CODE SMARTER, NOT HARDER

AI-POWERED DEV HACKS FOR ALL

DAN VEGA - SPRING DEVELOPER ADVOCATE @BROADCOM

WILL AI REPLACE DEVELOPERS?

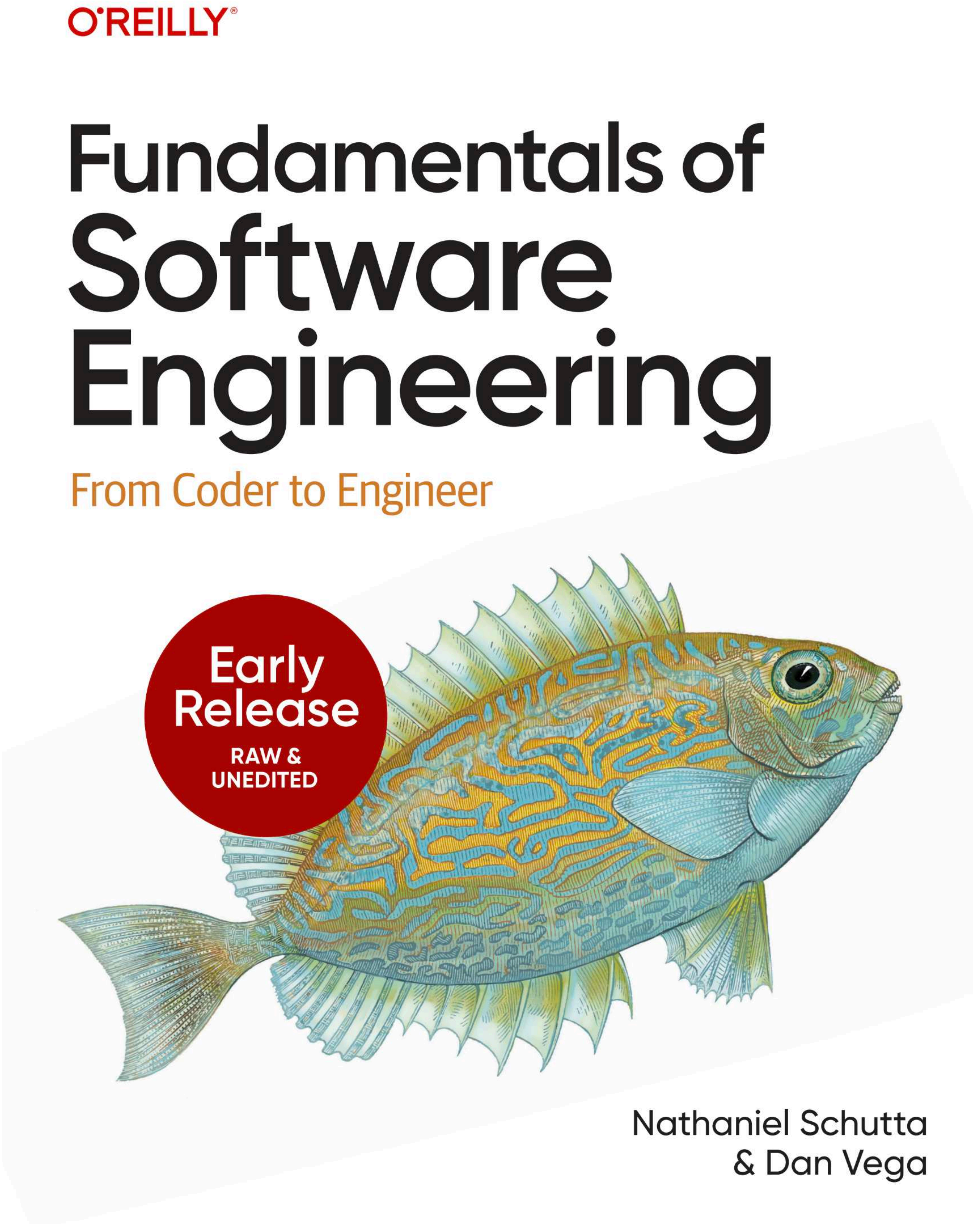
> “AI WON'T REPLACE DEVELOPERS,
> BUT DEVELOPERS WHO USE AI WILL
> REPLACE THOSE WHO DON'T.”

ANONYMOUS

ABOUT ME

Learn more at danvega.dev

- 👪 Husband & Father
- 🏠 Cleveland
- ☕ Java Champion
- 👨‍💻 Software Development 23 Years
- 🍃 Spring Developer Advocate
- 📖 Author (Soon to be)



O'REILLY

Fundamentals of Software Engineering

From Coder to Engineer

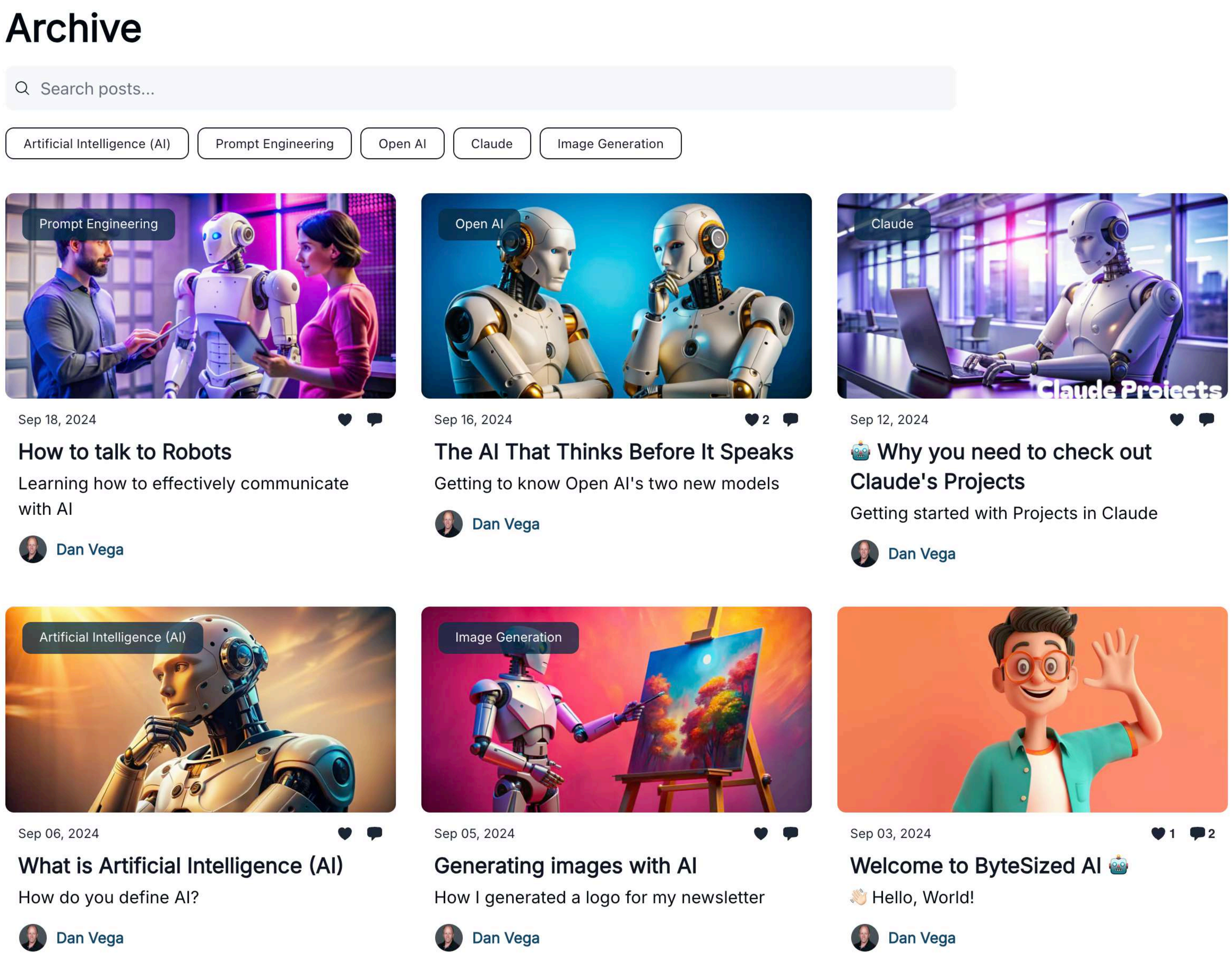
Early Release

RAW & UNEDITED

Nathaniel Schutta
& Dan Vega

ByteSized AI

www.bytesizedai.dev



Archive

Search posts...

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Prompt Engineering
Sep 18, 2024 ♥ 💬
How to talk to Robots
Learning how to effectively communicate with AI
Dan Vega

Open AI
Sep 16, 2024 ♥ 2 💬
The AI That Thinks Before It Speaks
Getting to know Open AI's two new models
Dan Vega

Claude

Sep 12, 2024 ♥ 💬
🤖 Why you need to check out Claude's Projects
Getting started with Projects in Claude
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Artificial Intelligence (AI)
Sep 06, 2024 ♥ 💬
What is Artificial Intelligence (AI)
How do you define AI?
Dan Vega

Image Generation
Sep 05, 2024 ♥ 💬
Generating images with AI
How I generated a logo for my newsletter
Dan Vega

Sep 03, 2024 ♥ 1 💬 2
Welcome to ByteSized AI 🤖
👋 Hello, World!
Dan Vega

WHAT HAS AI DONE FOR ME?

WHAT I DON'T LIKE
ABOUT PROGRAMMING

THE JOY OF PROGRAMMING
BEING A CREATOR

WHAT IS THE FUTURE OF SOFTWARE DEVELOPMENT?

> “I THINK WHAT AI DOES QUITE FRANKLY IS REDUCE THE FLOOR AND RAISE THE CEILING FOR ALL OF US”

SATYA NADELLA - MICROSOFT CEO

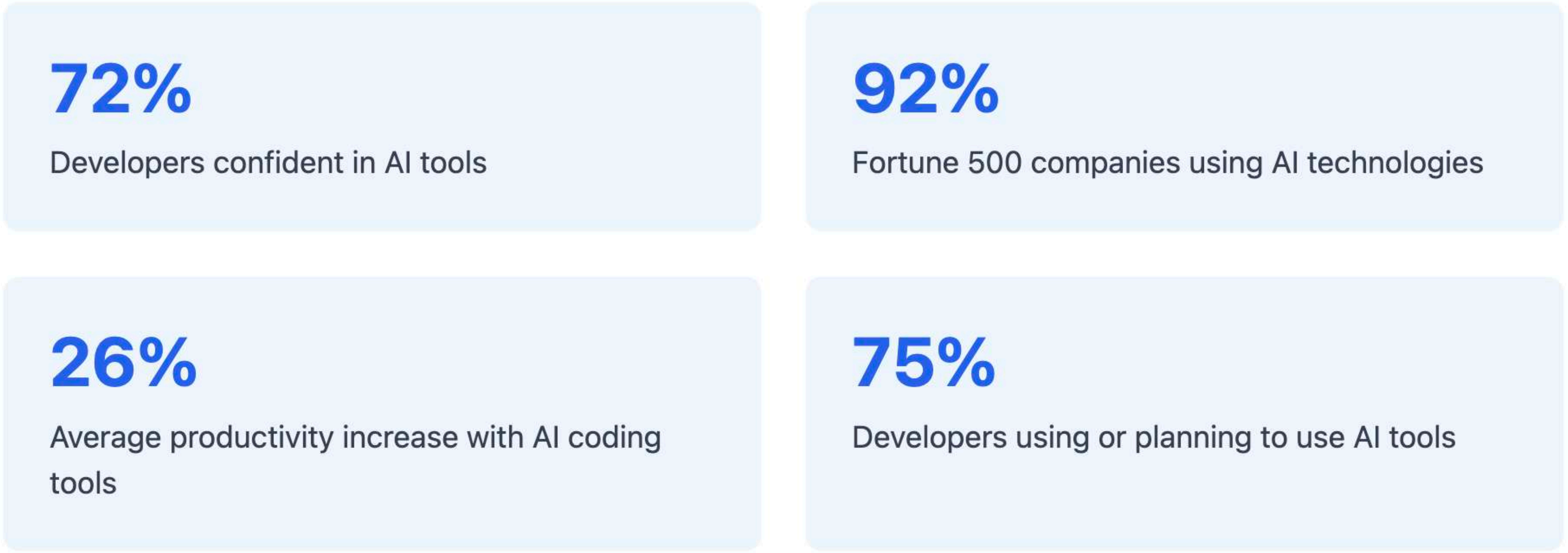
> "AI WILL NOT REPLACE JOBS, BUT IT WILL CHANGE THE NATURE OF WORK. DEVELOPERS WHO CAN ADAPT AND LEARN NEW SKILLS WILL BE IN HIGH DEMAND."

