Debugging Python

RSE Seminar, 17.11.2026

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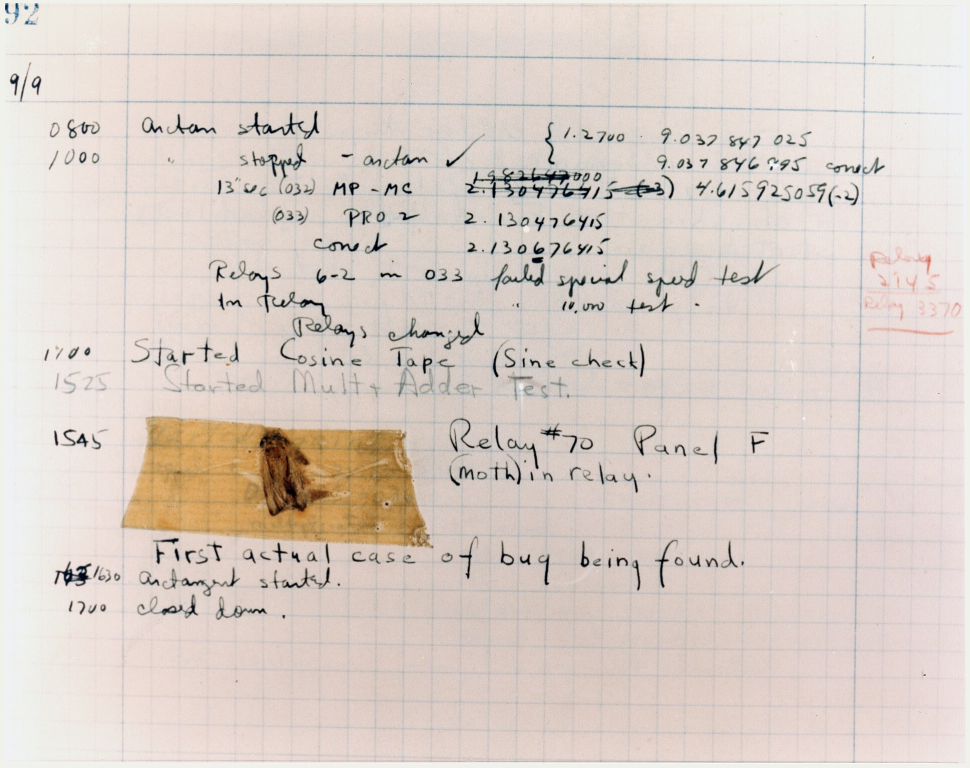
AAAhhhhh, bug?!?!!



This is a bug...

but seriously...



9 September 1947

why do we say "bug"?



Grace Hopper

real-world examples...

- ESA rocket *Ariane V88* exploded in 1996, with a loss of ~350 mil CHF (integer overflow)
- NASA space probe *Mars Climate Orbiter* failed on arrival in 1999, costing ~100 mil CHF (unit mismatch)
- OpenSSL *Heartbleed* venerability, exposing encrypted data over the internet without detection, in 2014 (out of bounds read)

just to name a few...

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  - logical issues in software design

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- human error!!!!!
  - logical issues in software design
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  - miscommunication, etc.
- hardware flaws
  - *Spectre* venerability (speculative execution exploit)
- random stuff
  - bit rot, EM interference, etc.

what is debugging?

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what is debugging?

- identifying where the bug is
- figuring out the cause
- applying a fix

Python Examples

see code samples

preventing them?

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- code testing
  - static testing
  - unit testing
  - programming language features

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- code testing
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  - programming language features
- reviewing code

preventing them?

- code testing
  - static testing
  - unit testing
  - programming language features
- reviewing code
- programming style

fin

Thank you!!!

Any questions?