COMP 3550

4.3 — TECHNICAL DEBT: WHAT IT IS, WHERE IT COMES FROM

Week 4: Exceptional Testing & Technical Debt

TECHNICAL DEBT: THE METAPHOR

Like financial debt:

💸 You borrow [speed] today...

🕳️ But you pay interest [debugging, rewrites, and headaches] tomorrow

When you **have to** clean your room but really don’t want to.

TECHNICAL DEBT: THE METAPHOR

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“We’ll hardcode this for now — we’ll refactor it later.”

- *B*ut “later” never comes without a plan.

COMMON CAUSES OF TECH DEBT

And not all are in your control...

Rushed features

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Your code, your friends code,
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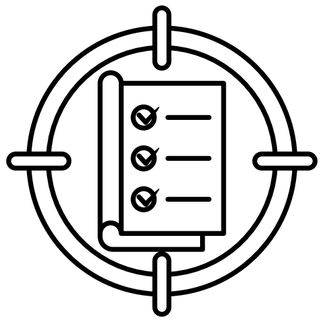
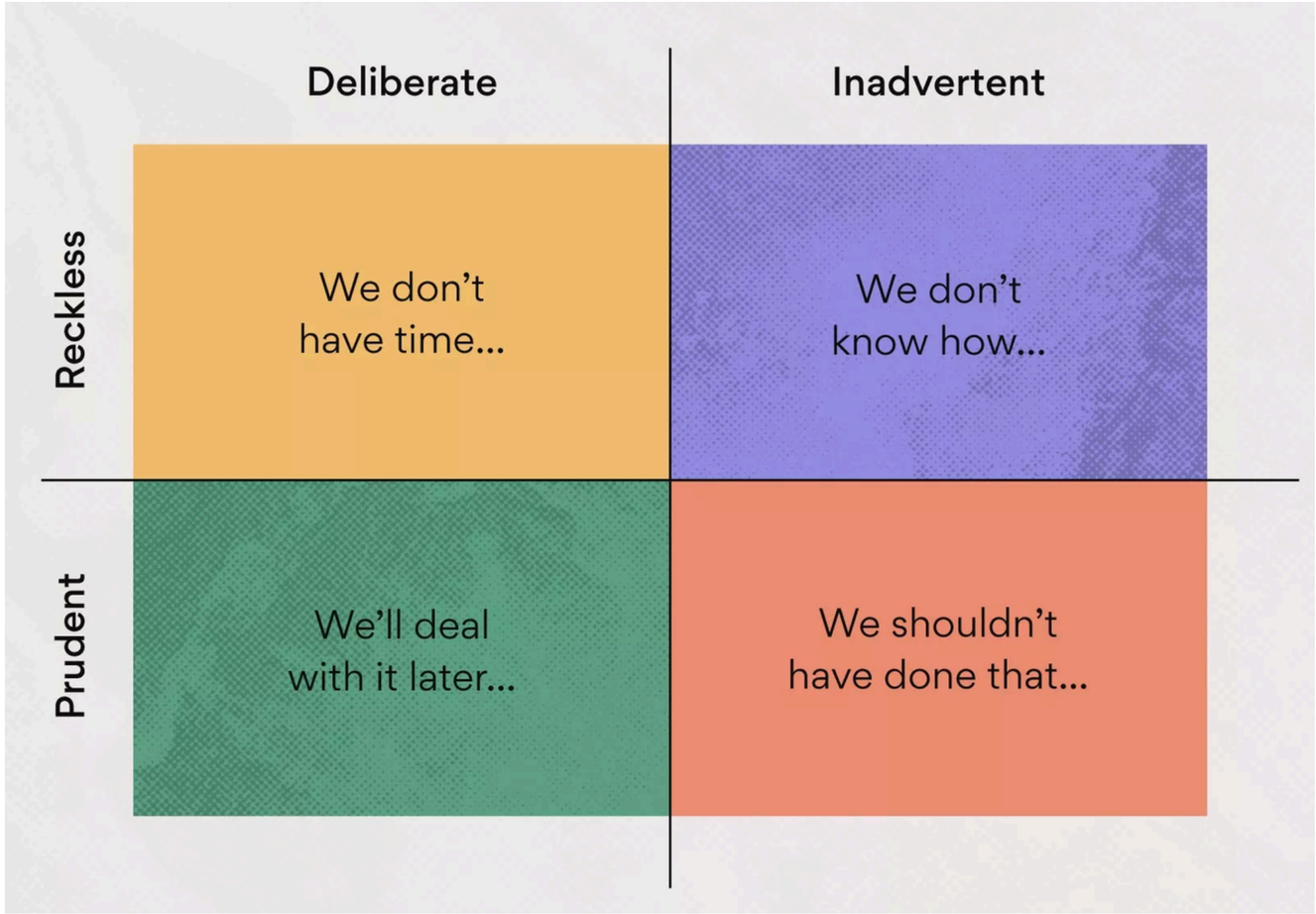