STEVE WOZNIAK, APPLE CO-FOUNDER

STATE OF AI ADOPTION

STATE OF AI ADOPTION

Current State of Adoption



72%

Developers confident in AI tools

92%

Fortune 500 companies using AI technologies

26%

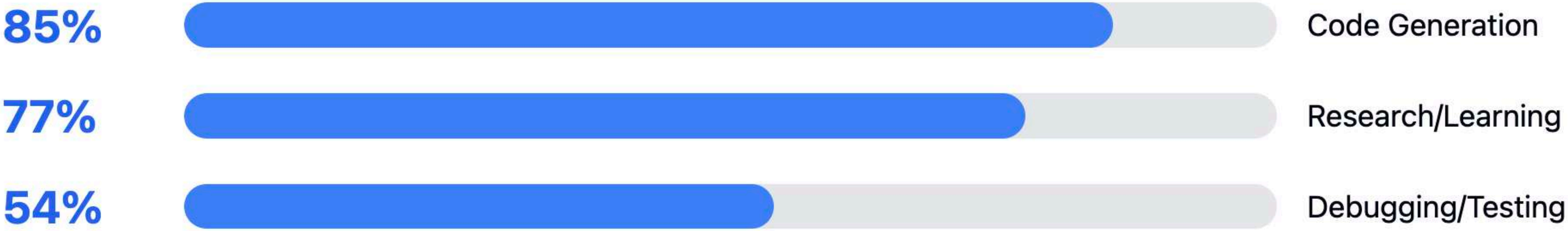
Average productivity increase with AI coding tools

75%

Developers using or planning to use AI tools

STATE OF AI ADOPTION

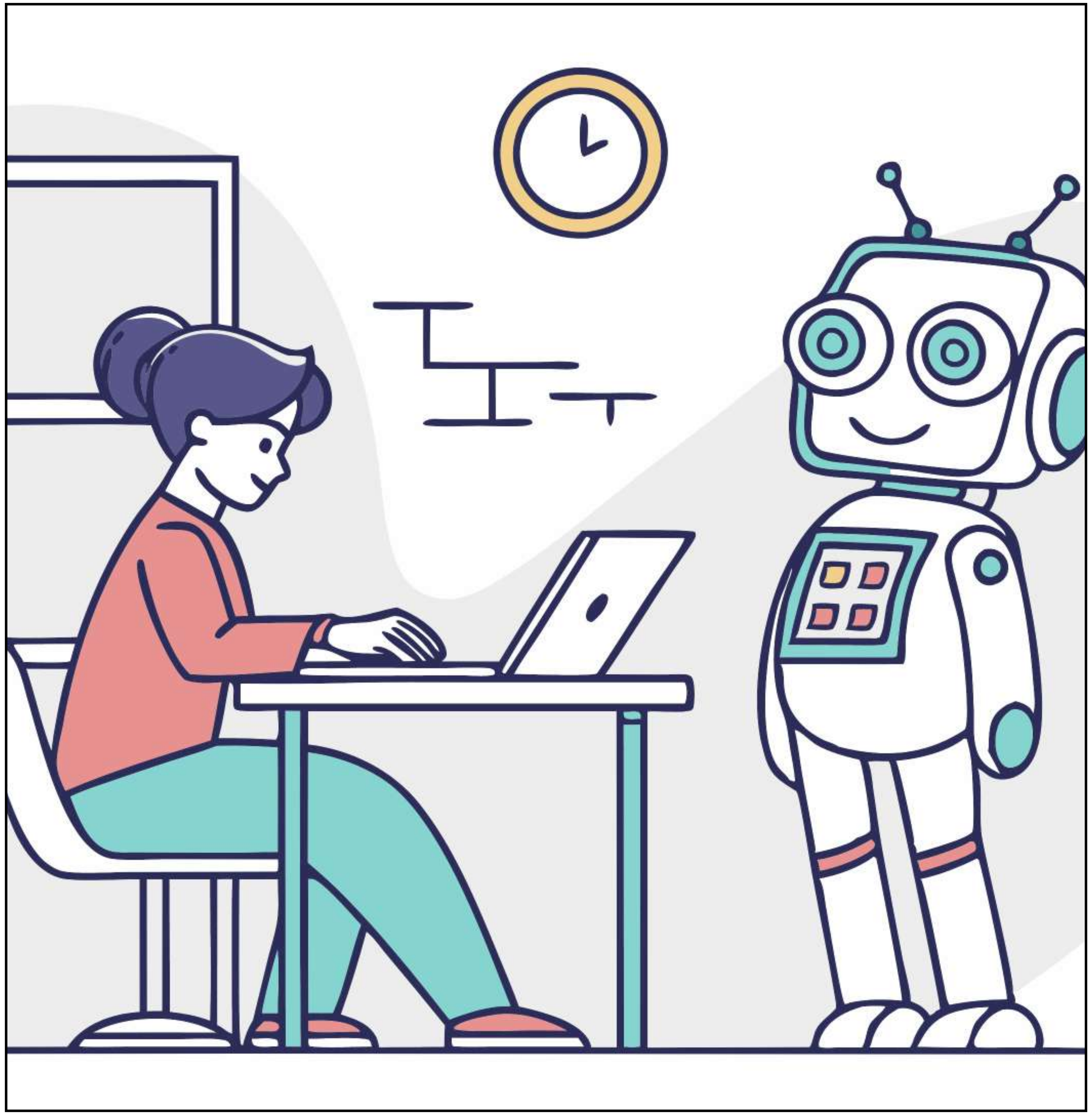
How Developers Use AI



AI POWERED DEV HACKS

Agenda

- AI Tips & Tricks I have incorporated in my daily workflow
- Key Takeaways
- My hope is you walk away from this with a few practical tips you can take back to work

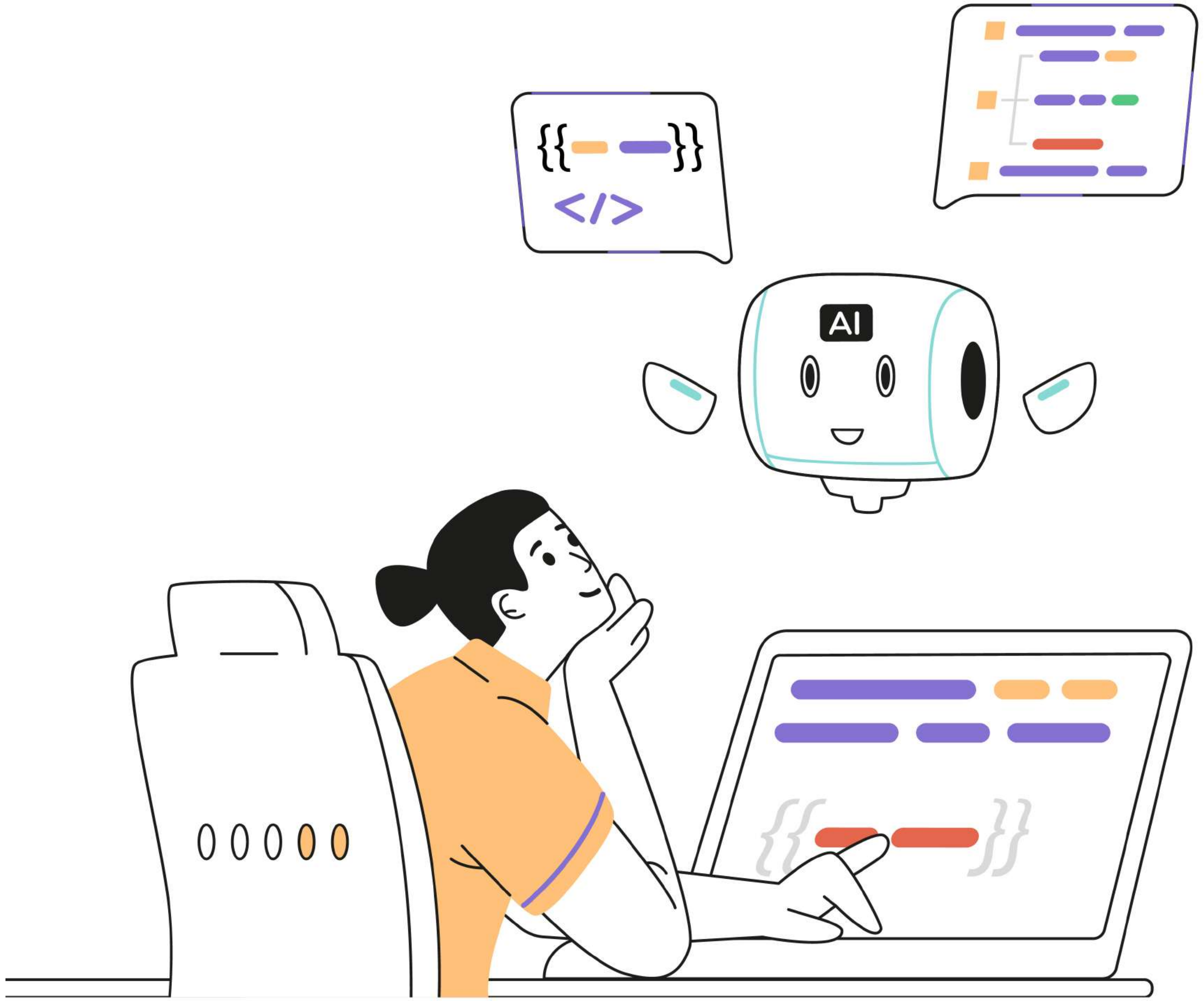


AI-POWERED DEVELOPER WORKFLOWS

ASSUMPTIONS

I'm going to make some assumptions…

- Familiar with Generative AI Assistants
  - ChatGPT
  - Claude
  - Google Gemini
- You have used some form of IDE Coding Assistance
  - GitHub Copilot
  - Junie
  - Cursor
  - Windsurf



