The Art of Software Development



@Sander_Mak

I'm a Software Engineer... right?

THE GLOBE AND MAIL

Is a ‘software engineer’ an engineer? Alberta regulator says no, riling the province’s tech sector

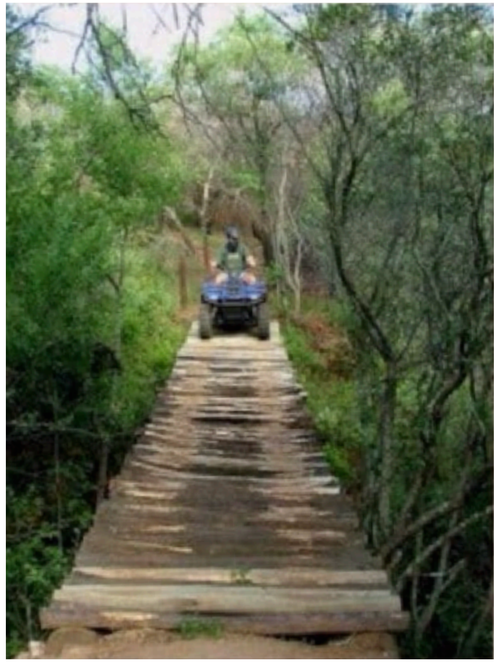
> “Professional engineers are held to high professional and ethical standards and work in the public interest,” it said. “The public places a high degree of trust in the profession and these layers of accountability and transparency help keep Canadians safe.”



PIC NIC

I'm a Software **Engineer**... right?







I'm a Computer **Scientist**... right?





PIC NIC

I'm a Computer Scientist... right?

Recursion

Hitman hires hitman who hires hitman who hires hitman who hires hitman who tells police



Basit Mahmood
Wednesday 23 Oct 2019 4:28 pm



The final hitman was insulted at the money he had been offered (Picture: AFP)

PIC NIC

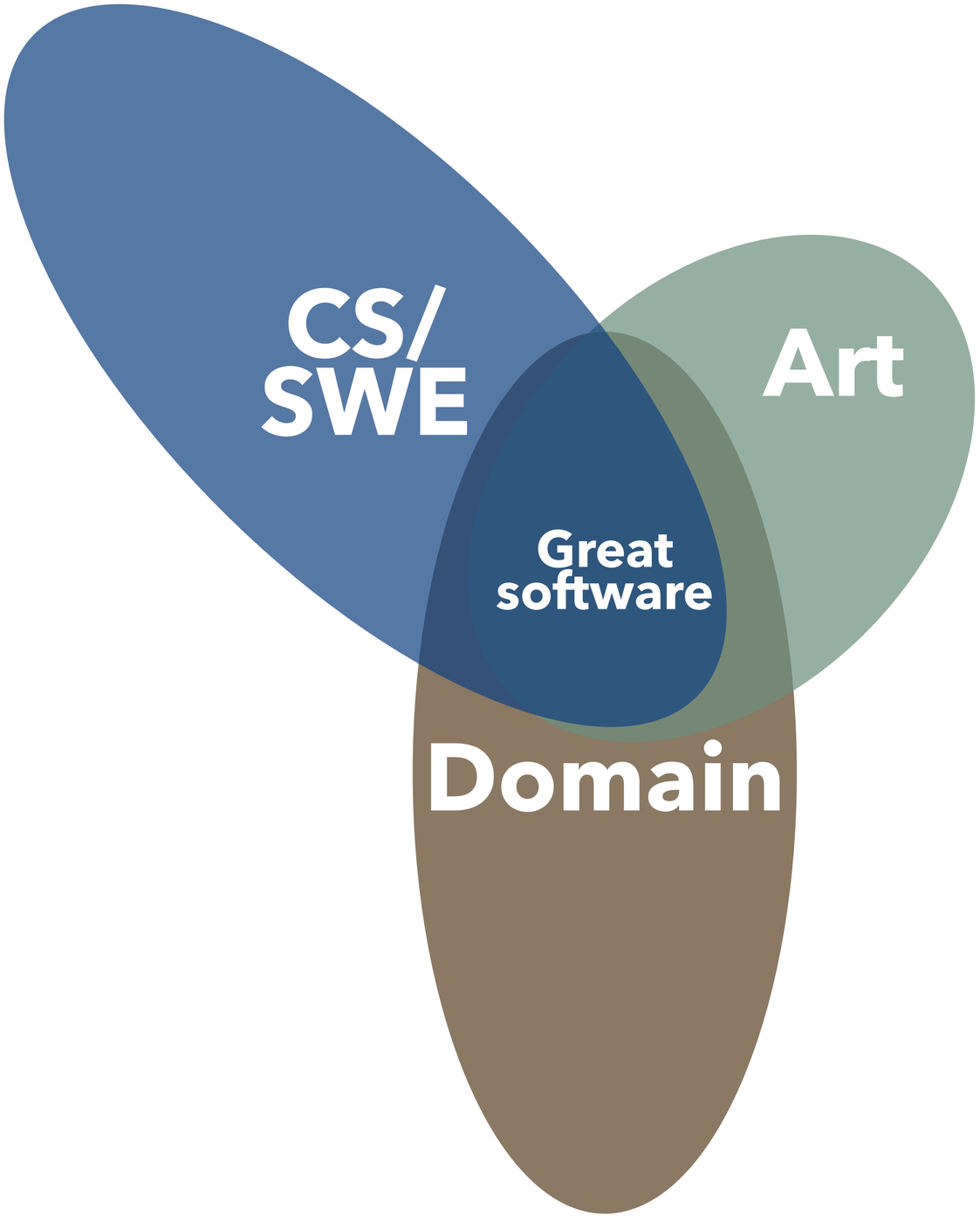
I'm a Computer **Scientist**... right?

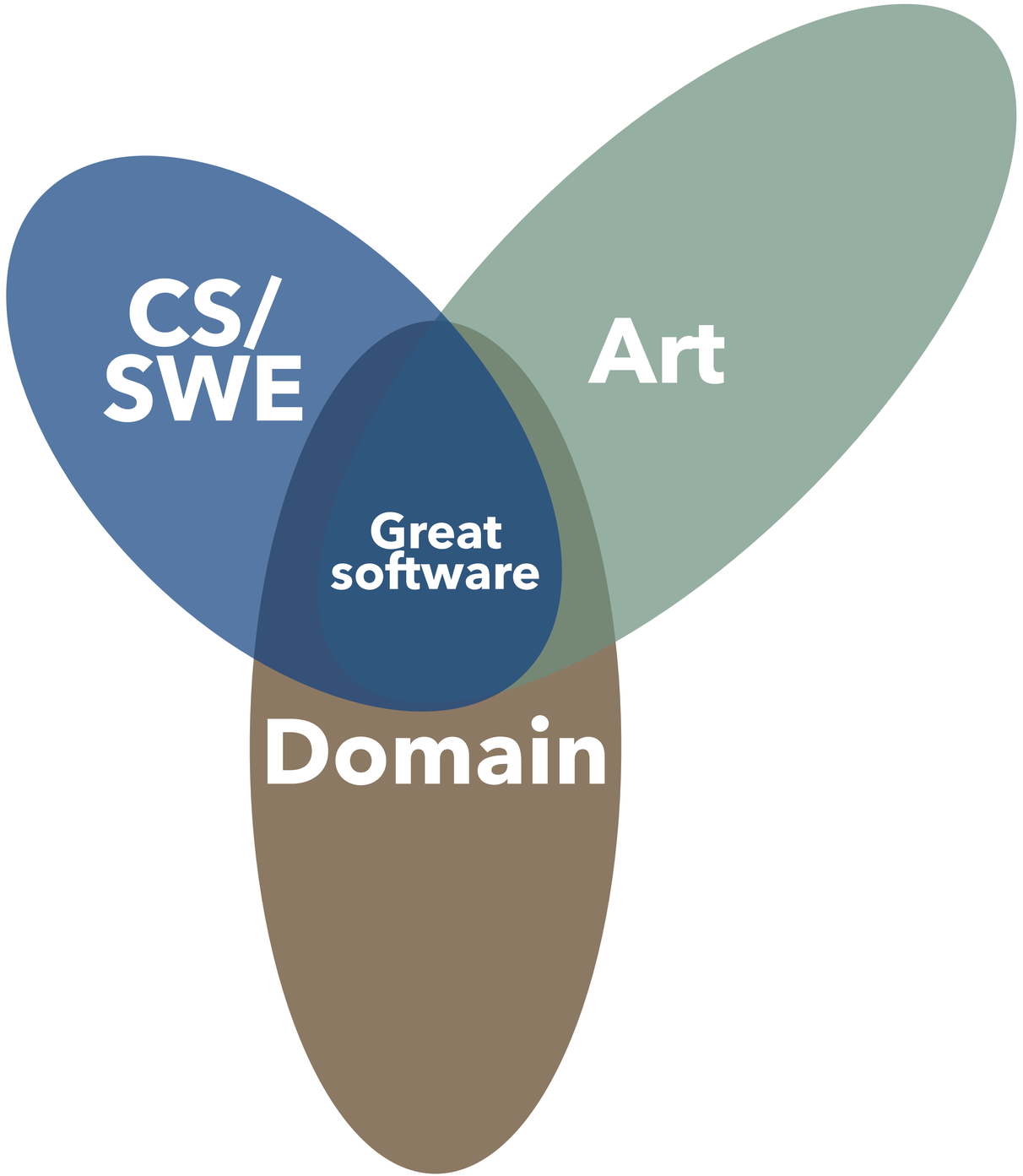
P = NP

PIC NiC

I'm a Computer **Scientist**... right?



