

CSE 403

Software Engineering

Spring 2023

#23: Debugging

Logistics

WEEK 8

05/15 L: Code Review

[SLIDES/REC](#)

[POINTS](#)

05/16 T: R2

DUE: [R2!!!](#)

05/17 L: Debugging

[SLIDES](#)

[Release Peer-Review
\(RPR\)](#)

05/18 P: RPR

05/19 LX: Debbing

[VIDEO/EXTRA-READING](#)

Debugging: What?



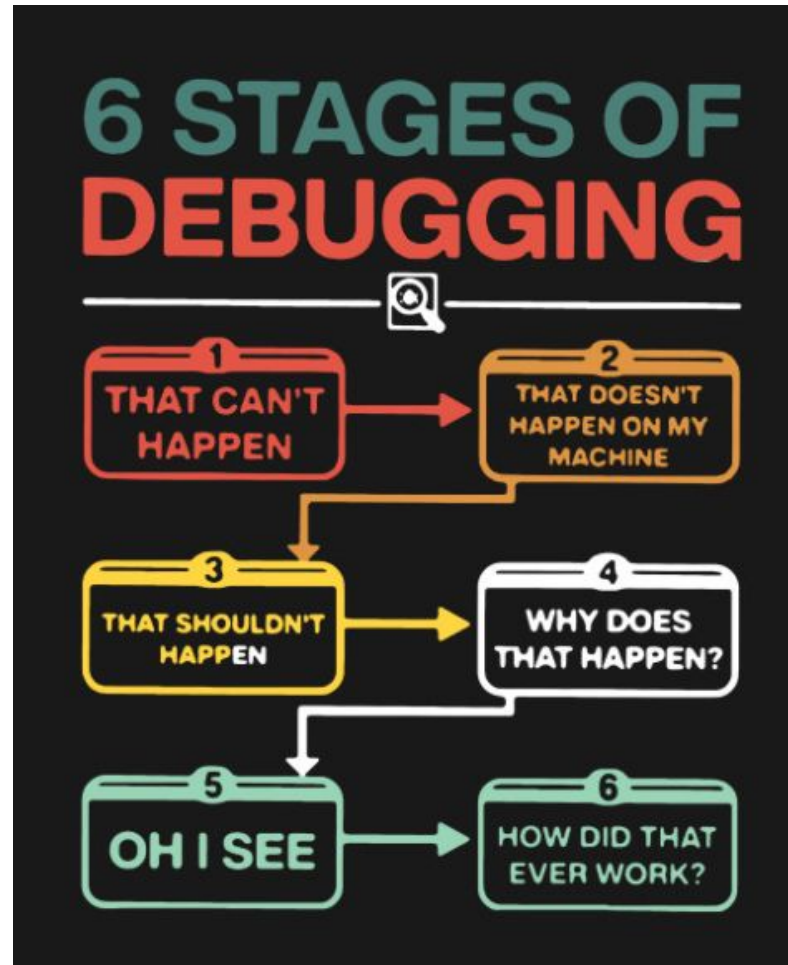
Debugging: What?

*A bug is an **error of flaw** in a program or system that produces incorrect or **unexpected results**.*