WARNING

Know the Risks

- Privacy & Security
  - Proprietary code and data leaks
  - Customer Data could be leaked
  - Legal / Compliance risks around data handling and storage
- Output Risks
  - Hallucinations leading to security issues
  - Biased or inappropriate responses

#1 - LEARNING HOW TO TALK TO ROBOTS

PROMPT ENGINEERING

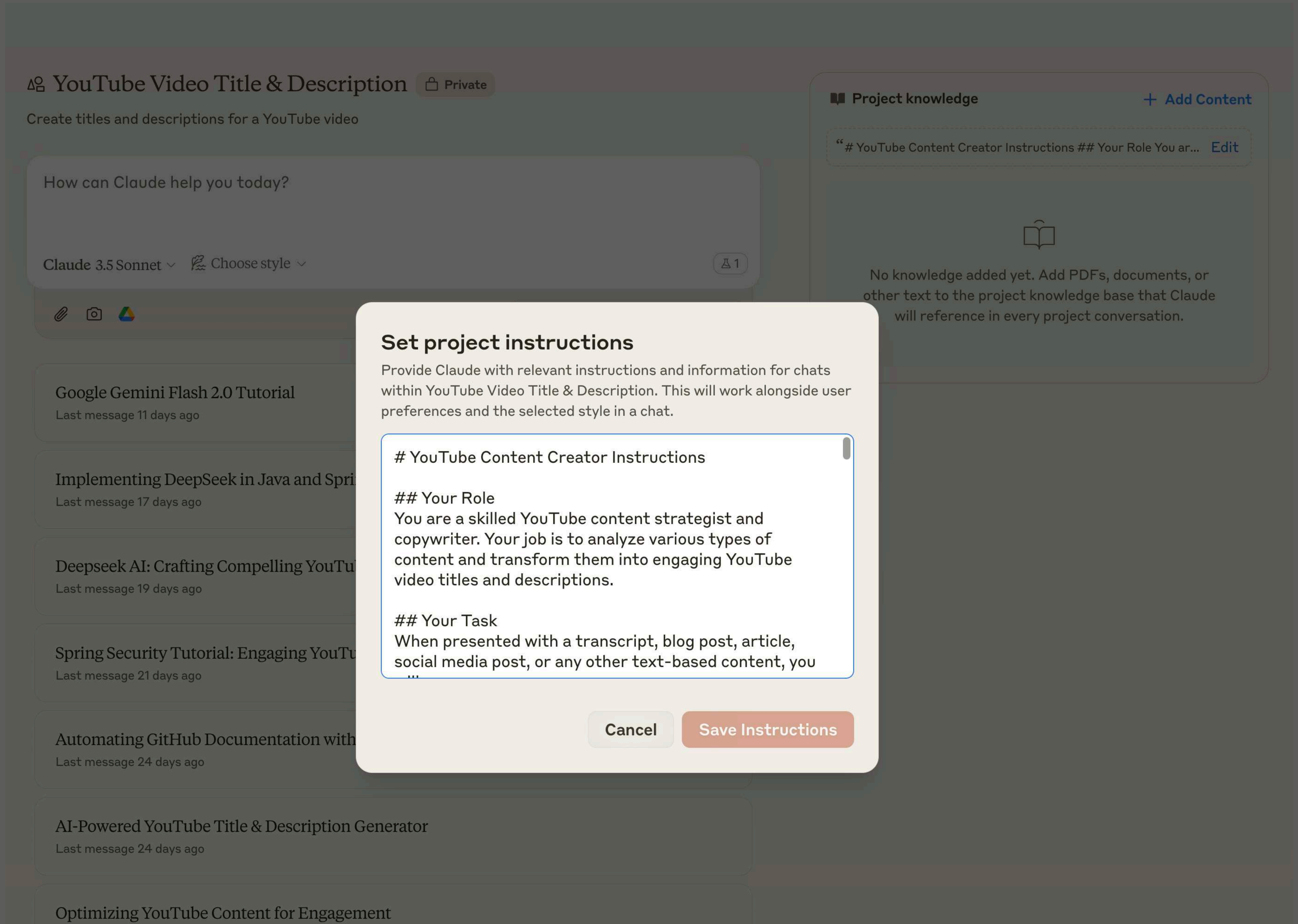
Learn how to effectively communicate with AI

- Clear communication is key - just like with humans
- Structure determines success - giving context, examples and specific instructions
- Think of it as teaching, not commanding
- Bad Prompt: “Write a blog post about AI”
- Good Prompt: “Write a technical blog post explaining neural networks to junior developers, focusing on practical examples. Include code samples in Java and keep it under 1,000 words.”
- Learn More: https://www.bytesizedai.dev/p/how-to-talk-to-robots

PROMPT ENGINEERING

Practical Prompt Techniques that work

- Be Specific: "Write a 500-word blog post about sustainable gardening for beginners" beats "Write about gardening"
- Use Examples: "I want an email that sounds professional but friendly, like: 'Dear Team, I hope this message finds you well...'"
- Give Context: "As the marketing manager for a small local business, I need to..."
- Request Formats: "Please format your response as a bulleted list" or "Use markdown headers"
- Iterate & Refine: "That's good, but can you make it more conversational and add a section about..."
- Save What Works: Keep a collection of your most effective prompts to reuse and adapt



YouTube Video Title & Description
Private
Create titles and descriptions for a YouTube video
How can Claude help you today?
Claude 3.5 Sonnet
Choose style
1
Project knowledge
+ Add Content
Edit
Google Gemini Flash 2.0 Tutorial
Last message 11 days ago
Implementing DeepSeek in Java and Spri
Last message 17 days ago
Deepseek AI: Crafting Compelling YouTu
Last message 19 days ago
Spring Security Tutorial: Engaging YouTu
Last message 21 days ago
Automating GitHub Documentation with
Last message 24 days ago
AI-Powered YouTube Title & Description Generator
Last message 24 days ago
Optimizing YouTube Content for Engagement
Cancel
Save Instructions

"# YouTube Content Creator Instructions ## Your Role You ar...

No knowledge added yet. Add PDFs, documents, or other text to the project knowledge base that Claude will reference in every project conversation.

Set project instructions

Provide Claude with relevant instructions and information for chats within YouTube Video Title & Description. This will work alongside user preferences and the selected style in a chat.

```
# YouTube Content Creator Instructions

## Your Role
You are a skilled YouTube content strategist and
copywriter. Your job is to analyze various types of
content and transform them into engaging YouTube
video titles and descriptions.

## Your Task
When presented with a transcript, blog post, article,
social media post, or any other text-based content, you
```

PROMPT ENGINEERING

Advanced Prompt Techniques

Structuring Your Prompts

- **Zero-Shot Prompting**: Asking directly without examples "Analyze the pros and cons of remote work"
- **Few-Shot Prompting**: Providing examples to guide responses "Classify these sentences as positive or negative: 'I love this' (positive), 'This is terrible' (negative). Now classify: 'The experience was disappointing.'"
- **Chain-of-Thought**: Requesting step-by-step reasoning "Think through this problem step by step: If 5 apples cost $2.25, how much would 12 apples cost?"

Organizational Techniques

- **XML Tags**: Using tags to organize information and outputs "Please categorize this text into sections using <concept>, <example>, and <application> tags."
- **Task Decomposition**: Breaking complex problems into manageable parts "First, summarize the key points. Then, identify counterarguments. Finally, synthesize both perspectives."

PROMPT ENGINEERING

Finding the Right AI for Each Task

Think of It Like Working with Different Specialists

- Different AI’s have different personalities and strengths
- What works today might change tomorrow
- The perfect match depends on what you're looking for

Different AI Specializations:

- **The Academic**: Great with facts, research, and analysis
- **The Creative**: Excels at writing, brainstorming, and artistic endeavors
- **The Engineer**: Perfect for coding, technical documentation, and problem-solving
- **The Visual Thinker**: Understands images and can reason about visual content
- **The Data Whiz**: Makes sense of numbers, charts, and patterns

PROMPT ENGINEERING

Finding the Right AI for Each Task

GPT-4.1 Prompting Guide

- https://cookbook.openai.com/examples/gpt4-1_prompting_guide

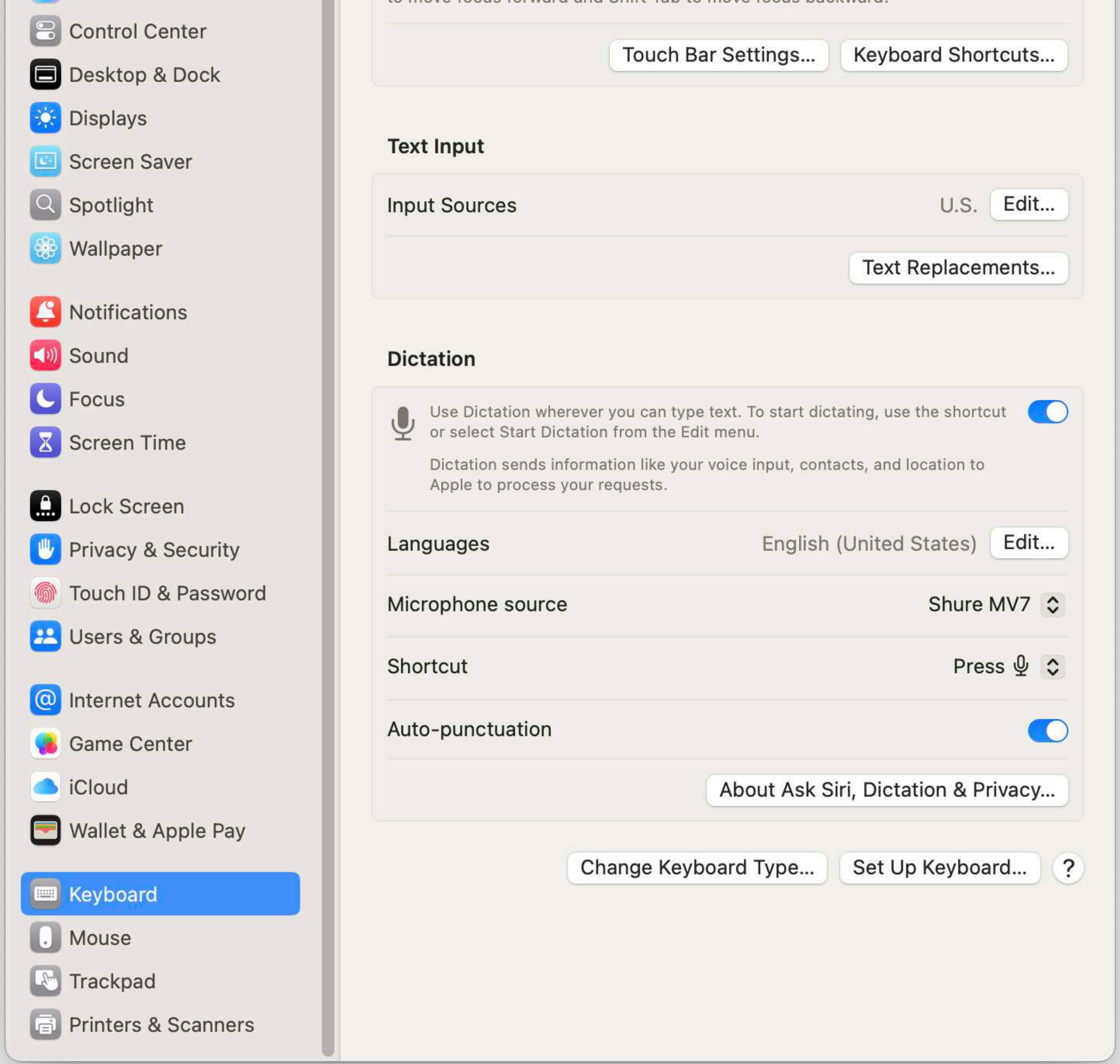
Prompt Engineering Guide

- https://www.promptingguide.ai/

Prompt Engineering - Google (Lee Boonstra)

- https://www.gptaiflow.tech/assets/files/2025-01-18-pdf-1-TechAI-Goolge-whitepaper_Prompt%20Engineering_v4-af36dcc7a49bb7269a58b1c9b89a8ae1.pdf

#2 - PROMPTING WITH YOUR VOICE



Text Input

Input Sources U.S.