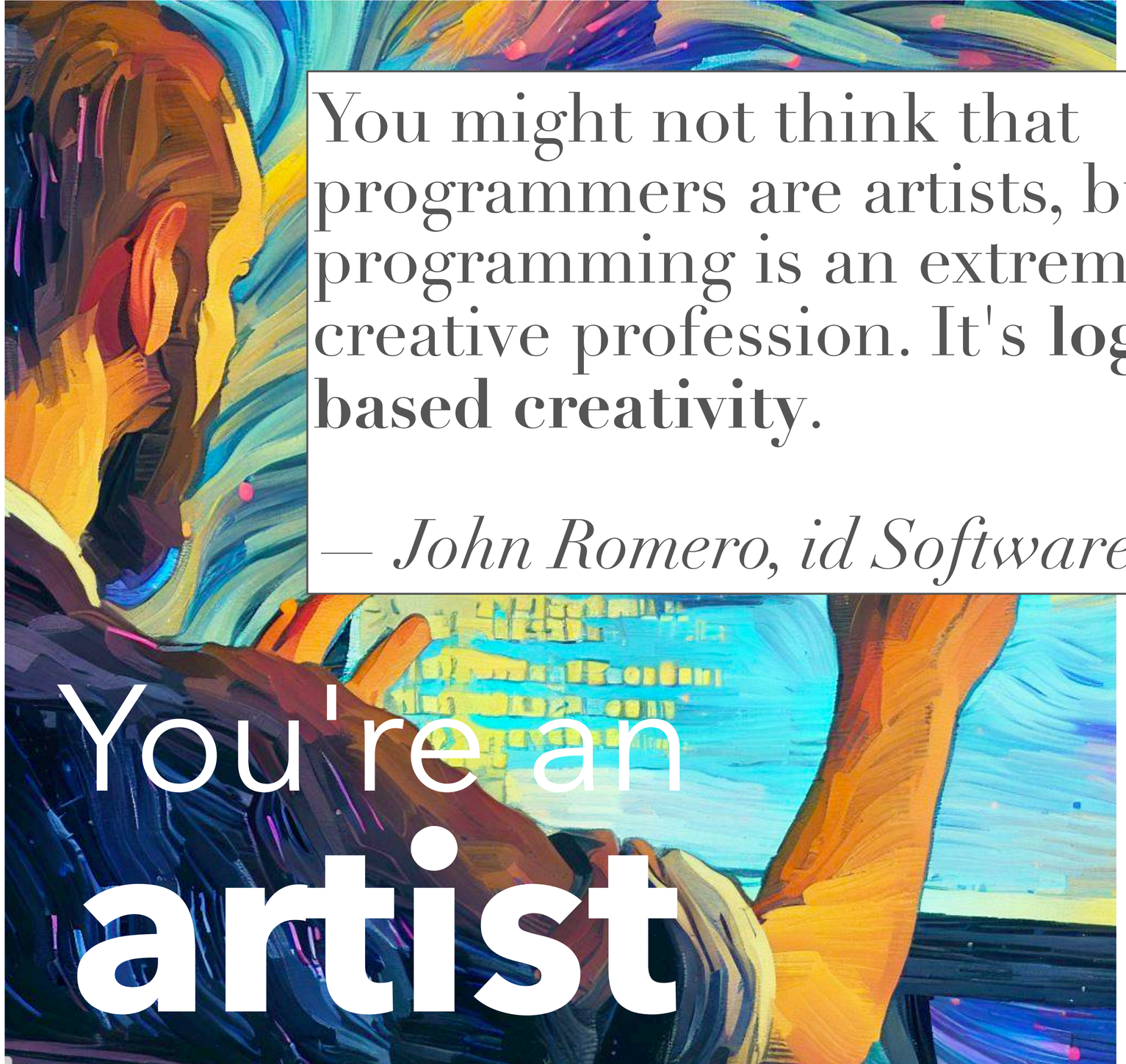

CS/
SWE
Art
Great
software
Domain


CS/
SWE
Art
Great
software
Domain

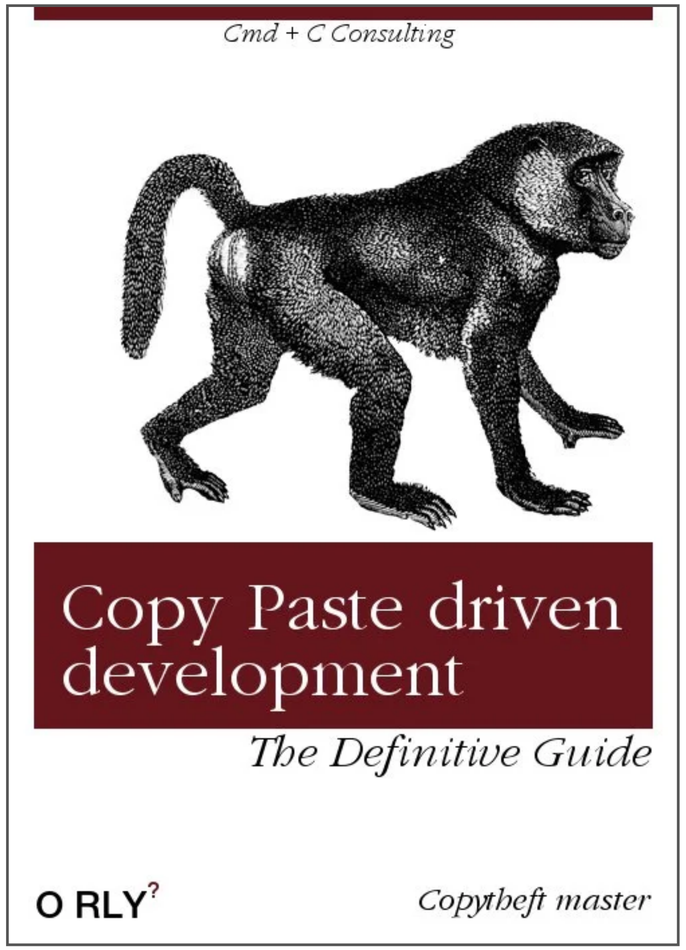
Shaping the world

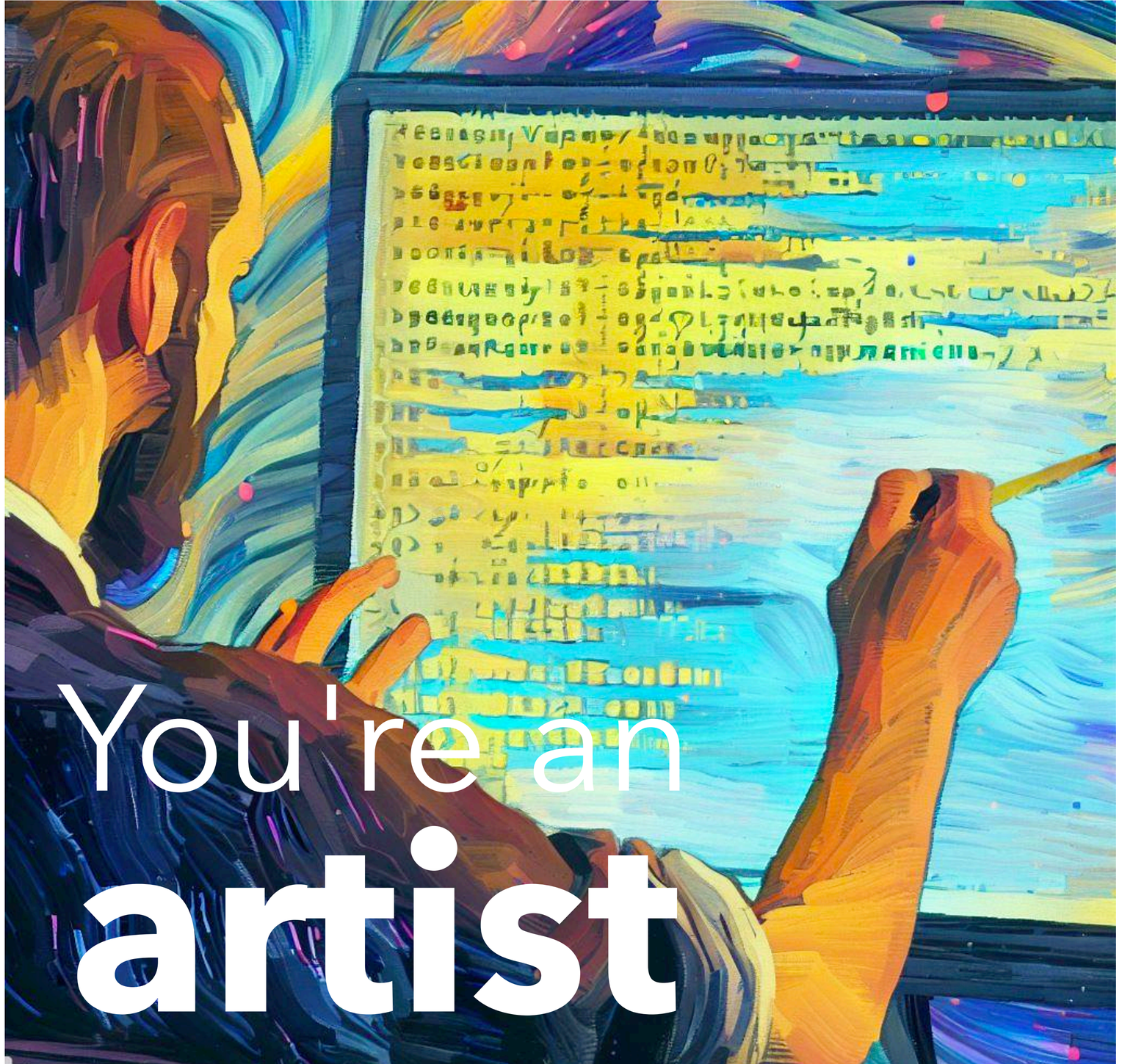
Creativity

Infinite possibilities



> You might not think that programmers are artists, but programming is an extremely creative profession. It's **logic-based creativity**.
>
> — *John Romero, id Software*



