

Recitation 1: "We did nothing wrong"

MIT - 6.033
Spring 2022
Henry Corrigan-Gibbs

Plan

- Introductions
- Logistics

Logistics

- * Name cards
- * Read the syllabus & late policy
- * Do DNS readings for Thursday recitation
- * Feedback!
(Feedback.henrycg.com)

Introductions

1. Find a partner

2. Write down

* Their name

* Their favorite or least favorite computing device/app/website/concept

* One fact about them that would be cool if it were true.
(but that's not necessarily true)

3. In ~3 mins you'll introduce your partner to the class.

Welcome!

Me: Henry Corrigan-Gibbs (henrycg@)

- Relatively new to MIT
- Focus: security, crypt, privacy
- Call me "Henry"
- Use he/him pronouns - please put yours on nametag if you have preferred

Any feedback ("any time, any reason")
↳ feedback.henrycg.com

TA: Amir Farhat (amirf@)

↳ Amir introduces himself

- * We LOVE teaching!
- * We LOVE computing!
- * We hope that this course explains why!

Class info

- * Read syllabus — lots of key info

M	T	W	Th	F
Lec	Rec	Lec	Rec	Comm Tutorial

- * Katrina (LaCurts) is source of truth for all logistics-related things
- * Use Piazza for all course comm.
 - ↳ Private note for sensitive things and/or special cases (illness, etc.)
- * **Participation** is key part of grade (25%)
 - ↳ see FAR on site, more later
- * Late policy: see website
- * Questions on reading due before recitation

About recitations

- A place to discuss the readings.
- **IMPORTANT**: Do the readings before recitation starts!
- I DO NOT expect you to:
 - * understand the papers completely,
 - * have any background on these topics
- I DO expect you to:
 - * read the papers carefully,
 - * come prepared with questions,
 - * participate actively in discussion,
 - * give feedback (anon feedback form)

Readings

- * See (optional) "How to Read a Paper" (Keshav)
- * Jot down questions as you go.
- * Mark confusing parts so that you can come back to them later

Ground Rules

- Want to create a supportive & inclusive environ
↳ words & music
- Fair allocation of bandwidth
- Try not to interrupt each other
- Critique ideas, not each other
- We are all learning... be respectful of that
- We all will make mistakes (especially me!)
↳ I hope you'll be forgiving & give feedback
⇒ Feedback form.

Resources for your time at MIT

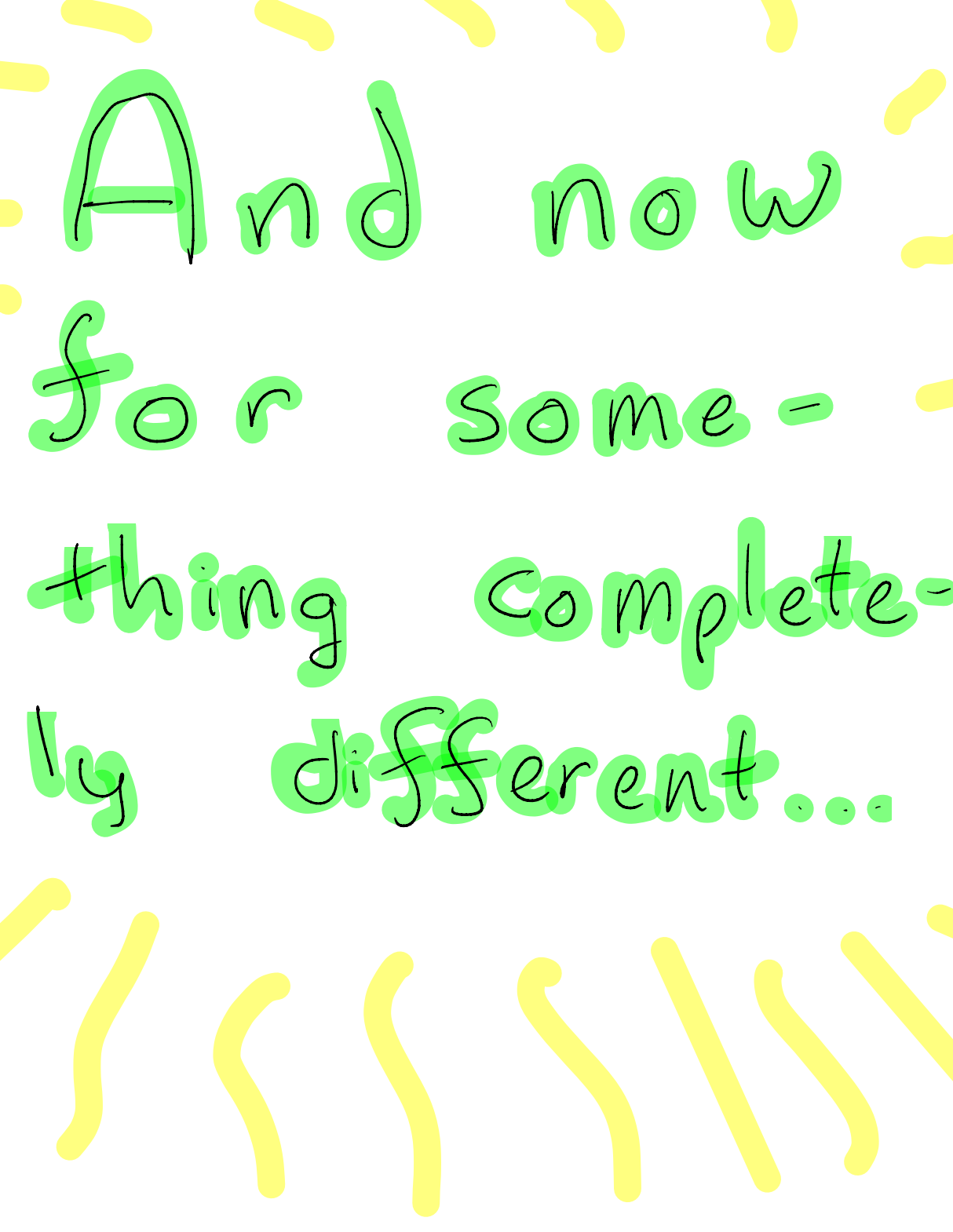
College is challenging & stressful in the best of times.