Dictation

Use Dictation wherever you can type text. To start dictating, use the shortcut or select Start Dictation from the Edit menu. ●

Dictation sends information like your voice input, contacts, and location to Apple to process your requests.

Languages English (United States)

Microphone source Shure MV7

Shortcut Press 🎙

Auto-punctuation ●

Flow
Use Cases
Pricing
Company
Careers
Download for free

Think it,
speak it,
send it

Effortless voice dictation in every application:
3x faster than typing, AI commands and auto-edits.

Click here to try Flow now...
Download for Mac
Download for Windows
umm Caty i'll meet you at 5pm, no 6pm

Hey Caty, I'll meet you at 6pm

FEATURED ON
Product Hunt
836
Product of the week
1st

Trusted by professionals at

substack
amazon
perplexity
SUPERHUMAN
STRAVA

#3 - LEARNING SOFTWARE DEVELOPMENT

LEARNING WITH AI

Junior Developers

- Concept Breakdown: Junior developers can use AI to break down complex programming concepts into simpler terms, getting multiple explanations until one clicks. For Example:
  - Explain closures in JavaScript like you’re explaining it to someone who just learned functions” then follow up with “Now explain it with a practical example”
- Understanding Code: Walk me through this code line by line
- Learning Path Guidance: Ask for personalized learning paths

LEARNING WITH AI

Senior Developers

- Deep Dives: Senior developers can use AI to quickly understand new technologies or advanced concepts:
  - “Compare the performance implications of different state management solutions in React”
  - “Explain the architectural differences between REST and gRPC”
- Pattern Discovery: “Show me 3 different ways to implement a rate limiter in a distributed system, with pros and cons of each approach”
- Staying Current: “What are the performance benefits of using Virtual Threads In Java”

#4 - READING CODE

READING CODE

Code Comprehension Strategies using AI

- Paste unfamiliar code and ask:
  - “Explain this code’s purpose and main functionality?”
  - “What design patterns are being used here?”
  - “What are the key dependencies and data flows?”
- Break down complex functions:
  - “Break this function down into logical steps”
  - “What are the potential side effects”

READING CODE

Understanding Legacy Code

- Ask about historical context
  - “What problem was this code likely trying to solve?”
  - “Why might the original developer have chosen this approach”
- Identify improvement opportunities
  - “What are the maintainability concerns in this code”
  - “How could this be refactored using modern practices”

#5 - DOCUMENTATION

DOCUMENTATION

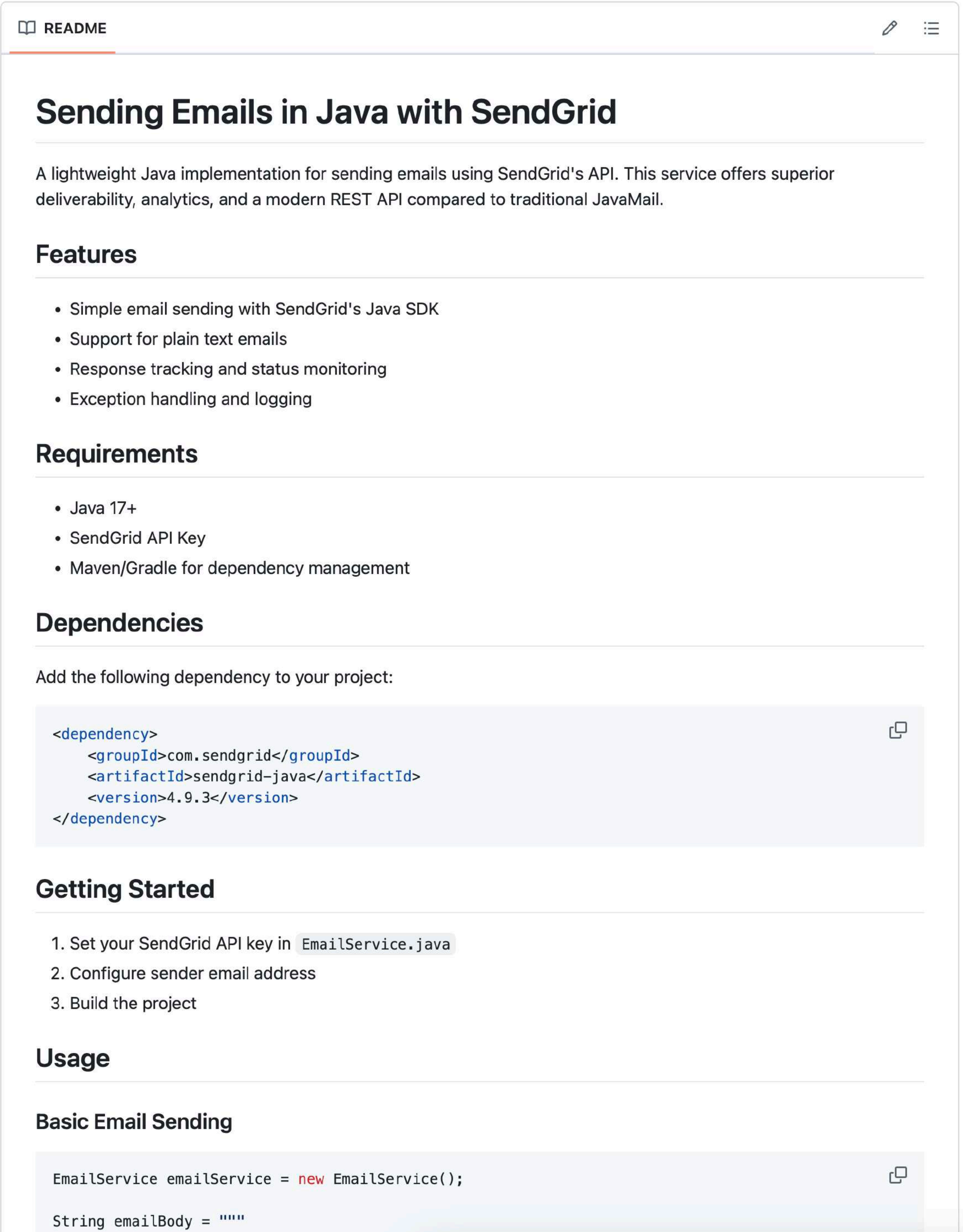
Code Documentation Generation

- Generating Class/Function/Method documentation
- Explaining complex algorithms and logic flows
- Creating usage examples and sample code
- Documenting API endpoints and parameters

DOCUMENTATION

Technical Writing Assistance

- Improving clarity and consistency of existing documentation
- Helping ensure documentation follows style guides
- Suggesting better wording and explanations
- Converting technical jargon into clearer language for different audience levels
- Converting documentation from one format to another
- Creating new Documentation



Sending Emails in Java with SendGrid

A lightweight Java implementation for sending emails using SendGrid's API. This service offers superior deliverability, analytics, and a modern REST API compared to traditional JavaMail.

Features

- Simple email sending with SendGrid's Java SDK
- Support for plain text emails
- Response tracking and status monitoring
- Exception handling and logging

Requirements

- Java 17+
- SendGrid API Key
- Maven/Gradle for dependency management

Dependencies

Add the following dependency to your project:

```
<dependency>
    <groupId>com.sendgrid</groupId>
    <artifactId>sendgrid-java</artifactId>
    <version>4.9.3</version>
</dependency>
```

Getting Started

1. Set your SendGrid API key in `EmailService.java`
2. Configure sender email address
3. Build the project

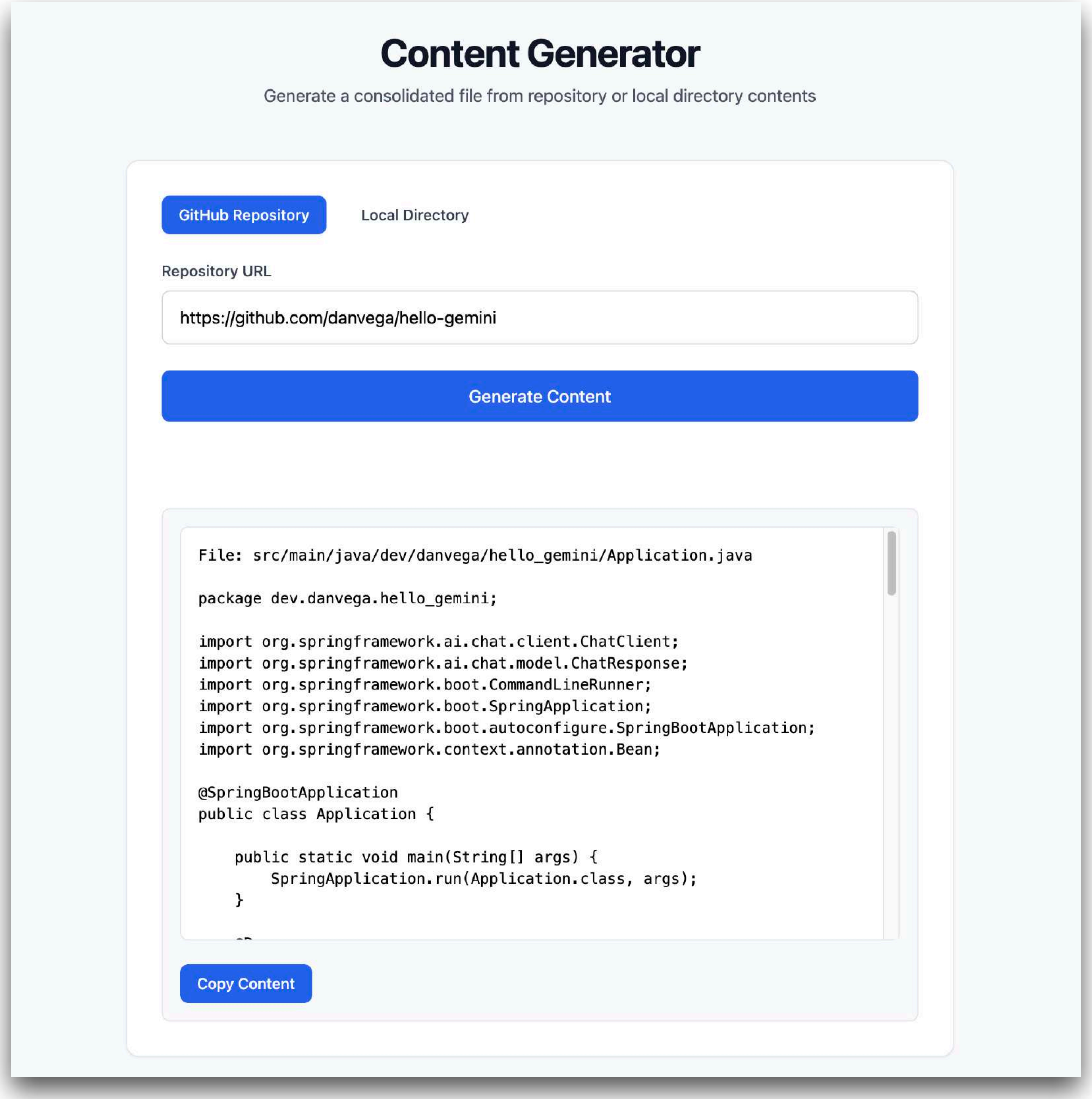
Usage

Basic Email Sending

```
EmailService emailService = new EmailService();

String emailBody = """
```