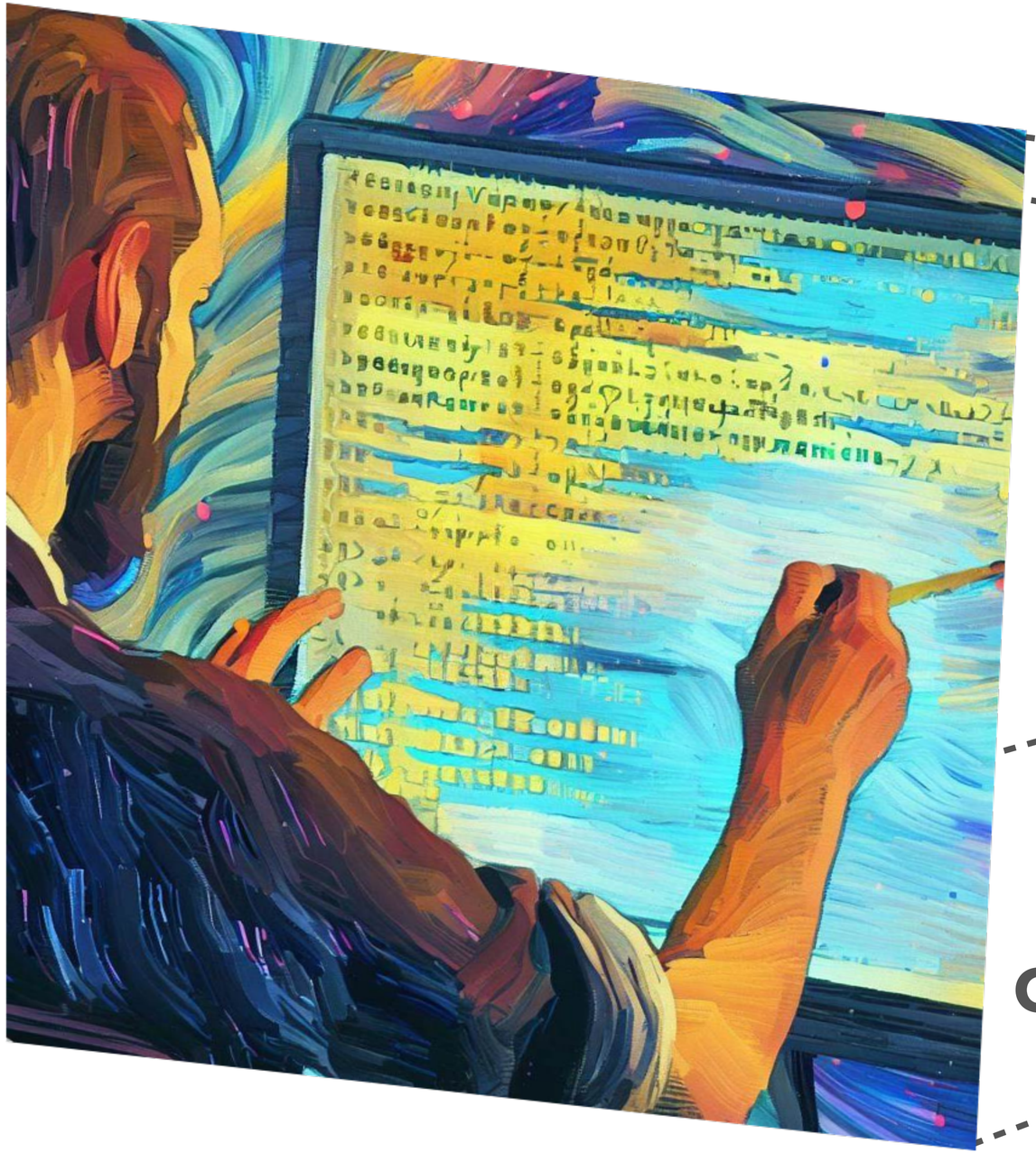


You're an artist

Yes, you're still a professional



Software Development == Abstraction



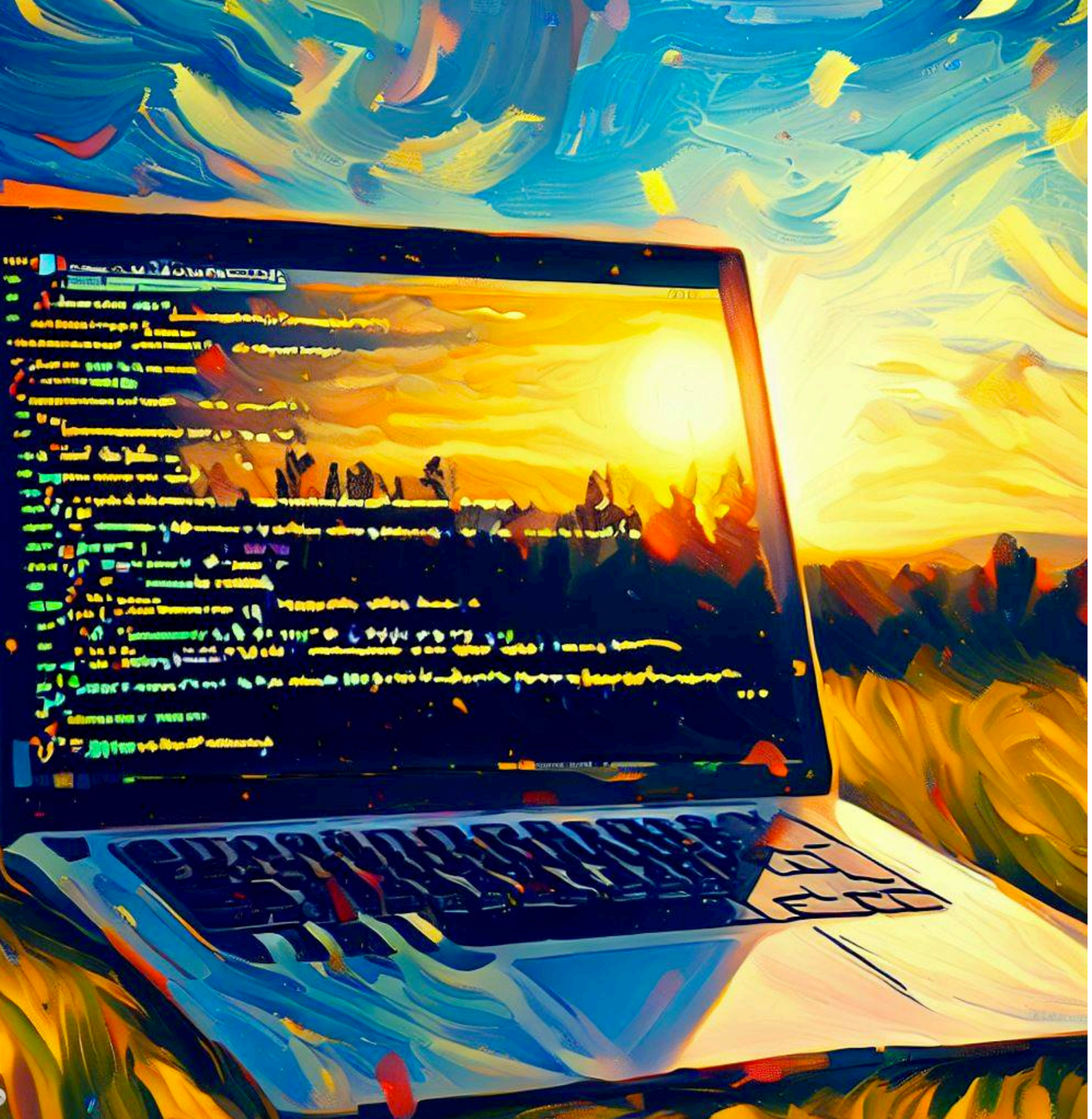


Process

Design

Testing

Coding



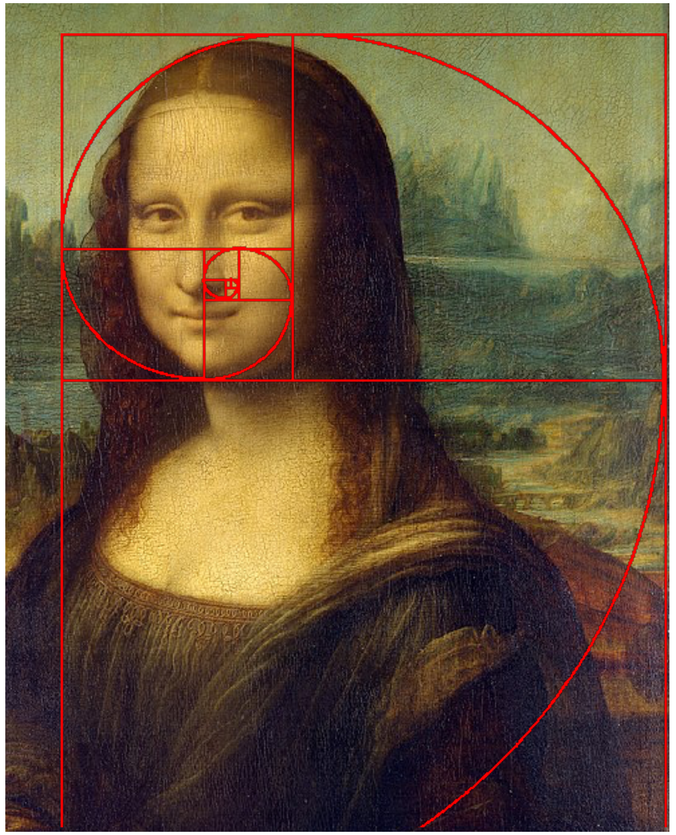
The Art of Software Development

~~Code~~

aka

The Truth™

What's Good Code?



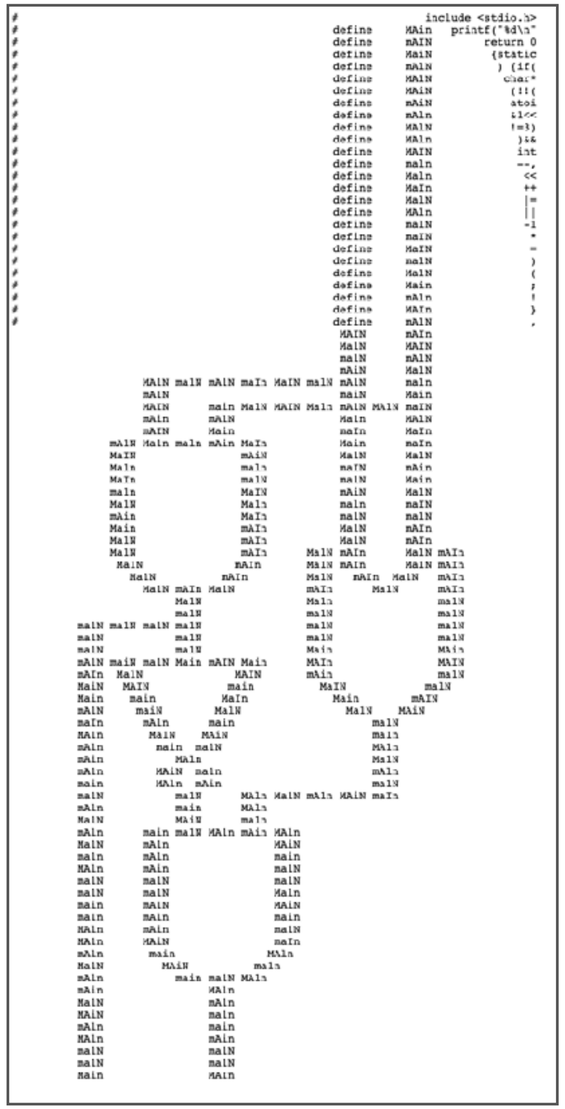
```php
function register()
{
    if (!empty($_POST)) {
        $msg = '';
        if ($_POST['user_name']) {
            if ($_POST['user_password_new']) {
                if ($_POST['user_password_new'] === $_POST['user_password_repeat']) {
                    if (strlen($_POST['user_password_new']) > 5) {
                        if (strlen($_POST['user_name']) < 65 && strlen($_POST['user_name']) > 1) {
                            if (preg_match('/^[a-z\d]{2,64}$/i', $_POST['user_name'])) {
                                $user = read_user($_POST['user_name']);
                                if (!isset($user['user_name'])) {
                                    if ($_POST['user_email']) {
                                        if (strlen($_POST['user_email']) < 65) {
                                            if (filter_var($_POST['user_email'], FILTER_VALIDATE_EMAIL)) {
                                                create_user();
                                                $_SESSION['msg'] = 'You are now registered so please login';
                                                header('Location: ' . $_SERVER['PHP_SELF']);
                                                exit();
                                            } else $msg = 'You must provide a valid email address';
                                        } else $msg = 'Email must be less than 64 characters';
                                    } else $msg = 'Email cannot be empty';
                                } else $msg = 'Username already exists';
                            } else $msg = 'Username must be only a-z, A-Z, 0-9';
                        } else $msg = 'Username must be between 2 and 64 characters';
                    } else $msg = 'Password must be at least 6 characters';
                } else $msg = 'Passwords do not match';
            } else $msg = 'Empty Password';
        } else $msg = 'Empty Username';
        $_SESSION['msg'] = $msg;
    }
    return register_form();
}
```





PIC NiC

What's Good Code?



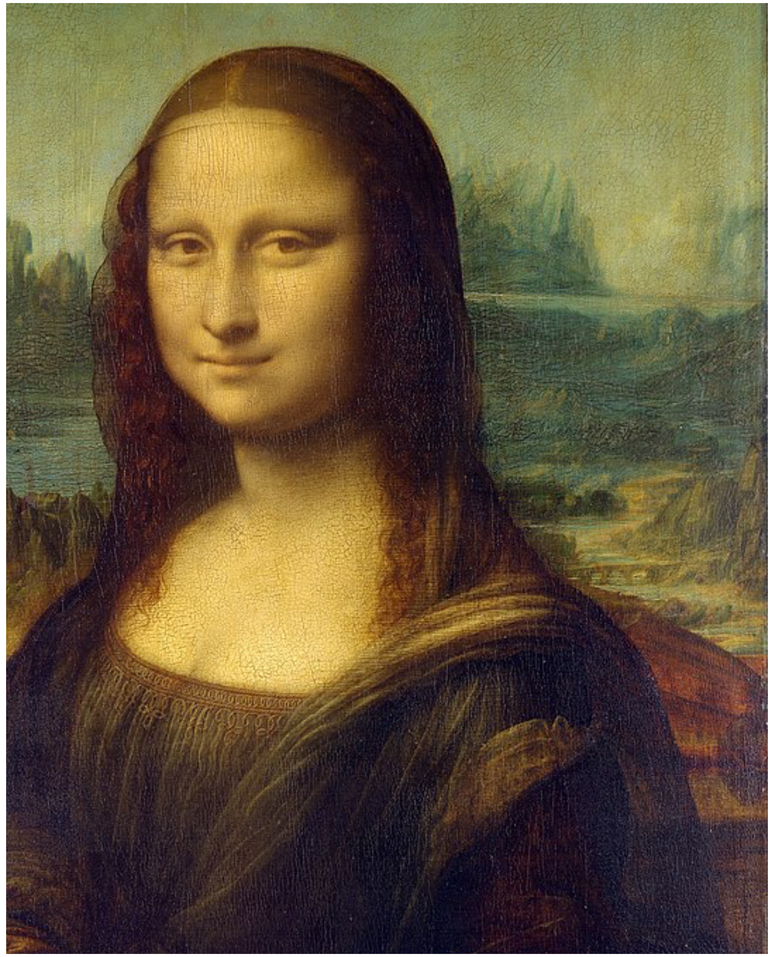
Beauty through uniformity!

`Spotless`

`google-java-format`

`formatter-maven-plugin`

The Art of Writing Good Code



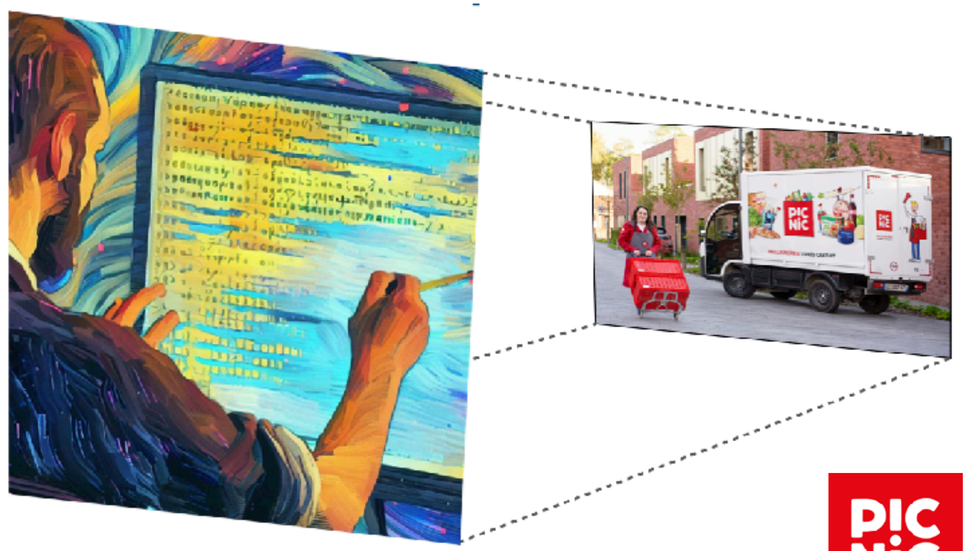
PIC
NiC

The Art of Writing Good Code

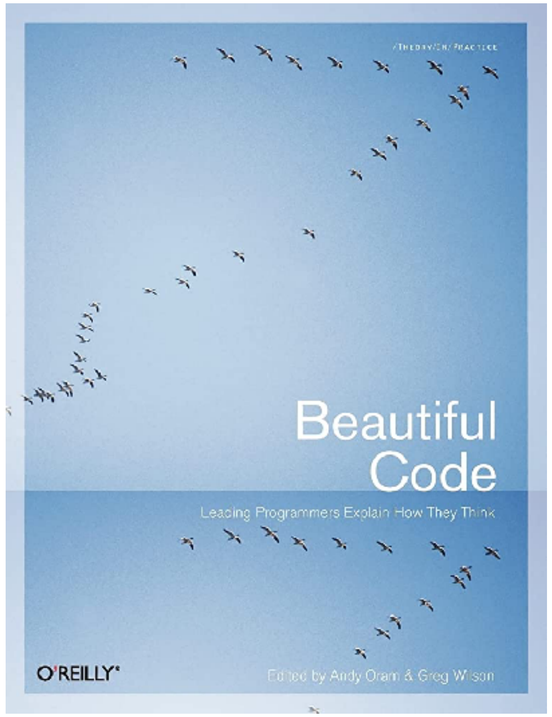
Useful: solves an actual problem, and solves it well

