

# Recitation 2

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MIT - 6.033  
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# What happened?

- Used 5 blocks instead of 4
- Software only supported 4
  - ↳ drew shape of block as custom
- Computer miscalculated dose when shapes drawn with zero-width segments

## SHOW SLIDES

- Overworked physicist, <sup>16 hr. days</sup> didn't manually check dosing times
- Patients got 20% - 2x more radiation than they should have
  - ↳ staff didn't notice that treatment times 2x others

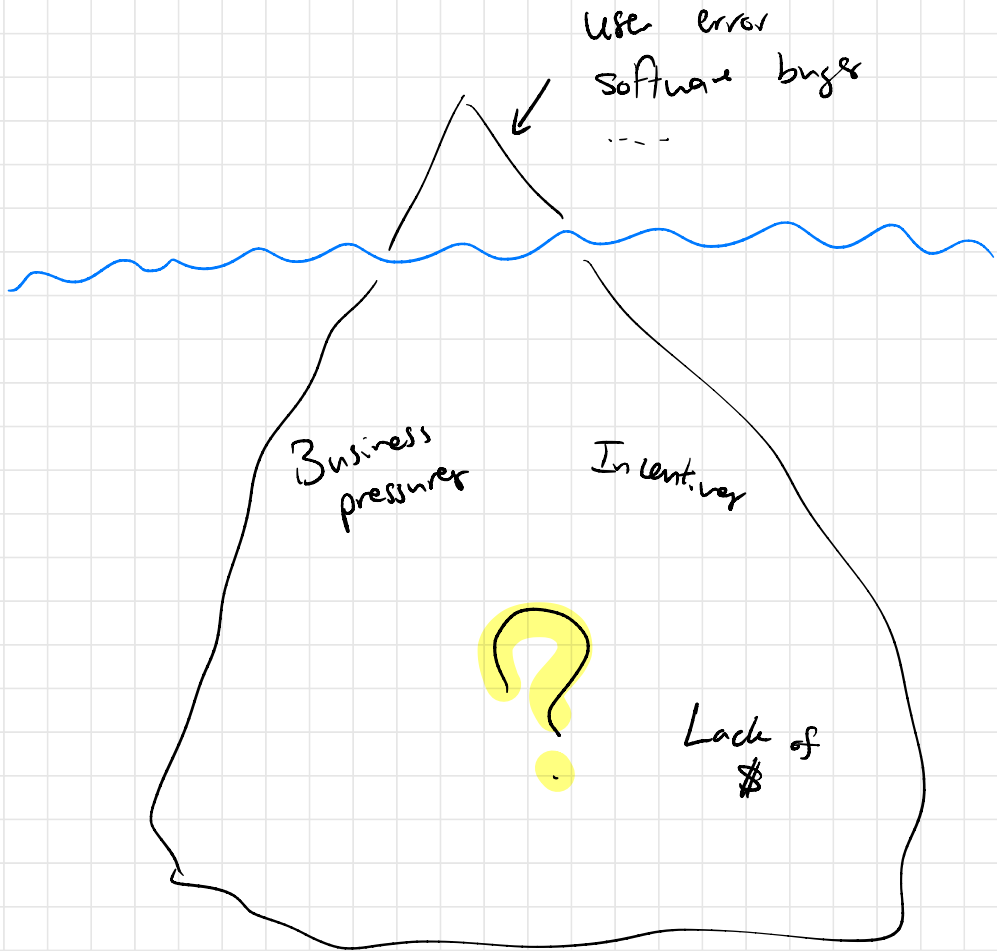
⇒ Would patients have had bad outcomes anyways? Seems not.

## SHOW SLIDES

# Why? Breakoff Rooms

- Tiny company (Multidata) focused on radiology
- Software has bugs — but not all bugs lead to catastrophe!
- Vulnerable population
- Overworked staff  
lack of manual checks
- Using system in unexpected ways  
5 blocks instead of 4... but supported
- Hospital didn't have software maintenance contracts  
↳ bought cheap software... under maintained
- Poor documentation
- No warning to user when computer got unexpected input
- Multidata didn't respond to complaints about miscalculations
- FDA didn't follow up on 1998 warning letter  
↳ "reliant on the good intentions"
- Social factors
  - \* Wealthy hospital?
  - \* Wealthy patients

# But really why?



# What to do about it?

Breakout  
(if time)

## Software/Hardware

- Defense in depth ("Swiss cheese model")
  - \* e.g. Covid test at MIT
- Average-case inputs vs. worst-case inputs
  - \* Anything can be put into system will be
  - \* "Computer scientist walks into a bar, ..."

## Human Factors

- Article blames the software but I'm not so sure...
- Legal protections/sanctions?

## Physical Checks

- Dosimeter on patient (defense in depth)

→ There are only cost-benefit calculations that underlie all of the systems we use.

Modularity - What would it mean here?  
How would it help?

# Why are we reading about this mishap?

- An obvious disaster ... no doubt that something went wrong
- Beware: Computer systems are responsible for many non-obvious disasters as well.

↳ examples...

Usually, we are many steps removed from the people whose lives our system affect.

↳ Think about the non-obvious disasters as well.