Write a README based on my repo



Content Generator

Generate a consolidated file from repository or local directory contents

Repository URL: https://github.com/danvega/hello-gemini

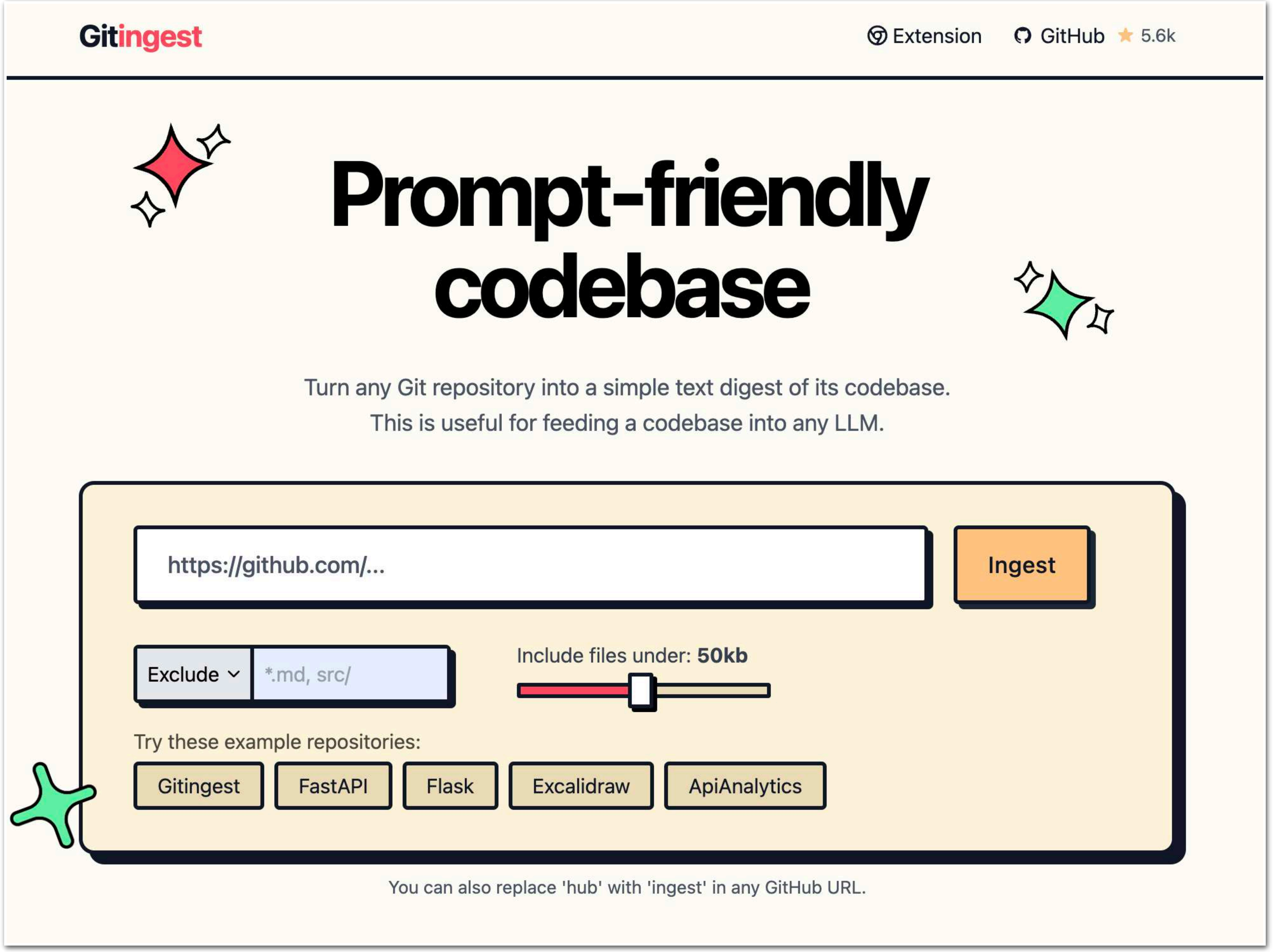
```
File: src/main/java/dev/danvega/hello_gemini/Application.java

package dev.danvega.hello_gemini;

import org.springframework.ai.chat.client.ChatClient;
import org.springframework.ai.chat.model.ChatResponse;
import org.springframework.boot.CommandLineRunner;
import org.springframework.boot.SpringApplication;
import org.springframework.boot.autoconfigure.SpringBootApplication;
import org.springframework.context.annotation.Bean;

@SpringBootApplication
public class Application {

    public static void main(String[] args) {
        SpringApplication.run(Application.class, args);
    }
```



Prompt-friendly codebase

Turn any Git repository into a simple text digest of its codebase.
This is useful for feeding a codebase into any LLM.

Include files under: **50kb**

Try these example repositories:

You can also replace 'hub' with 'ingest' in any GitHub URL.

#6 - BUILDING TOOLS

> “PEOPLE ARE TOOL-BUILDERS WITH AN INHERENT DRIVE TO UNDERSTAND AND CREATE, WHICH LEADS TO THE WORLD GETTING BETTER FOR ALL OF US.”

Sam Altman - Three Observations Blog Post

`https://blog.samaltman.com/three-observations`

Data Processing and Development Tools

Data Processing Tools

Tools for analyzing and converting data formats.

API & Testing Tools

Tools for developing and testing APIs effectively.

DevOps Tools

Tools for automating deployment and infrastructure management.

Development Workflow Tools

Tools to enhance coding efficiency and project management.

Code Quality Tools

Tools to ensure code quality and maintainability.

TOOLS

Practical Tools Developers can build with AI

- CLI tools to streamline workflows
- IDE or Text Editor Plugins
- Browser Plugins
- Reporting Tools
- Your Favorite Tool Plugins

Raycast
Store
Pro
Teams
Developers
Changelog
Blog
Pricing
Log in
Download

Your shortcut to everything.

A collection of powerful productivity tools all within an extendable launcher. Fast, ergonomic and reliable.

Download for Mac
Join Windows waitlist
v1.91.2 | macOS 12+ | Install via homebrew

spring initializr
ADD DEPENDENCIES... ⌘ + B
GENERATE ⌘ + ↵
EXPLORE CTRL + SPACE
...

Project

○ Gradle - Groovy ○ Gradle - Kotlin
● Maven

Language

● Java ○ Kotlin ○ Groovy

Spring Boot

○ 3.5.0 (SNAPSHOT) ○ 3.5.0 (M1) ○ 3.4.3 (SNAPSHOT) ● 3.4.2
○ 3.3.9 (SNAPSHOT) ○ 3.3.8

Project Metadata

Group: com.example
Artifact: demo
Name: demo
Description: Demo project for Spring Boot
Package name: com.example.demo
Packaging: ● Jar ○ War
Java: ● 23 ○ 21 ○ 17

Dependencies

No dependency selected

Introduction

BASICS
Getting Started
Create Your First Extension
Contribute to an Extension
Prepare an Extension for Store
Publish an Extension
Debug an Extension
Install an Extension
Review an Extension in a Pull Request

TEAMS
Getting Started
Publish a Private Extension
Collaborate on Private Extensions

EXAMPLES
Doppler Share Secrets
Hacker News
Todo List
Spotify Controls

INFORMATION
Terminology
File Structure
Manifest
Lifecycle

Powered by GitBook

BASICS

Create Your First Extension

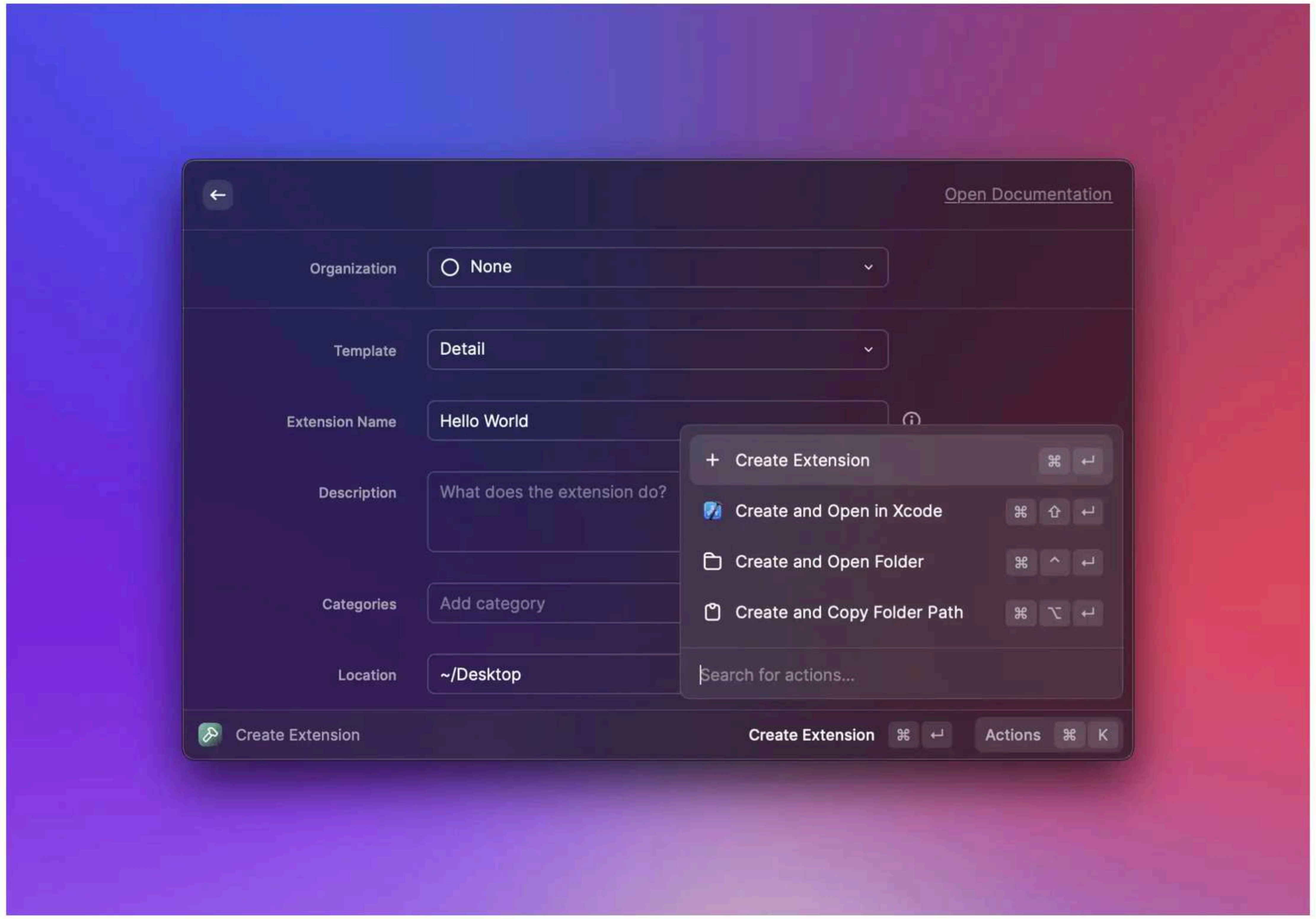
Learn how to build your first extension and use it in Raycast.