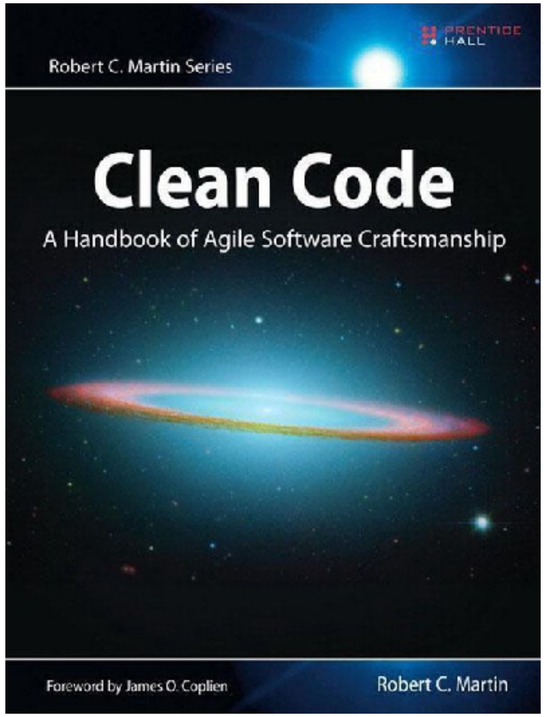
Quality: code that outlives you

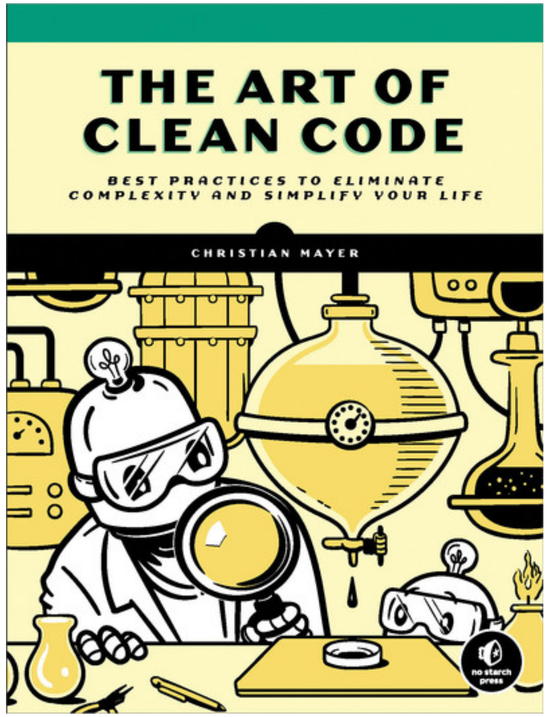
Fit: context is king



Principles of Quality Code







SRP
OCP
LSP
ISP
DIP

CUPID

SLAP

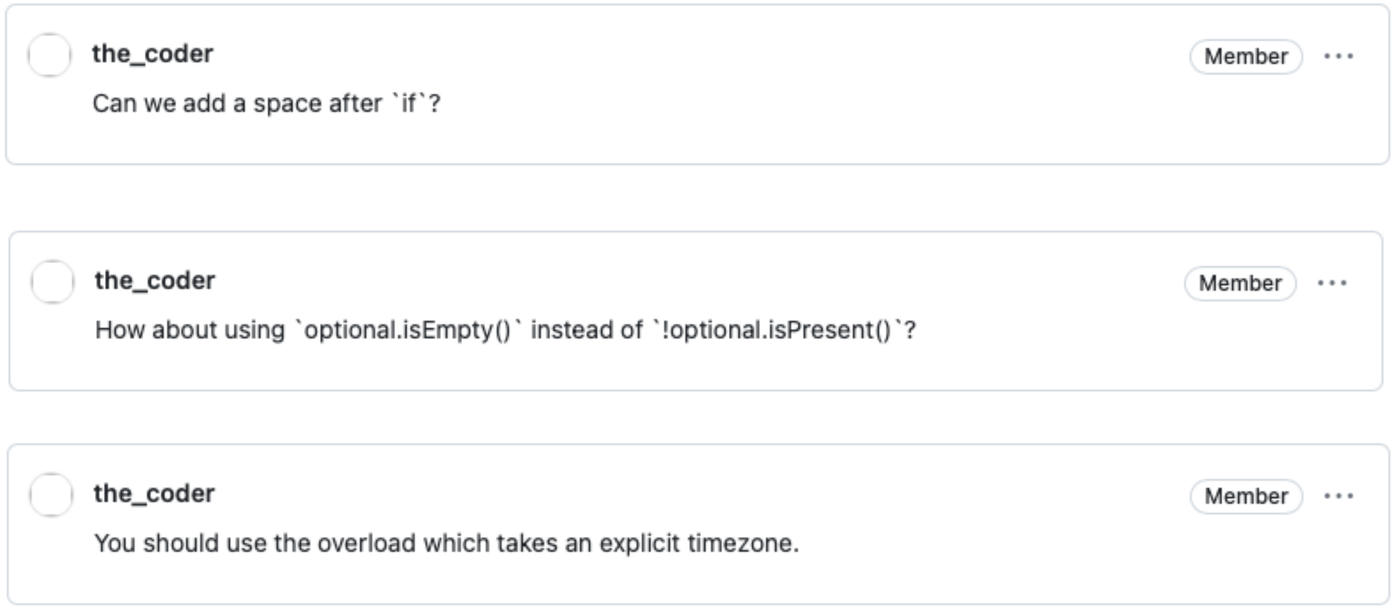
YAGNI **OOP** **KISS** **DRY** **Design Patterns**

Low coupling, High cohesion

PIC NIC

Find your {team,company} style

Then engineer it 💪



SpotBugs

SonarQube

ArchUnit

Error Prone

OpenRewrite

PIC NIC

Find Your {Team, Company} Style

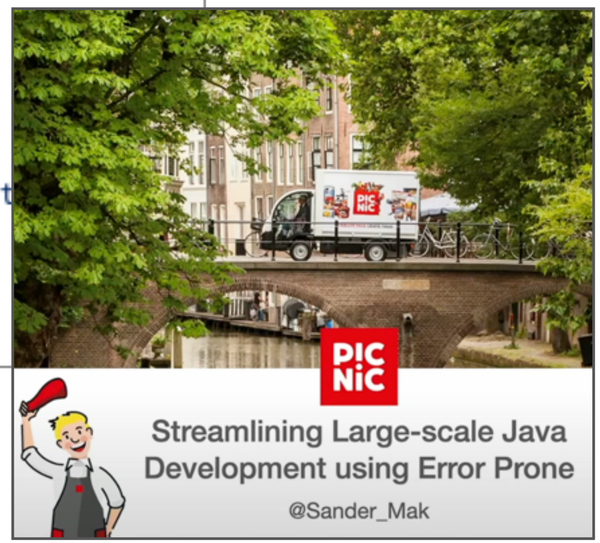
Then engineer it 💪

```java
/** A {@link BugChecker} which flags illegal time-zone related operations. */
@AutoService(BugChecker.class)
@BugPattern(
    name = "TimeZoneUsage",
    summary =
        "Derive the current time from an existing `Clock` Spring bean, and don't rely on a `Clock`'s t
    linkType = LinkType.NONE,
    severity = SeverityLevel.WARNING,
    tags = StandardTags.FRAGILE_CODE)
```

```java
/** Prefer {@link Optional#isPresent()} over the inverted alternative. */
static final class OptionalIsPresent<T> {
  @BeforeTemplate
  boolean before(Optional<T> optional) {
    return !optional.isEmpty();
  }

  @AfterTemplate
  boolean after(Optional<T> optional) { return optional.isPresent(); }
}
```

Is rewritten to



Devoxx Belgium:
https://youtu.be/B-GaOGuXvwA

PIC NiC

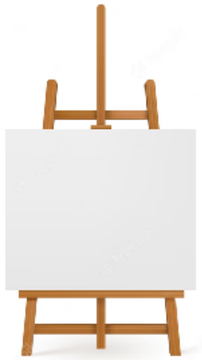
The Tools Are Not the Point











This Artist Tried 10 Different Paintbrushes And The Results Will Shock You

BruzhFeed

Even if you have great technique, it doesn't matter,
if you don't create inspired work that ignites others

PIC NiC

Ye olde Reddit | MY SUBREDDITS | HOME - POPULAR - ALL - RANDOM - USERS | ASKREDDIT - POLITICS - WORLDNEWS - MOVIES - WTF - TECHNOLOGY - ASKSCIENCE - MUSIC - PROGRAM

/r/painting

comments

1248

Question **Which brush to use?** (i.redd.it)

submitted 1 day ago by VanGogh_TheOneEarMan

47 comments share save hide give award report crosspost

all 47 comments

sorted by: best

save content policy formatting help

[–] **VanGogh_TheOneEarMan** 62 points 1 day ago

Hey guys, I need some advice on which brush to use for my next masterpiece. Any recommendations?

permalink embed save report give award reply

> [–] **Monet_WaterLilyKing** 8 points 17 hours ago
>
> Van Gogh, seriously? Your paintings look like a chaotic mess! Fine brushes provide the finesse and control needed for true artistry.
>
> permalink embed save parent report give award reply

> [–] **VanGogh_TheOneEarMan** 51 points 16 hours ago
>
> I find fine brushes so boring. I like to use a fan brush to create interesting textures.
>
> permalink embed save report give award reply

> > [–] **Renoir_TheColorist** 6 points 16 hours ago
> >
> > Fan brushes are overrated, Van Gogh. A filbert brush is much better for blending colors.
> >
> > permalink embed save parent report give award reply

> > > [–] **VanGogh_TheOneEarMan** 10 points 14 hours ago
> > >
> > > Oh, come on, Renoir. Filbert brushes are too generic. I like to use brushes that are a little more unique.
> > >
> > > permalink embed save parent report give award reply

Ye olde Reddit

~1885

PICNIC

Good craftsmen never blame their tools. Nor do they **obsess** over them.

https://boringtechnology.club

No Resume-Driven Development



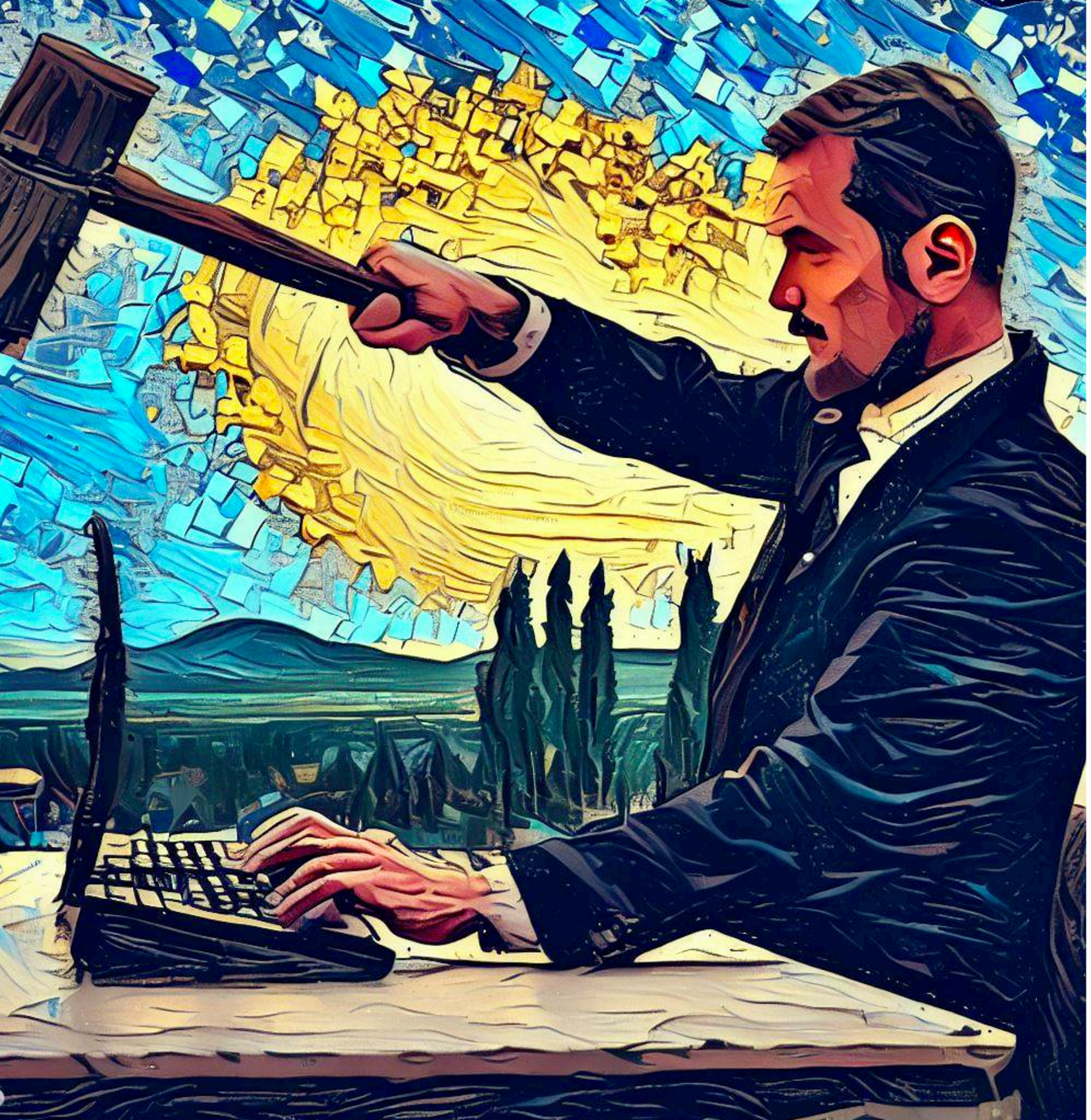
Your Users Don't Care About Your Code ...