If you need help with school or non-school,
you can go to:

- Katrina LaCourts
- Student Support Services (SS)
- Student Mental Health* ← free for you

↳ anxious? isolated? sleeping too much?
* = confidential

⇒ You can always ask me if you are not
sure where to go. I'll try to point you to
the right place.



And now
for some-
thing complete-
ly different...

What happened?

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

SHOW SLIDES

- Overworked physicist, ^{16 hr. days} didn't manually check dosing times
- Patients get 20% - 2x more radiation than they should have
 - ↳ staff didn't notice that treatment times 2x other

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

SHOW SLIDES

Debate

Who is responsible here?

↳ Go to jail? Pay fines?

1. Multidata

2. Radiation technologists

3. Hospital administrators

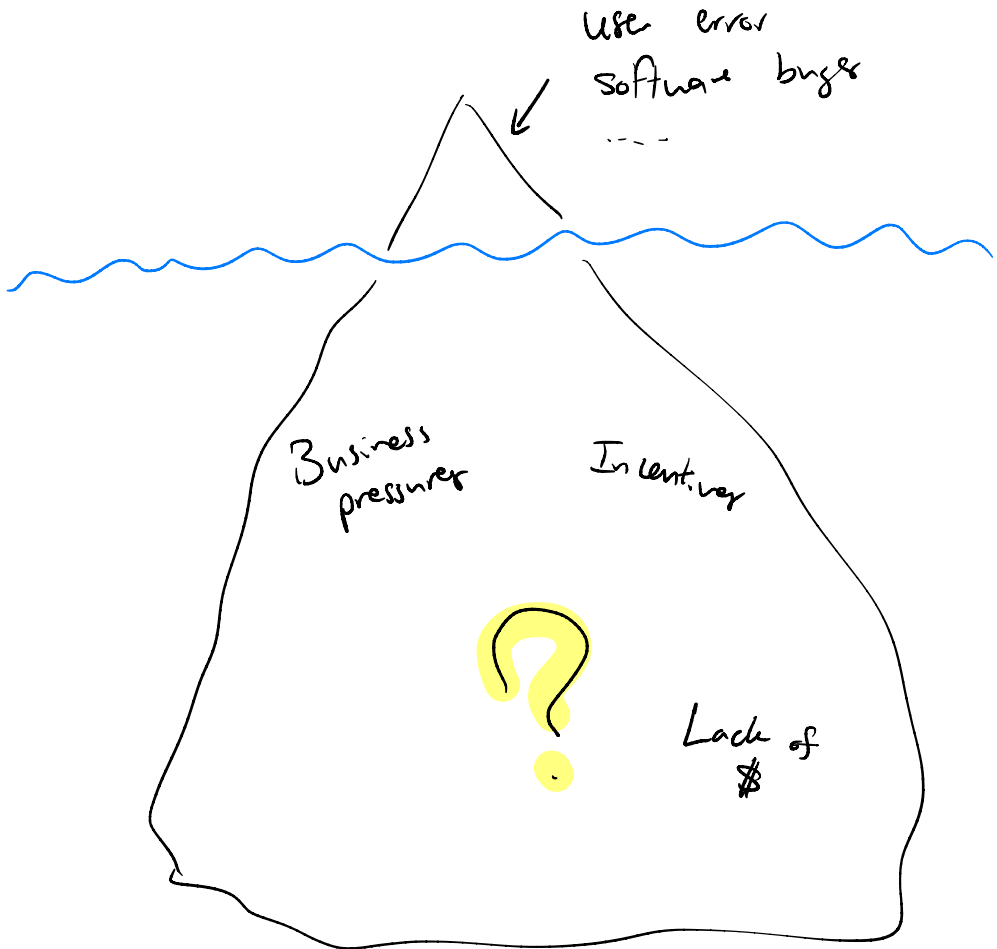
4. FDA.

5. No one / other?

Why?

- 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 ugly 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.