Changing Requirements/Scope

TECH DEBT QUADRANT



Asana

CODE EXAMPLE

```
public void processOrder(Order order) {
    if (order == null || order.getItems().isEmpty()) {
        throw new IllegalArgumentException("Invalid order");
    }
    double total = 0;
    for (Item item : order.getItems()) {
        total += item.getPrice();
    }
    if (order.hasDiscount()) {
        total *= 0.9;
    }
    PaymentService ps = new PaymentService();
    ps.charge(order.getCustomer(), total);
    EmailService es = new EmailService();
    es.send(order.getCustomer().getEmail(), "Thanks!");
}
```

CODE EXAMPLE

```
public void processOrder(Order order) {
    validate(order);
    applyDiscount(order);
    chargeCustomer(order);
    sendConfirmationEmail(order);
}

private void validate(Order order) { ... }
private void applyDiscount(Order order) { ... }
private void chargeCustomer(Order order) { ... }
private void sendConfirmationEmail(Order order) { ... }
```

IDENTIFYING DEBT IN YOUR CODE

- Long methods
  - more than 10 lines?

- Inconsistent logic
  - Four different “validateUser” methods in four classes doing four different things

- Duplicated code
  - *if(user != null && !user.getName().trim().isEmpty()) { /* do work */ }*
  - null checks and .trim().isEmpty() on every textfield?
- TODOs and Questionable comments such as:
  - *// I know this is bad, will fix later*
  - *// shouldn’t hit this line of code ever*
  - *// not sure how else to catch this*

IDENTIFYING IT AS YOU CODE

- A quick digression on cognitive inertia
  - We need some rules that help us to interupt our default train of thought

IDENTIFYING IT AS YOU CODE

- A quick digression on cognitive inertia
  - We need some rules that help us to interupt our default train of thought
- When designing code:
  - What are you trying to accomplish? Be wary of ‘ands’
- The dreaded Copy/Paste
  - any copy/paste should give you **pause**
- During testings
  - Unit testing, what does this method/class/etc do? Is it well defined?

We will learn some acronyms soon enough to help with this as well

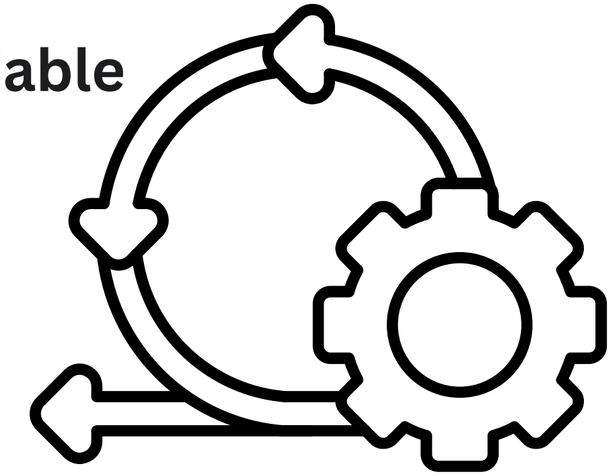
PAYING IT DOWN

- Prioritize and Document
  - "Tech Debt Log" (shared doc)
- Refactor incrementally
  - Sprint Planning
- Add tests first
  - helps us to make sure we don’t break anything

TECH DEBT ≠ BAD TEAM

- Tech Debt is normal and **not completely avoidable**

- Interrupt the cognitive inertia
- Notice it
- Document
- Help Each Other



PAUSE AND PROJECT REFLECT

Find one piece of tech debt in your code.
Create a task or issue for cleaning it up later.

Now do the same for a piece of code you did not write in your project (a teammates code). Remember to be kind, we all create debt, it’s about working together and growing.