Value delivered



Quality of code

... until they do!

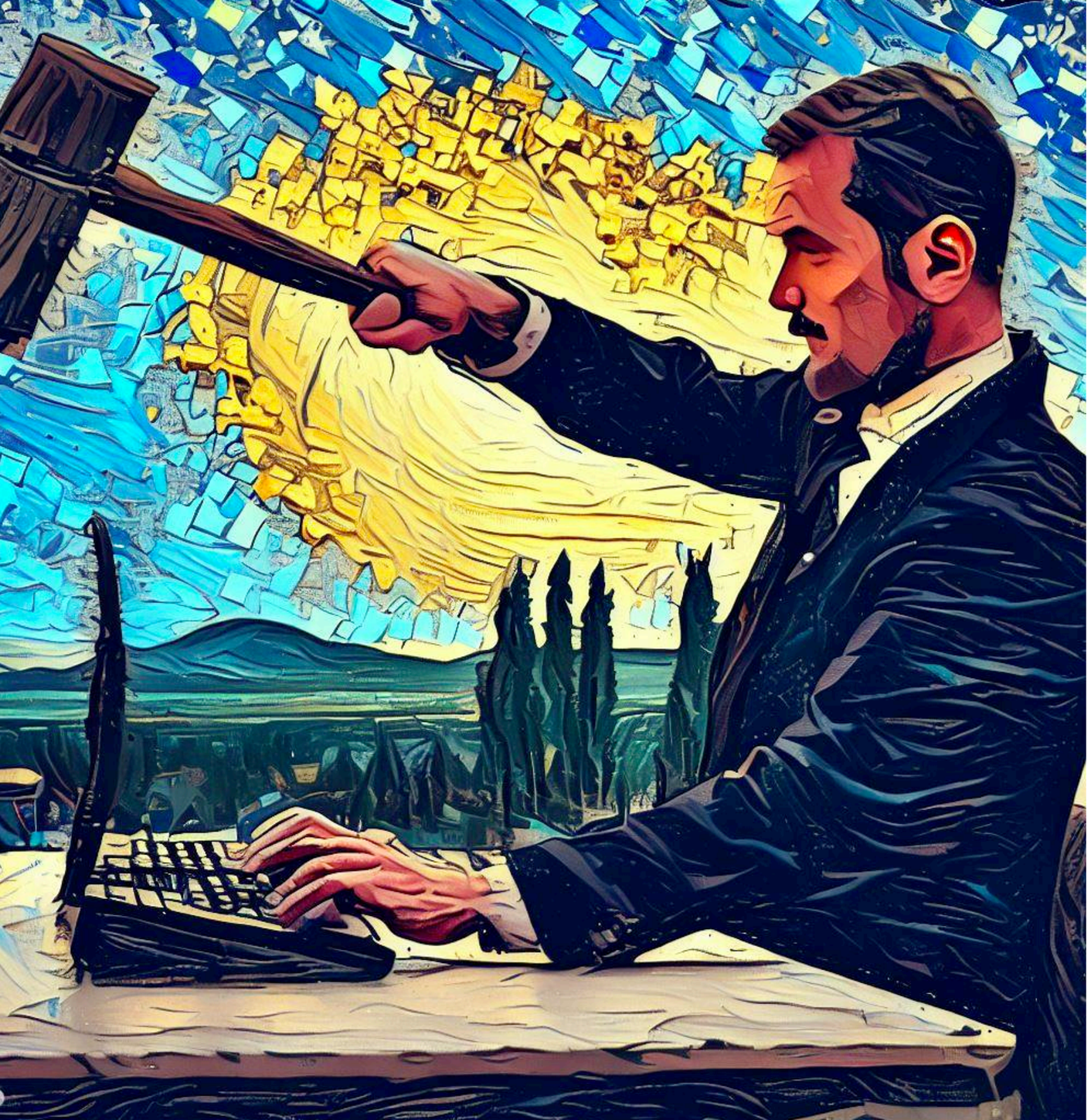


The Art of Software Development

~~**Testing**~~

aka

Creative Destruction



Exploratory testing



Tests should be **understandable** & **maintainable**

- To mock or not to mock?
- Share data between tests?

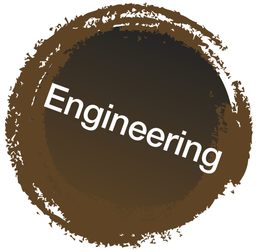


Tests should be **focused** & drive **design**

- Is it over-constraining?
- Have we covered enough?

Tests should assert an **outcome**

- One or multiple?
- JUnit vs. AssertJ




```
@Test
void ensureOrderIsFulfilled() {
  // Arrange
  Order order = ...
  OrderService orderService = ...

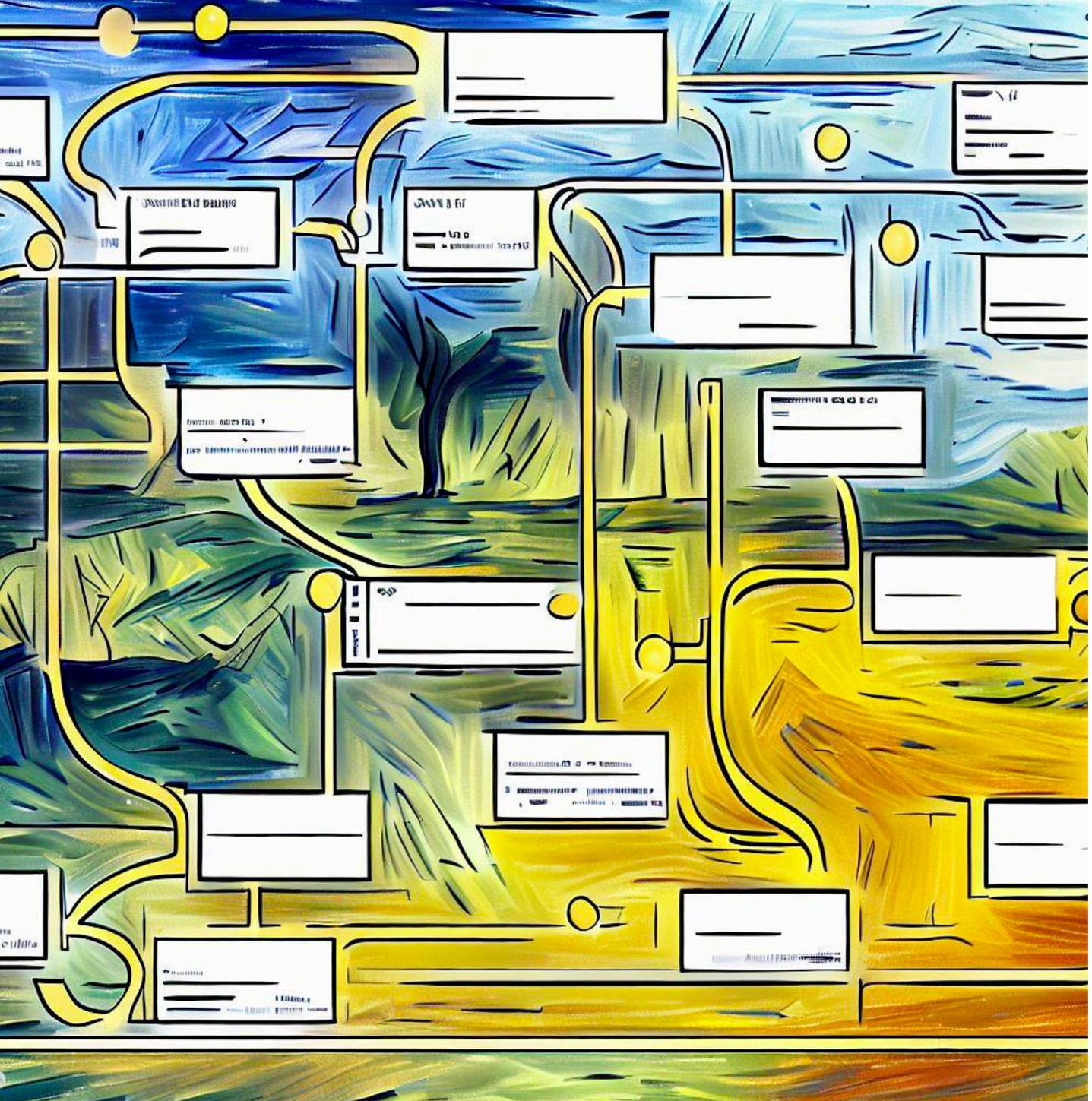
  // Act
  OrderResult result =
    orderService.fulfill(order);

  // Assert
  assertTrue(result.isFulfilled());

}
```

What makes **good tests**?

PIC NIC



The Art of Software Development

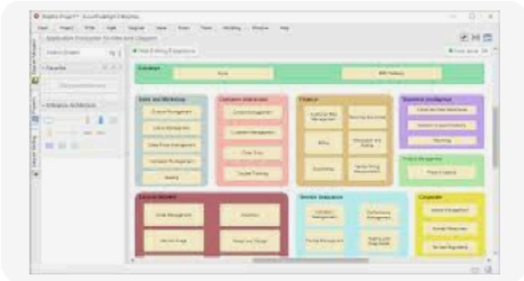
~~Design~~

aka

Do we even need this stuff?

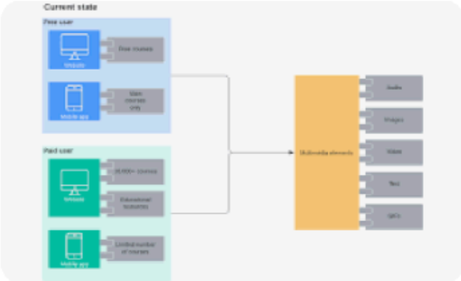
Software Architecture Art

Google it architecture diagram



Visual Paradigm

Enterprise Architecture Diagram Tool



Lucidchart

Architectural Diagrams ...



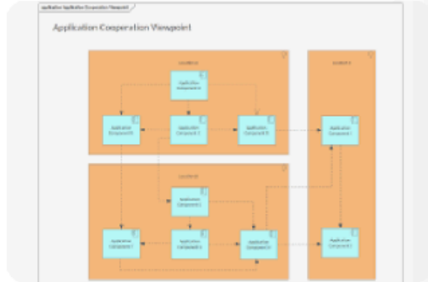
EdrawMax

Free Online Architecture Diagram Maker ...



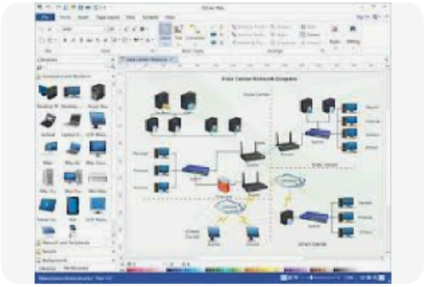
YouTube

How to Create Enterprise Architecture ...



