <https://0.30000000000000004.com/>
- Assumption: writing to disk can't fail



David J. Pearce

@whileydave



Replying to [@wilcoxjay](#)

Verifier could have a bug; hardware could have a bug; virtual machine could have a bug; compiler could have a bug; specification could be wrong or too weak; deployed program might be linked against different version of library.

10:48 PM · Nov 9, 2021 · Twitter for iPhone