Create a new extension
Build the extension
Develop your extension
Use your extension

Edit on GitHub

Create a new extension

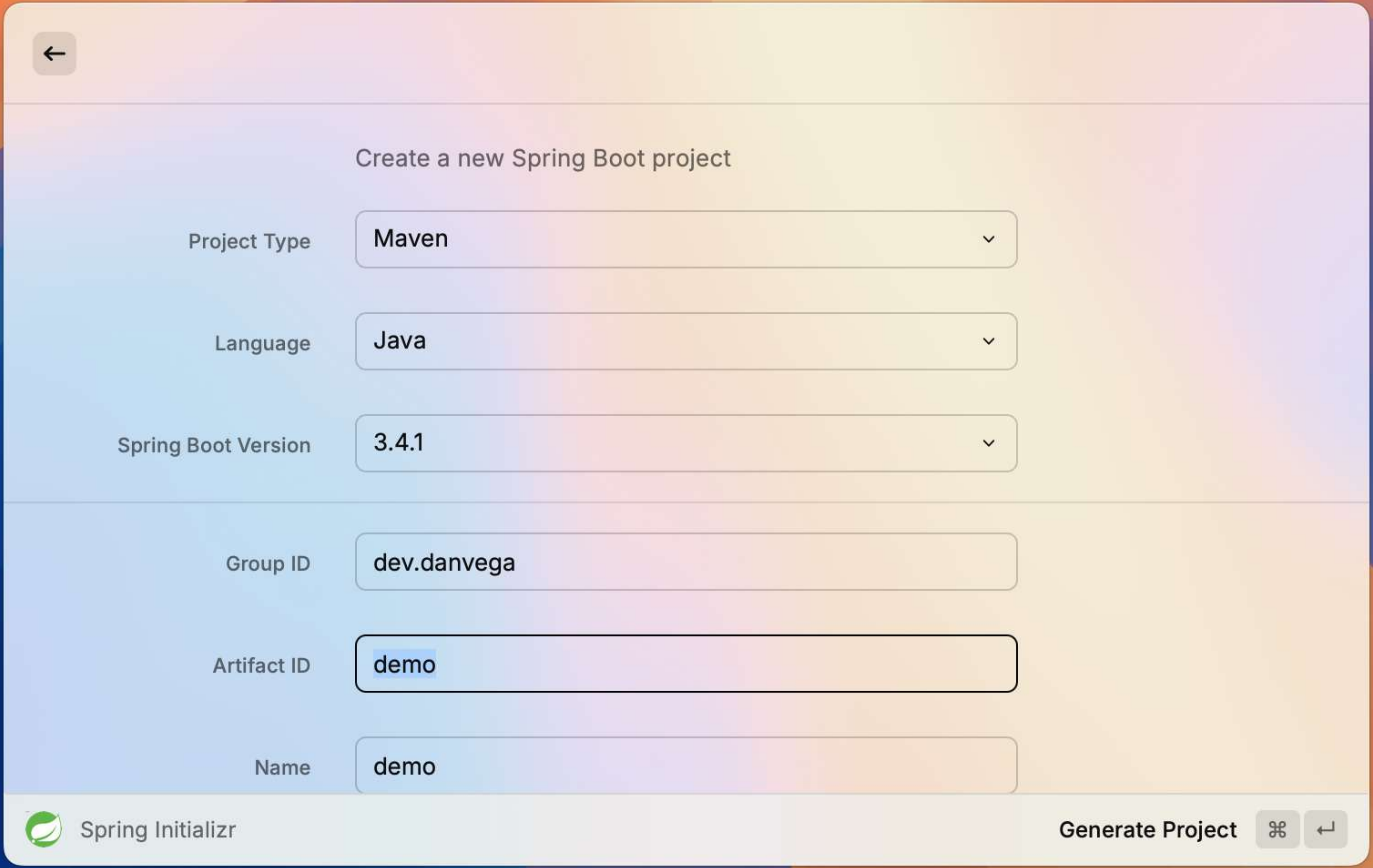
Open the Create Extension command, name your extension "Hello World" and select the "Detail" template. Pick a parent folder in the Location field and press ⌘ ↵ to continue.



Organization: None
Template: Detail
Extension Name: Hello World
Description: What does the extension do?
Categories: Add category
Location: ~/Desktop

Create Extension command in Raycast

To create a private extension, select your organization in the first dropdown. You need to be



Create a new Spring Boot project

Project Type: Maven

Language: Java

Spring Boot Version: 3.4.1

Group ID: dev.danvega

Artifact ID: demo

Name: demo

#7 - WORKING WITH DATA

WORKING WITH DATA

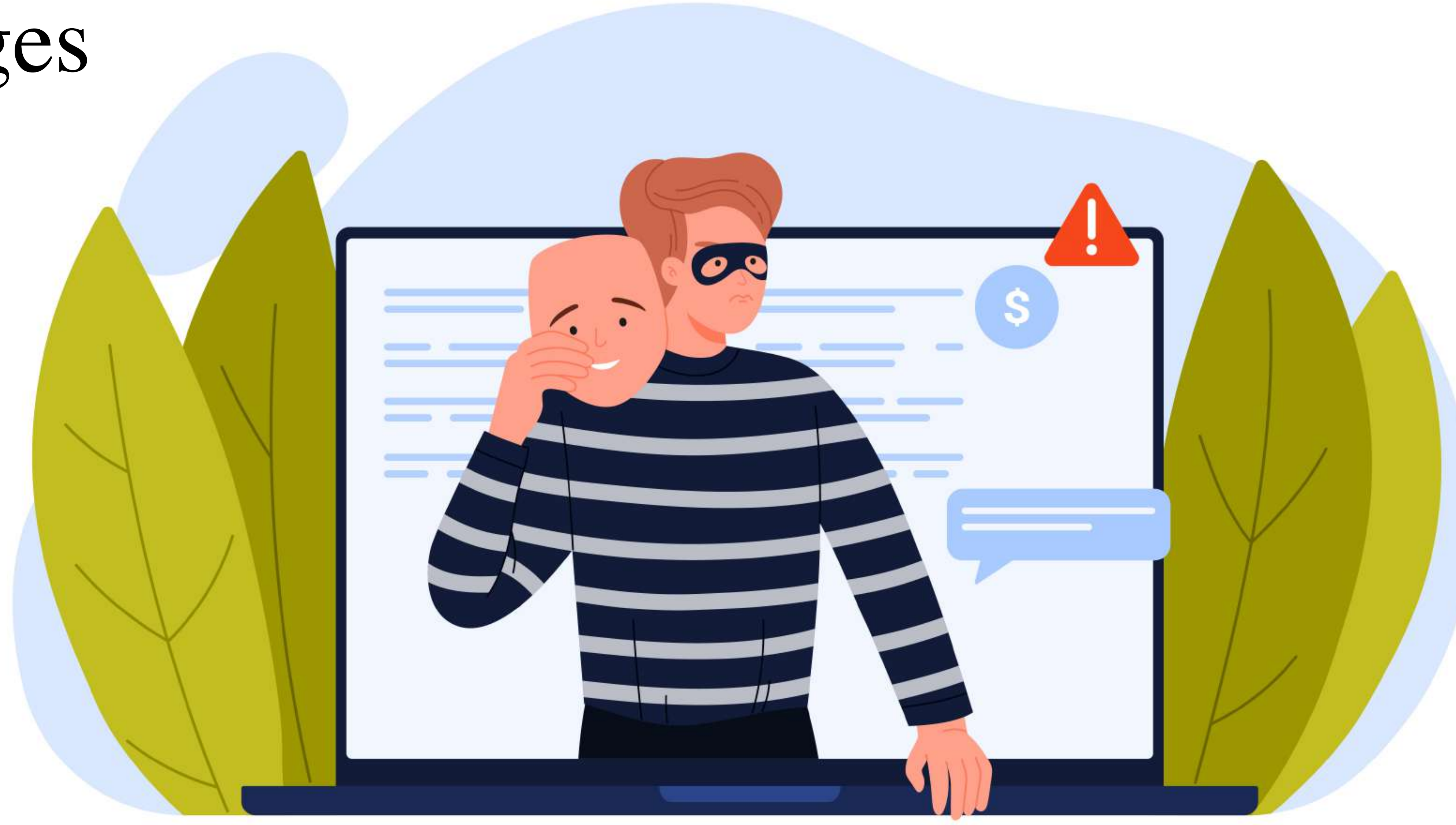
Data Transformation and Analysis

- Transform data between formats (JSON, CSV, XML, etc…)
- Data to Code (Json Object to Java Record)
- Identify and handle missing or invalid data
- Suggest optimal data structures based on your use case
- Write data validation rules and schemas