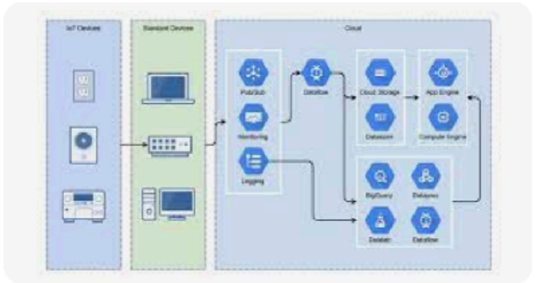
Sparx Systems

Enterprise Architect Diagrams ...



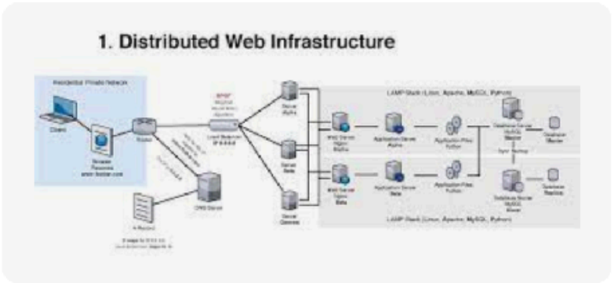
Red Hat

6 architectural diagramming tools for ...



Gliffy

Cloud Architecture Diagrams ...



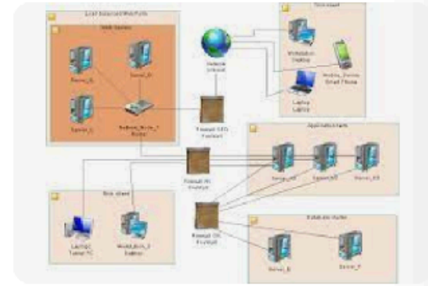
Wikimedia Commons

File:Network Architecture Diagram ...



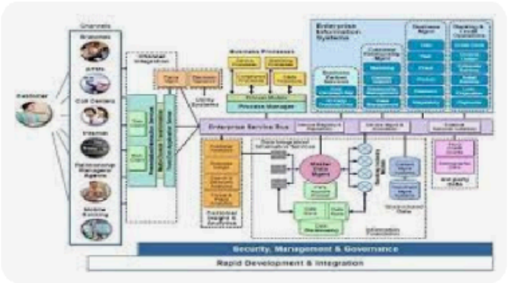
Alibaba Cloud

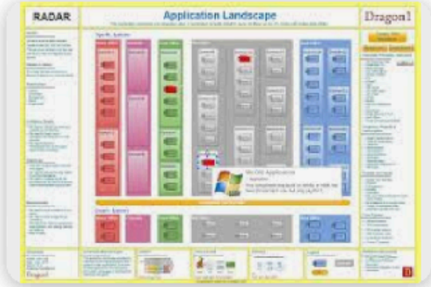
Technical Architectural Diagram ...

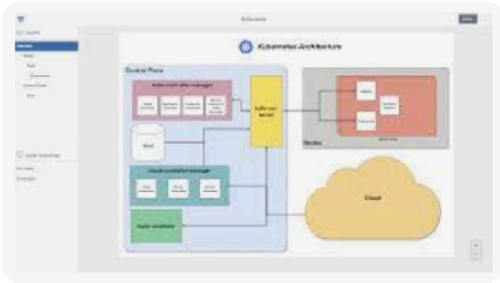


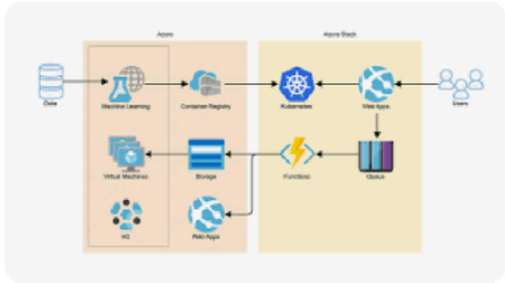
SAP Help Portal

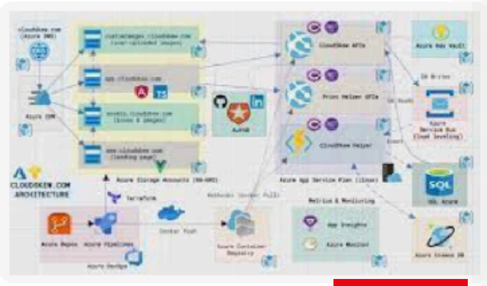
Technology Infrastructure Diagrams ...











Early 21st century, recognizable box and arrow style

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Do We Need Software Design/Architecture?

Is Design Dead?

May 2004



Martin Fowler

Build the right thing

Avoid costly mistakes

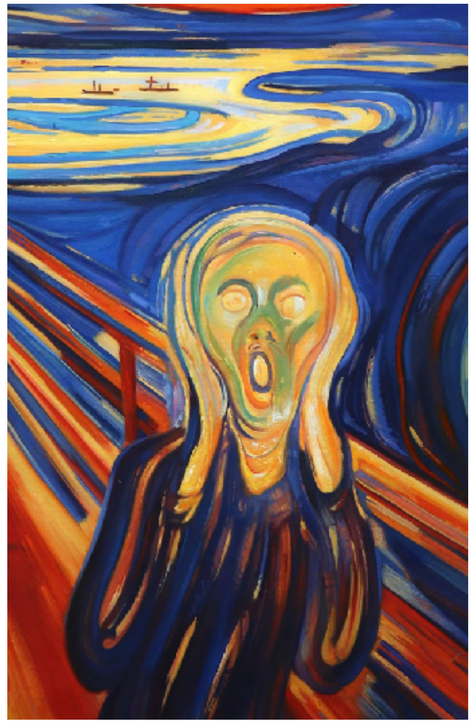
Uncover risks and assumptions

Document and share knowledge

"Weeks of coding can save you hours of designing"

PIC NIC

Software Design Is Still Essential





(Last year @ Devoxx PL!)

Most creative and daunting part of software development

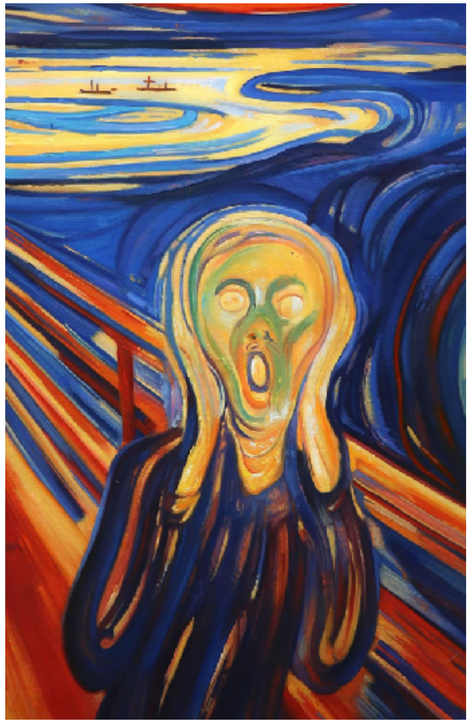
Why Is Software Design Hard?

No compiler

Tradeoffs

Understand the true problem

Design is communication



Simplify

If I had more time, I would have written a shorter letter.
– *Blaise Pascal*



If only I had more time, I would've created a simpler architecture
– *No software developer, ever*



PIC NiC

Simplify Designs: What Will You Take Away?



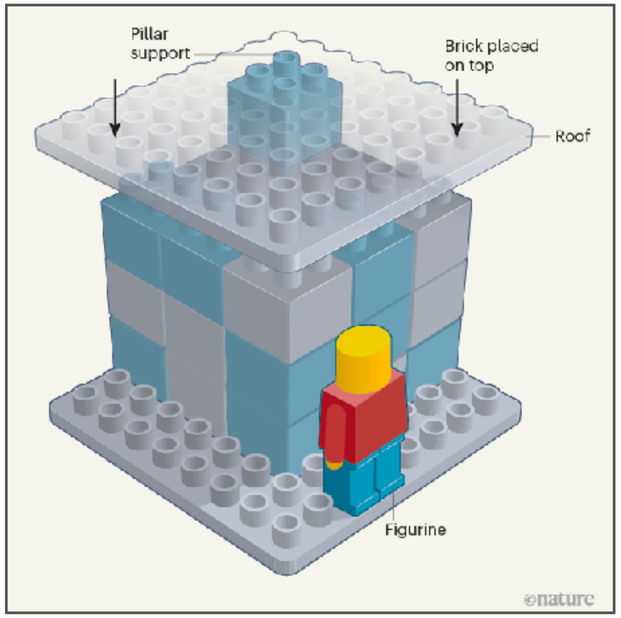
nature

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NEWS AND VIEWS | 07 April 2021

Adding is favoured over subtracting in problem solving

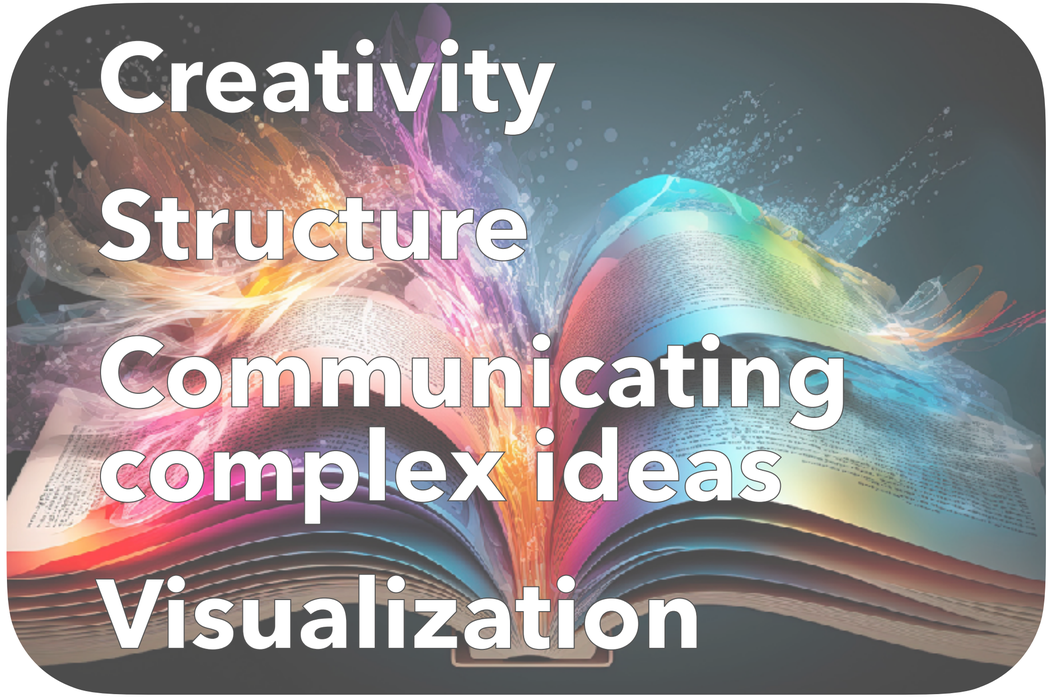
A series of problem-solving experiments reveal that people are more likely to consider solutions that add features than solutions that remove them, even when removing features is more efficient.