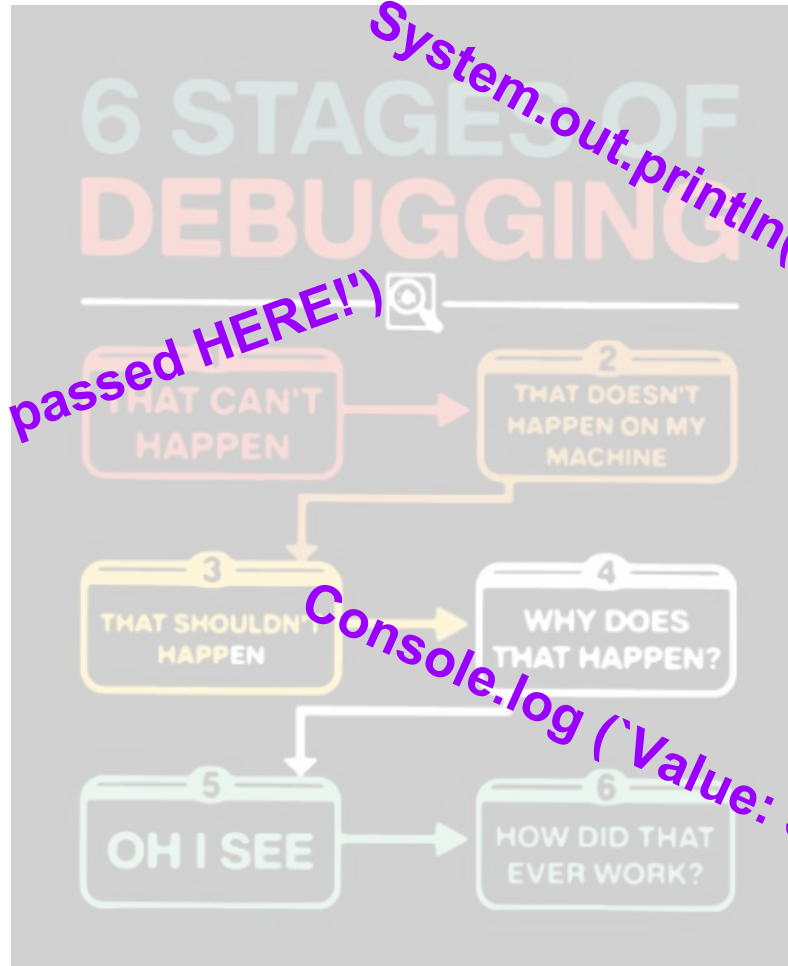
*Debugging is the process to **identify** and **resolve** bugs.*



Debugging: A process



Debugging: ~~A process~~ Nah! I got this!



`Console.log('I passed HERE!')`

`System.out.println('I am so smart!')`

`Console.log(`Value: ${my_account}`)`

Debugging: A process (a suggestion)

0. Identify & Document
1. Understand & Document
2. Reproduce & Document
3. Investigate & Capture
4. Fix it & Document

Live Example

The screenshot shows a GitHub repository page for 'labinthewild / LITW-API' (Private). The navigation bar includes 'Code', 'Issues' (6), 'Pull requests', 'Actions', 'Projects' (1), 'Security', 'Insights', and 'Settings'. The issue title is 'GET study authorization misbehaving #8'. The issue is marked as 'Open' and was opened by 'nigini' 15 minutes ago with 0 comments. A comment from 'nigini' 15 minutes ago reads: 'If study X is authorized, it can call for any valid study ID and get a 200. The expected behavior is only to get a 200 when the call is for ID=X. The problem is less of an issue because it is always retrieving the study X content, not any unauthorized content!'. There is a 'Tip' icon in the top right of the comment box.

<https://github.com/nigini/SWEng/pulls>

0. Identify & Document

Step 1: What the heck?

Step 2: This is broken, yall! (i.e., issue report)

Step 3: Feel like a hero!

1. Understanding (& improve documentation)

How is the program failing?

What are the assumptions to justify this error?

What inputs or conditions are causing the error?

(focus of next in-class activity!)

Is this an error in our understanding?

Is this really a bug in the code?

2. Reproduce (& improve documentation)

Can one replicate the bug?

Can I rule out other issues? (i.e., config, code synch, etc.)

Can I pinpoint a version of the code?

Can I refine the assumptions and conditions?

3. Investigate & Capture

What are my hypotheses about what is wrong?

What are the components involved in this?

Can I narrow down to a Class, method, line?

How can I test my hypothesis?

(print vs debugger vs tests)

How can I CAPTURE the bug?

(create an automated way/test to trap this damn bug in the future!)

4. Fix it!

Have I really trapped the bug?

What change will fix the bug?

Remember TDD?

- Trap with a test (red bar)
- Change the code
- Test pass!!!

Logistics

WEEK 8

05/15	L: Code Review	SLIDES/REC	POINTS
05/16	T: R2		DUE: R2!!!
05/17	L: Debugging	SLIDES	Release Peer-Review (RPR)
05/18	P: RPR		
05/19	LX: Debbing	VIDEO/EXTRA-READING	

Delta Debugging: finding a minimal set of conditions that expose the bug in complex cases. [[VIDEO](#)]

Debugging...

STEP BY STEP DEBUGGING



Questions, please!