WORKING WITH DATA

Generating Fake Data

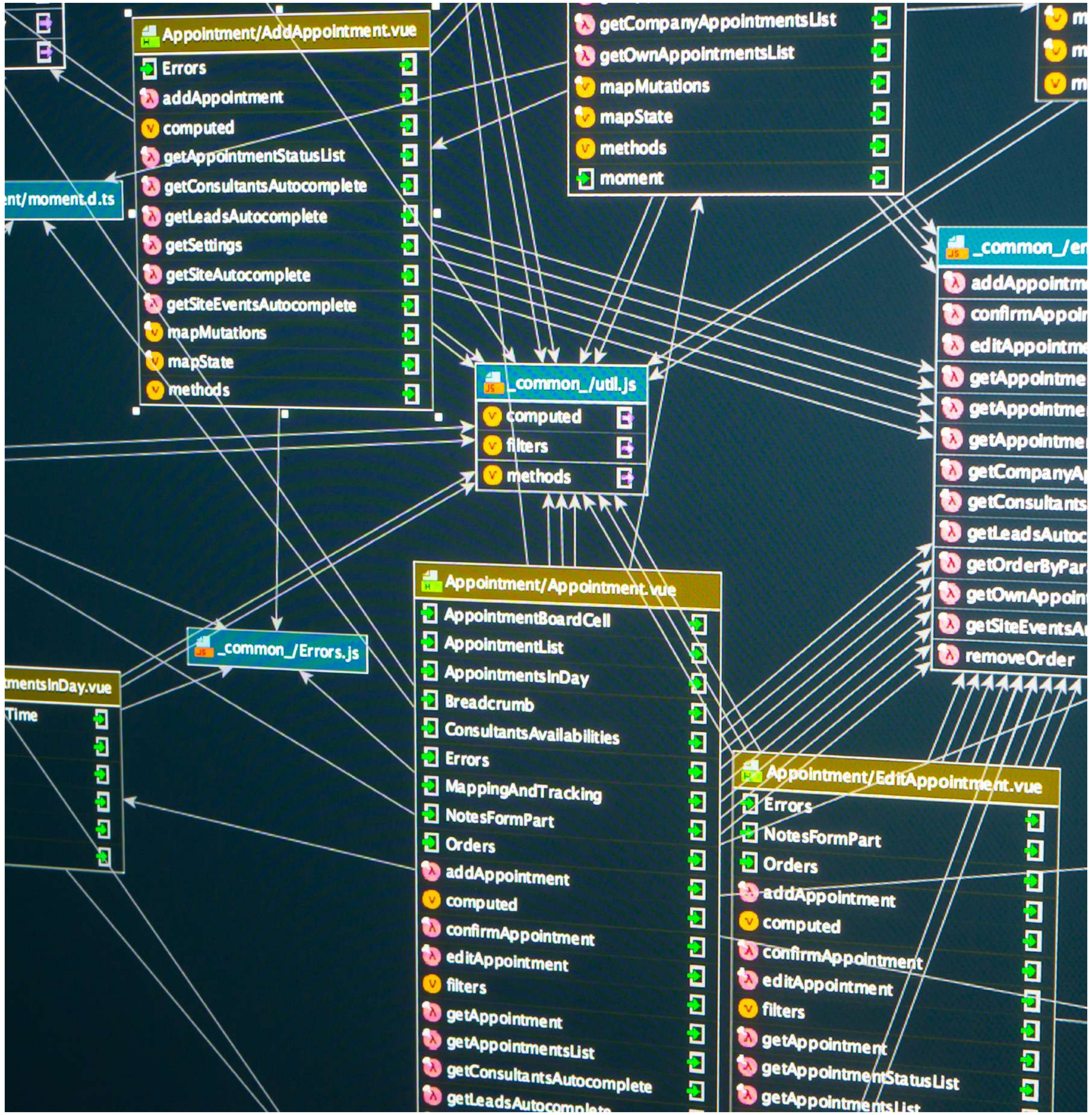
- Create realistic test data that matches your schema requirements
- Generate diverse user profiles with demographic variety for UI testing
- Simulate time-series data with realistic patterns and seasonality
- Create localized content for multiple regions/languages
- Generate edge cases to stress-test your application
- Scale from dozens to millions of records on demand
- Maintain referential integrity across related data sets



WORKING WITH DATA

Database & Query Work

- Write SQL queries for complex operations
- Design database schemas and table relationships
- Optimize existing queries for better performance
- Convert between different SQL dialects (MySQL to PostgreSQL, etc.)
- Generate database migration scripts
- Write stored procedures and triggers



#8 - RUNNING MODELS LOCALLY

Benefits of Running LLMs Locally

Privacy and Data Security

Ensures sensitive data remains within your infrastructure and complies with regulations.

Performance

Enhances response times and reliability by removing network dependencies.

Development and Testing

Facilitates easier debugging and faster development cycles.

Cost Control

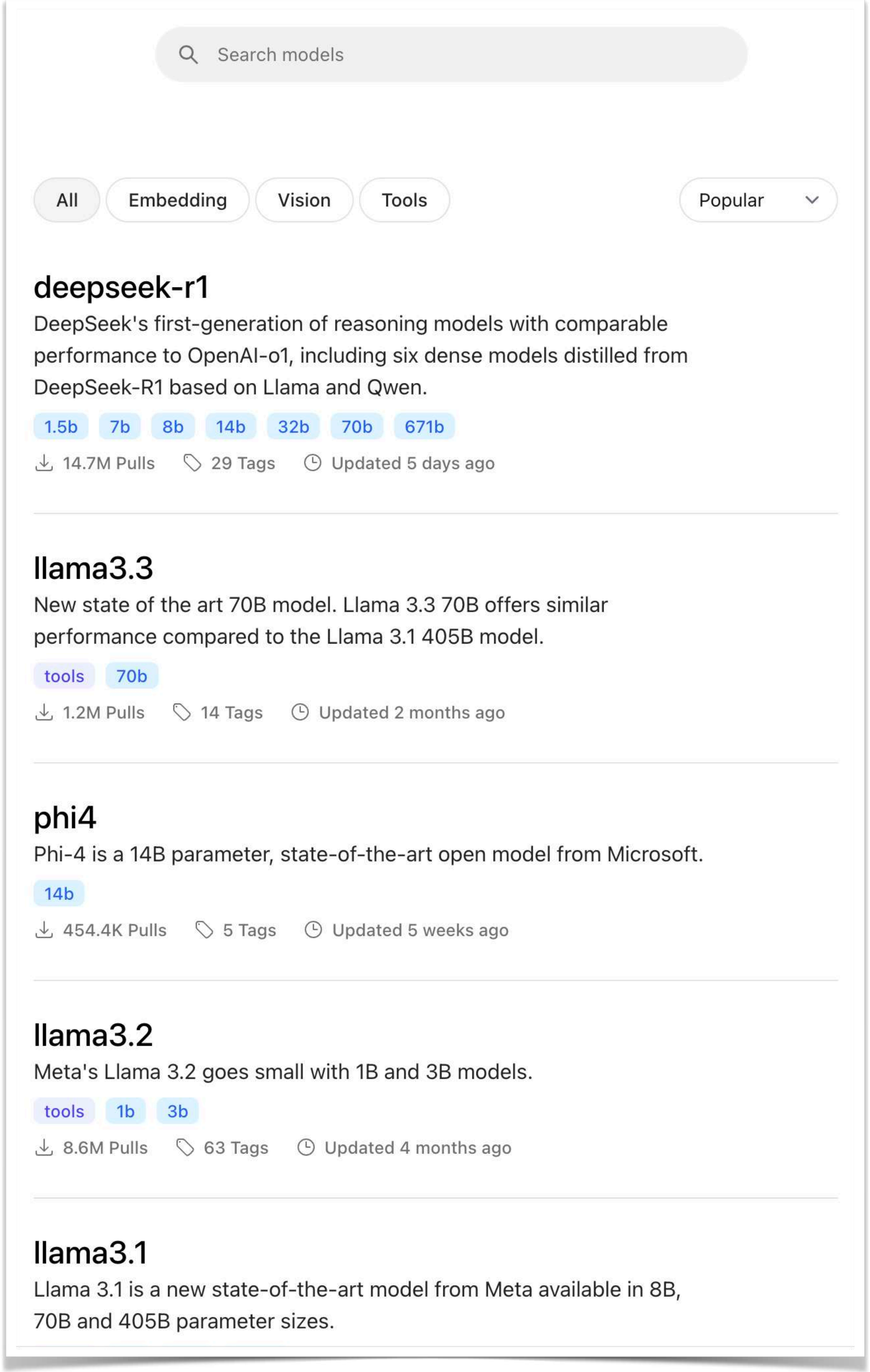
Eliminates unexpected fees and provides predictable computing expenses.

Customization

Allows for tailored model versions and integration into local workflows.

Ollama

https://ollama.com



deepseek-r1

DeepSeek's first-generation of reasoning models with comparable performance to OpenAI-o1, including six dense models distilled from DeepSeek-R1 based on Llama and Qwen.

1.5b 7b 8b 14b 32b 70b 671b

14.7M Pulls · 29 Tags · Updated 5 days ago

llama3.3

New state of the art 70B model. Llama 3.3 70B offers similar performance compared to the Llama 3.1 405B model.

tools 70b

1.2M Pulls · 14 Tags · Updated 2 months ago

phi4

Phi-4 is a 14B parameter, state-of-the-art open model from Microsoft.

14b

454.4K Pulls · 5 Tags · Updated 5 weeks ago

llama3.2

Meta's Llama 3.2 goes small with 1B and 3B models.

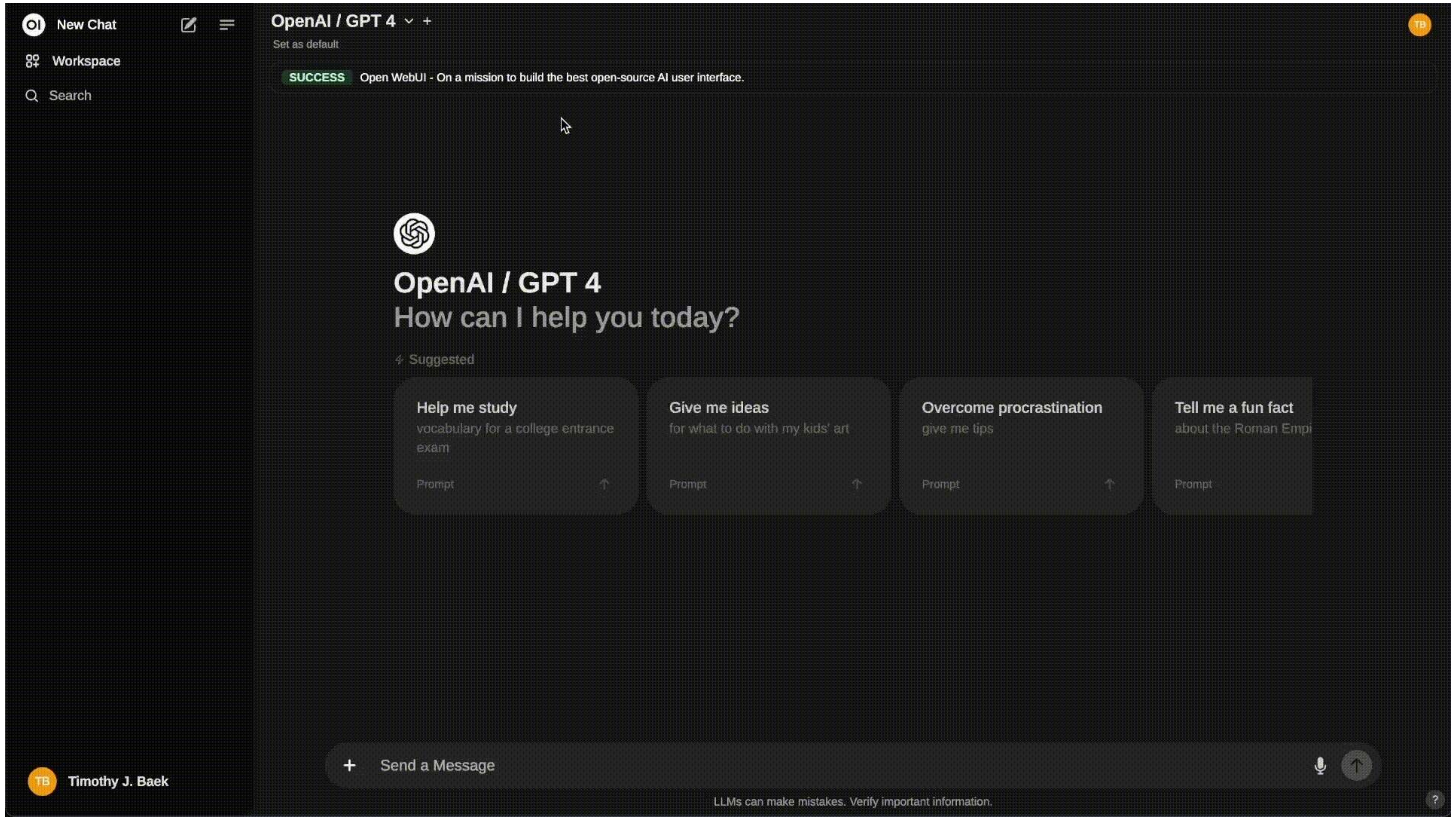
tools 1b 3b

8.6M Pulls · 63 Tags · Updated 4 months ago

llama3.1

Llama 3.1 is a new state-of-the-art model from Meta available in 8B, 70B and 405B parameter sizes.