"Perfection is achieved when there is nothing left to take away."
—*Antoine de Saint-Exupéry*

Communicating Design: Storytelling

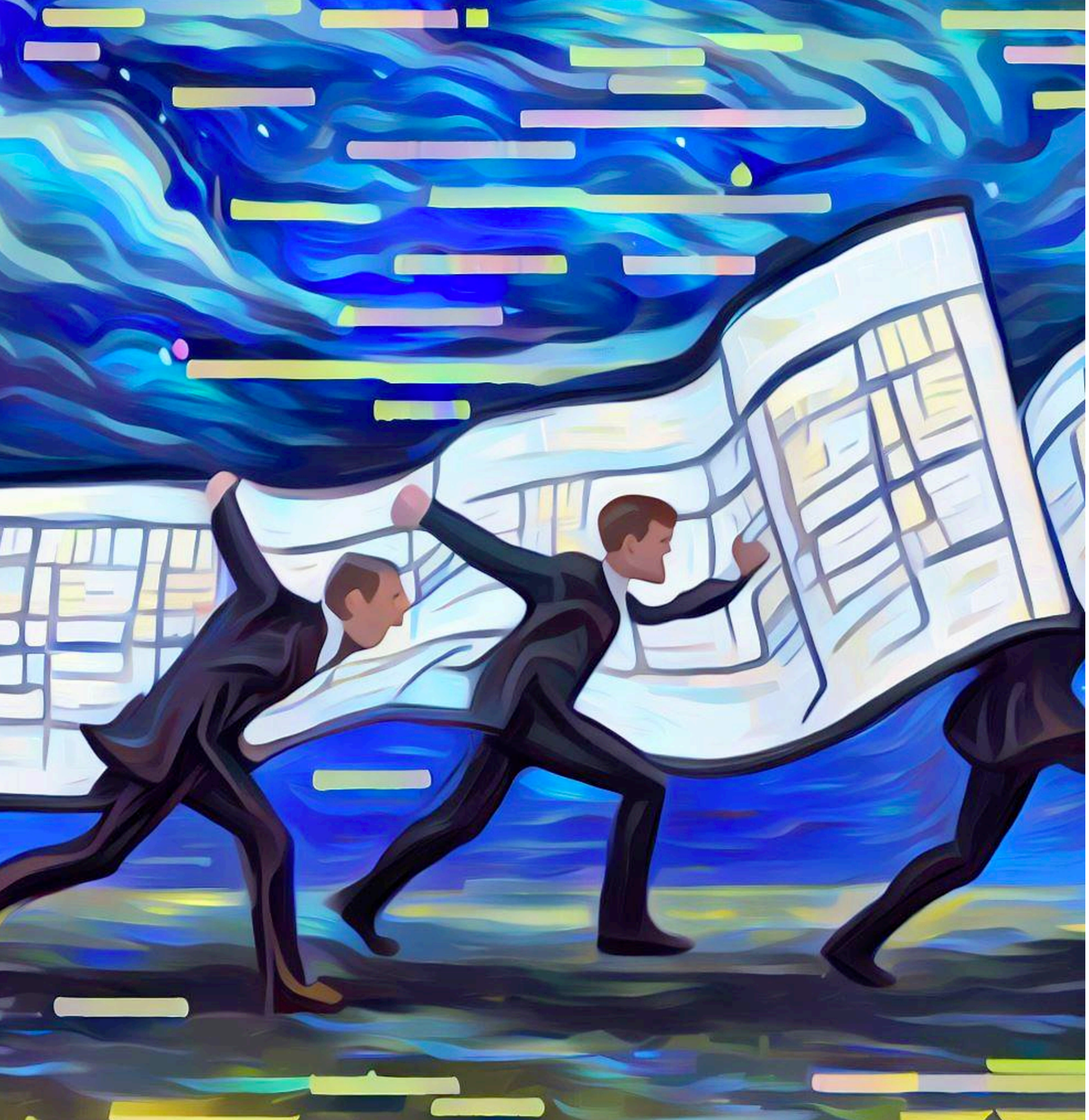


Design documents
RFCs
Arch. Decision Records

Domain Driven Design & Event Storming

Deliberate practice: workshop a fictional feature

PIC NiC



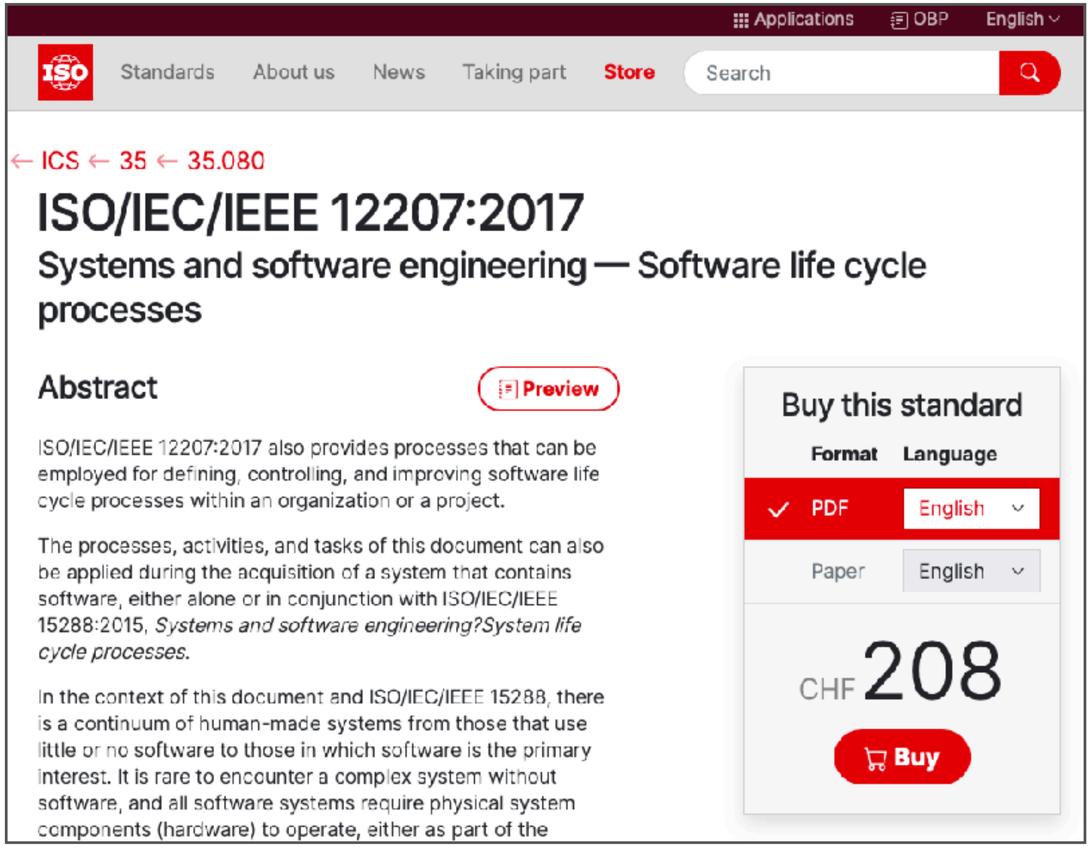
The Art of Software Development

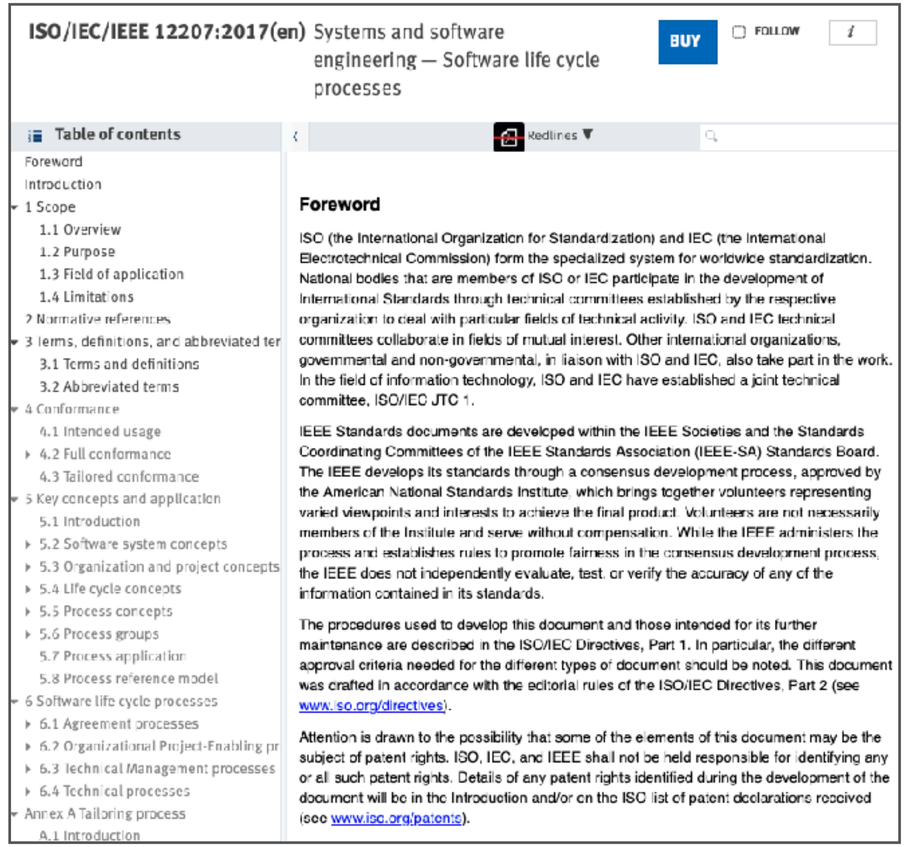
~~**Process**~~

aka

"Is it done yet?"

Software Development Process





Illusion of control

PIC NIC

Software Development Process

Agile is nature's way of telling us software development isn't strictly engineering.

Spec-by-Slack  **Scrumfall**

No Silver Bullet
—Essence and Accident in Software Engineering

Frederick P. Brooks, Jr.
University of North Carolina at Chapel Hill

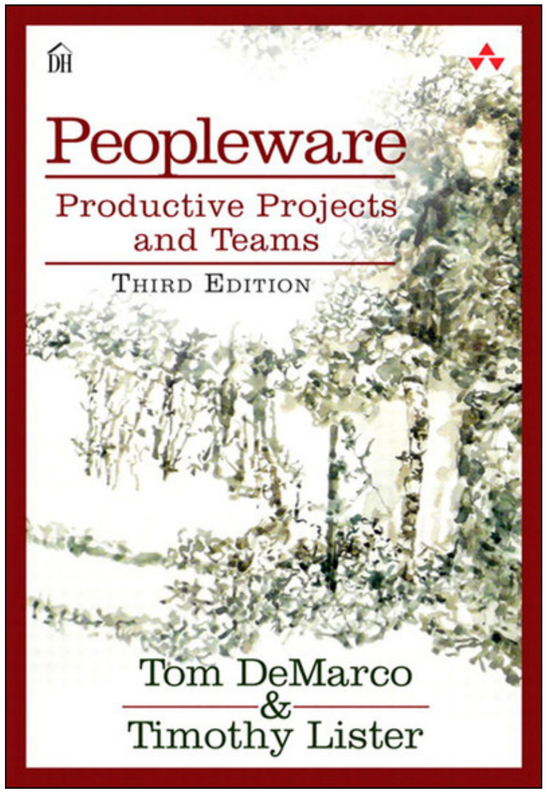
PIC NiC

Software Development ~~Process~~ Team

Explicit expectations
Inward and outward, with empathy

Autonomy
Earn trust, give trust

Continuous learning
Curiosity fosters skills growth



Great teams can evolve good processes, or at least survive bad ones, creating good outcomes

PIC NIC



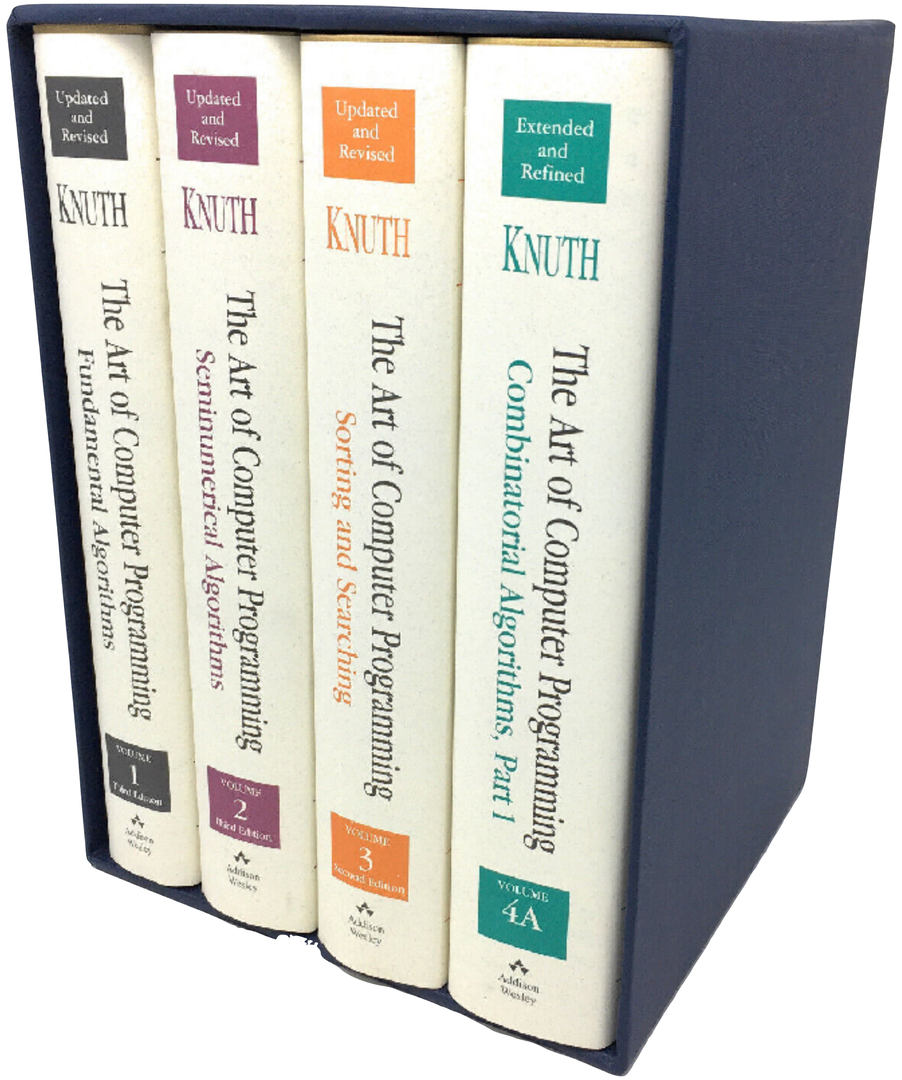
The Art of Software Development

~~**How do we learn this stuff??**~~

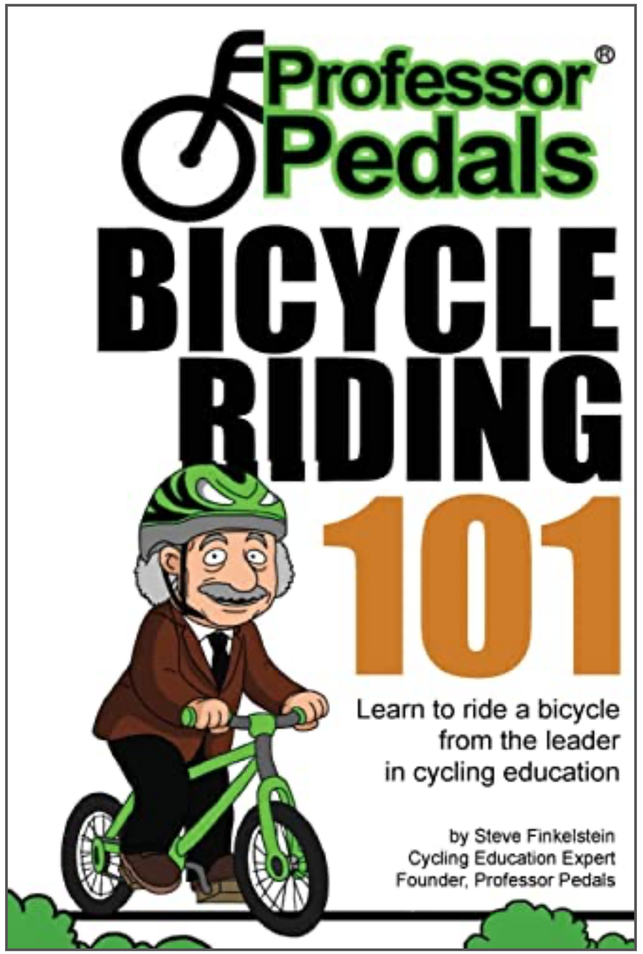
aka

'Just' experience

So You Mean... How To Get the Right Knowledge?



So You Mean... How To Get the Right ~~Knowledge~~? Skills



Bartosz Ciechanowski

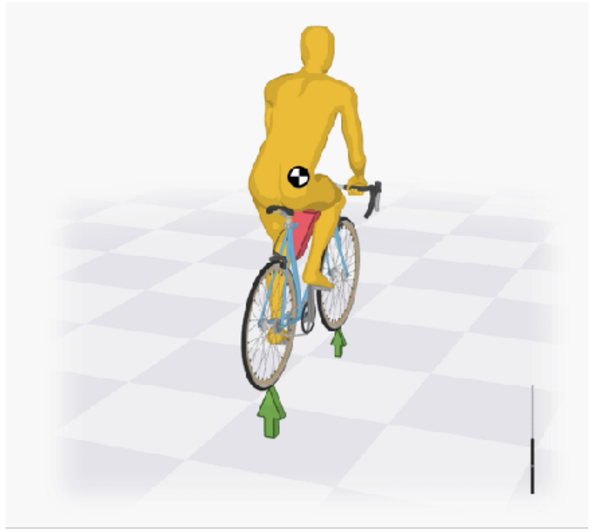
Blog Archives

March 28, 2023

Bicycle

There is something delightful about riding a bicycle. Once mastered, the simple action of pedaling to move forward and turning the handlebars to steer makes bike riding an effortless activity. In the demonstration below, you can guide the rider with the slider, and you can also drag the view around to change the camera angle:

https://ciechanow.ski/bicycle/



Metis (/ˈmiːtɪs/; Ancient Greek: Μῆτις, romanized: *Mêtis*, lit. 'wisdom', 'skill', or 'craft')

... it "resists simplification into deductive principles which can successfully be transmitted through **book learning**, because the environments in which it is exercised are so **complex and non-repeatable** that formal procedures… are impossible to apply."
-- Scott, J. C. (2020). Seeing like a state. Yale University Press.

Guilds & Apprenticeships





An Example: Picnic's Tech Academy

Graduate

Join a development team

50% contributing, 50% learning

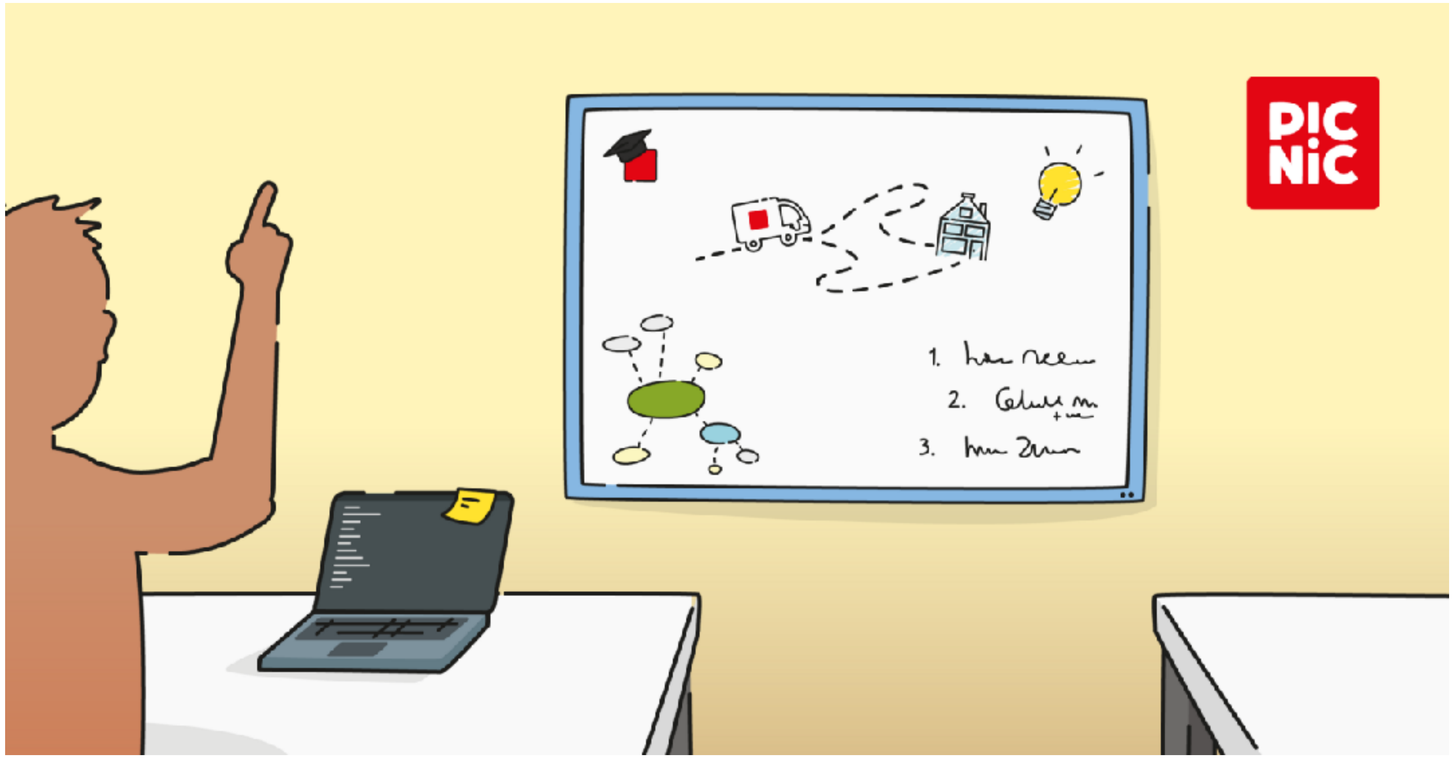
Dedicated team mentor

Expert-led courses

Full access to books/courses

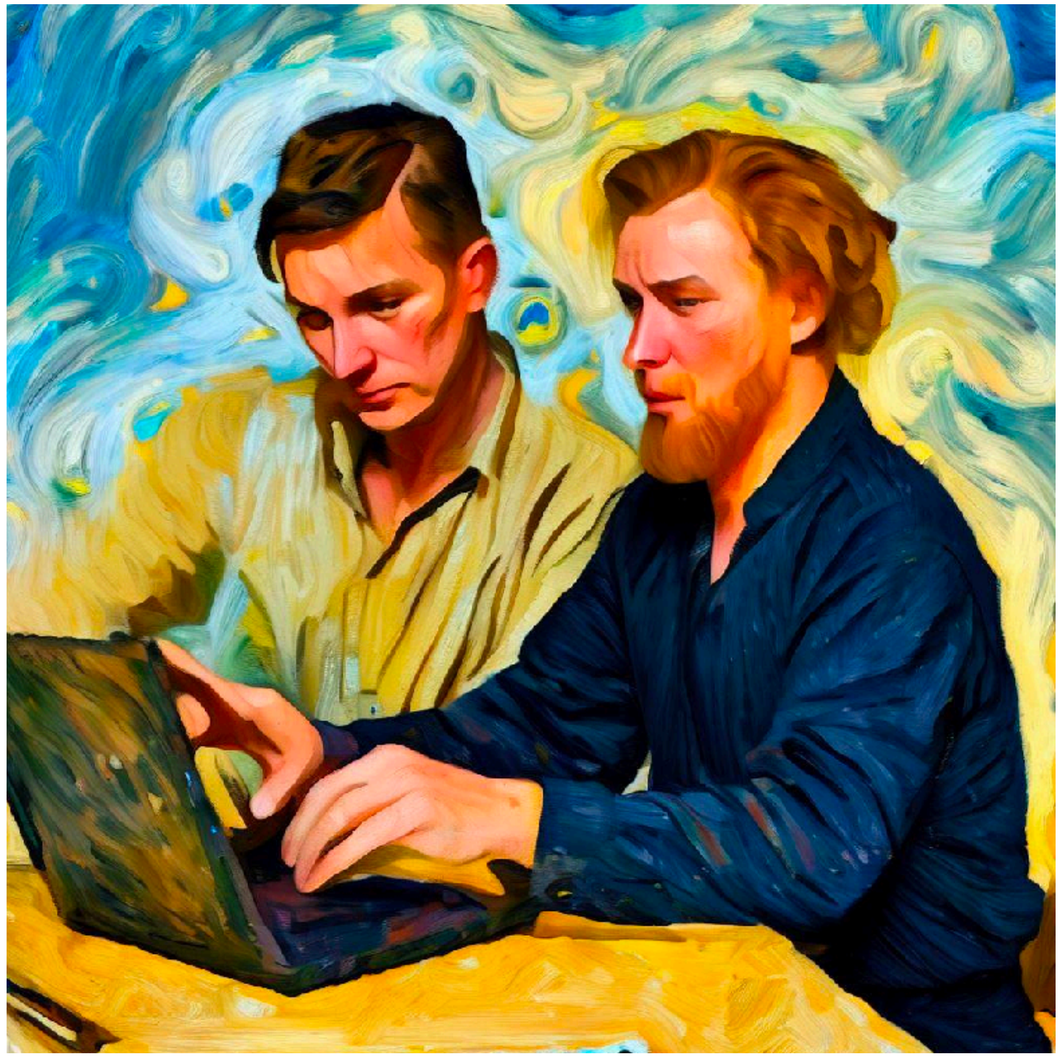
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Learning the Art of Software Development



https://blog.picnic.nl/picnics-tech-academy-through-the-eyes-of-recent-graduates-7e42094108e3

Share the Art of Software Development



Find a mentor;
be a mentor

Company &
Community

Real Artists Leave a Legacy

Work on what matters
Shape the world with your talents



Craftsmanship with a purpose
Find your style & engineer it

Share and mentor
Think of who comes after: 10x 10%

Let's hope we get some recognition
before our demise :)



Now go forth, and
write
beautiful code!

https://blog.picnic.nl

https://join.picnic.app

PIC
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