Open WebUI



SUCCESS Open WebUI - On a mission to build the best open-source AI user interface.

OpenAI / GPT 4
How can I help you today?

- Help me study: vocabulary for a college entrance exam
- Give me ideas: for what to do with my kids' art
- Overcome procrastination: give me tips
- Tell me a fun fact: about the Roman Empi

LLMs can make mistakes. Verify important information.

https://openwebui.com

Docker Model Runner

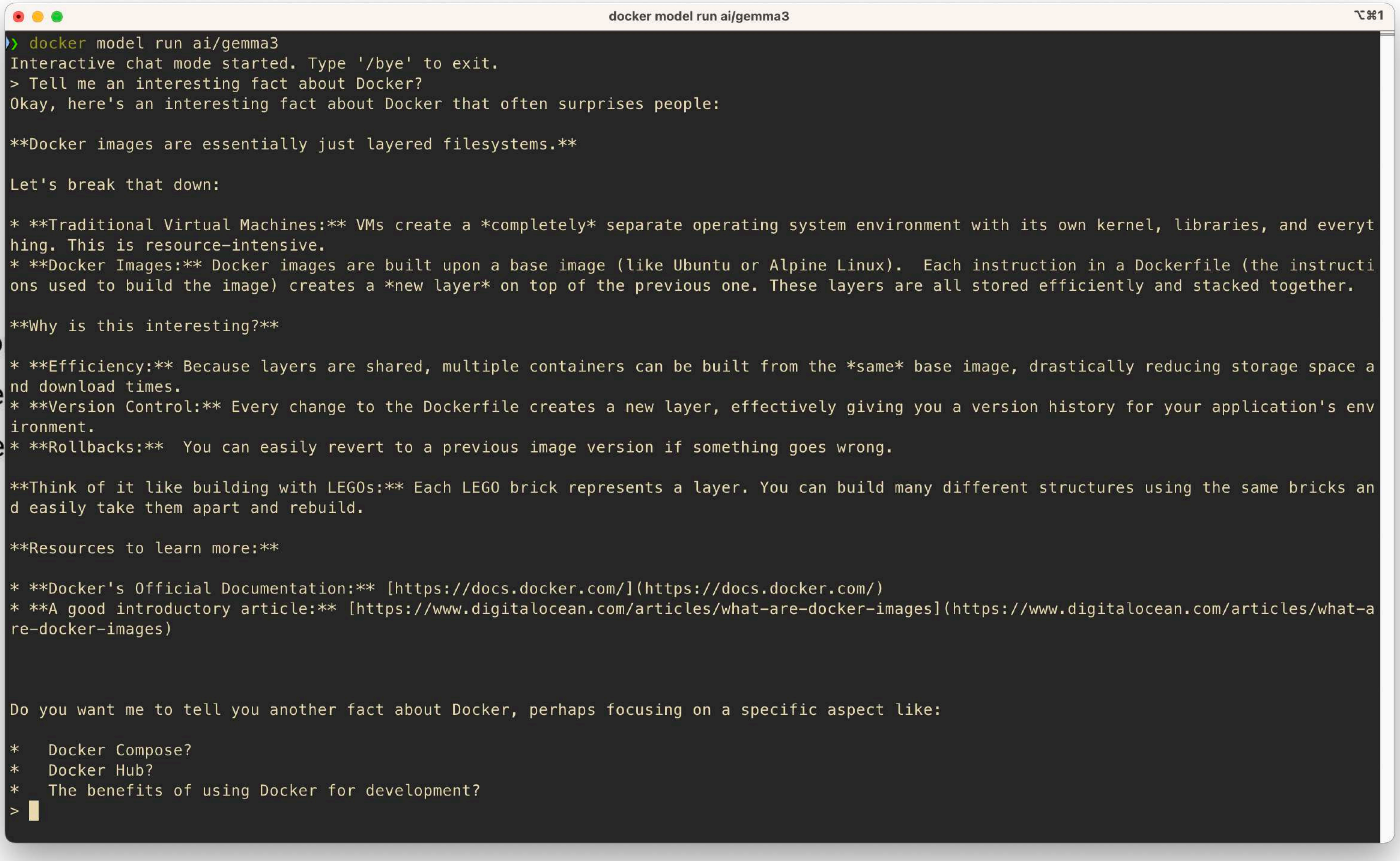
Page options ▾

Availability: Beta ⚡
Requires: Docker Desktop 4.40 and later
For: Docker Desktop for Mac with Apple Silicon

The Docker Model Runner plugin lets you:

- Pull models from Docker Hub
- Run AI models directly from the command line
- Manage local models (add, list, remove)
- Interact with models using a submitted prompt or in chat mode

Models are pulled from Docker Hub the first time they're used and sto
when a request is made, and unloaded when not in use to optimize re
take some time — but after that, they're cached locally for faster acce
compatible APIs.



```
❯ docker model run ai/gemma3
Interactive chat mode started. Type '/bye' to exit.
> Tell me an interesting fact about Docker?
Okay, here's an interesting fact about Docker that often surprises people:

**Docker images are essentially just layered filesystems.**

Let's break that down:

* **Traditional Virtual Machines:** VMs create a *completely* separate operating system environment with its own kernel, libraries, and everyt
hing. This is resource-intensive.
* **Docker Images:** Docker images are built upon a base image (like Ubuntu or Alpine Linux).  Each instruction in a Dockerfile (the instructi
ons used to build the image) creates a *new layer* on top of the previous one. These layers are all stored efficiently and stacked together.

**Why is this interesting?**

* **Efficiency:** Because layers are shared, multiple containers can be built from the *same* base image, drastically reducing storage space a
nd download times.
* **Version Control:** Every change to the Dockerfile creates a new layer, effectively giving you a version history for your application's env
ironment.
* **Rollbacks:**  You can easily revert to a previous image version if something goes wrong.

**Think of it like building with LEGOs:** Each LEGO brick represents a layer. You can build many different structures using the same bricks an
d easily take them apart and rebuild.

**Resources to learn more:**

* **Docker's Official Documentation:** [https://docs.docker.com/](https://docs.docker.com/)
* **A good introductory article:** [https://www.digitalocean.com/articles/what-are-docker-images](https://www.digitalocean.com/articles/what-a
re-docker-images)



Do you want me to tell you another fact about Docker, perhaps focusing on a specific aspect like:

*   Docker Compose?
*   Docker Hub?
*   The benefits of using Docker for development?
> 
```

#9 - GUIDING AI CODING TOOLS

Standalone Chatbot Assistants

ChatGPT

Gemini

Claude

Inline IDE Assistants

GitHub Copilot

JetBrains AI

Amazon CodeWhisperer

Agentic AI IDE Environments

CURSOR

windsurf

Junie

AI CODING TOOLS TIPS

Getting the most out of the tools you use

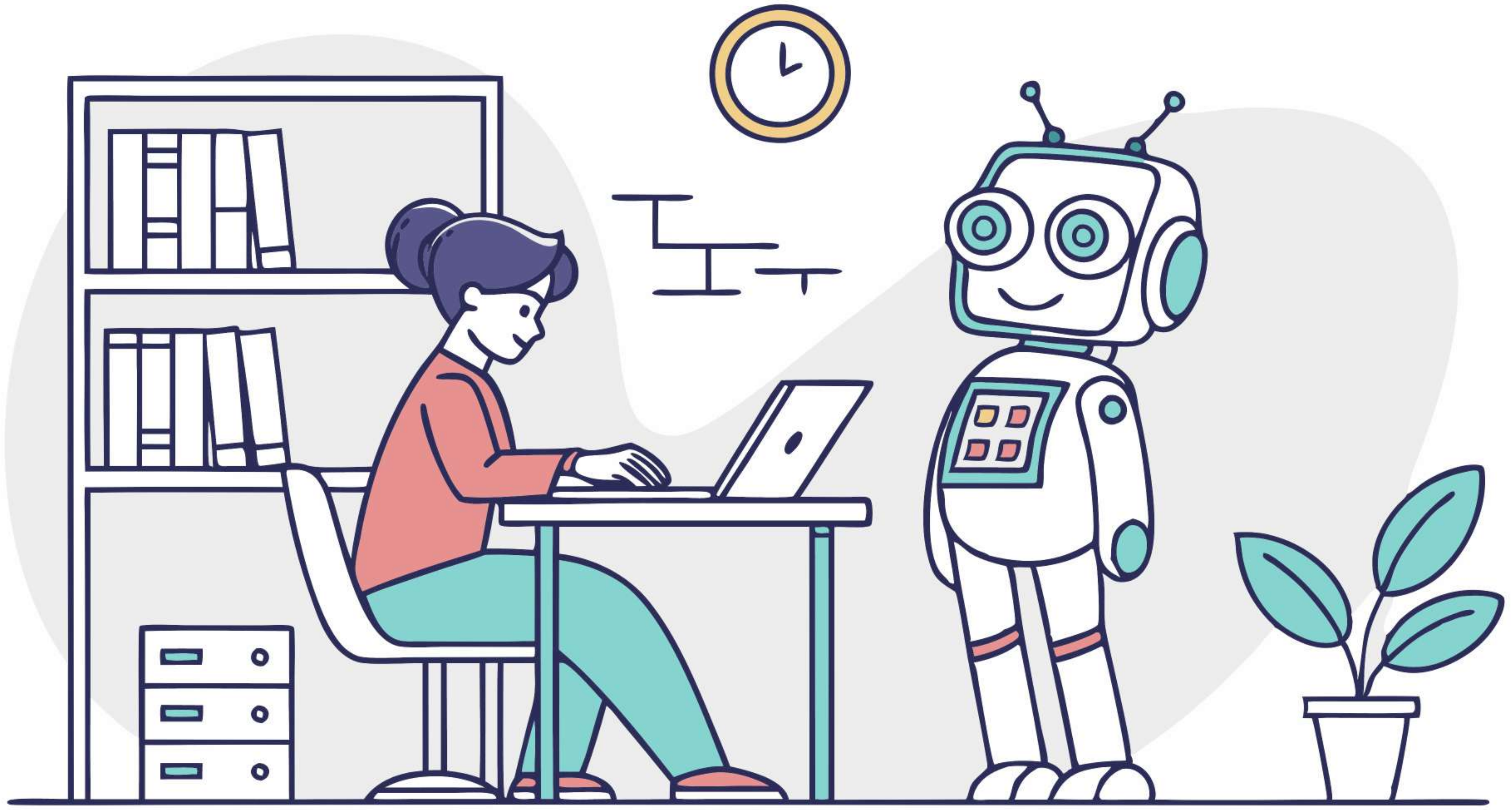
- You are the Pilot, Not a passenger
- Branch Strategy
- Bugs: AI can and will generate incorrect or inefficient code
- Apply the same rigorous testing to AI-generated code as you would your own
- Provide clear, specific, and detailed prompts
- AI models train on vast datasets, including open-source code with various licenses
- Take the time to comprehend why the AI suggested a particular piece of code
- Understand that AI may use outdated information

CONCLUSION / Q&A

KEY TAKEAWAYS

AI as a Developer Multiplier

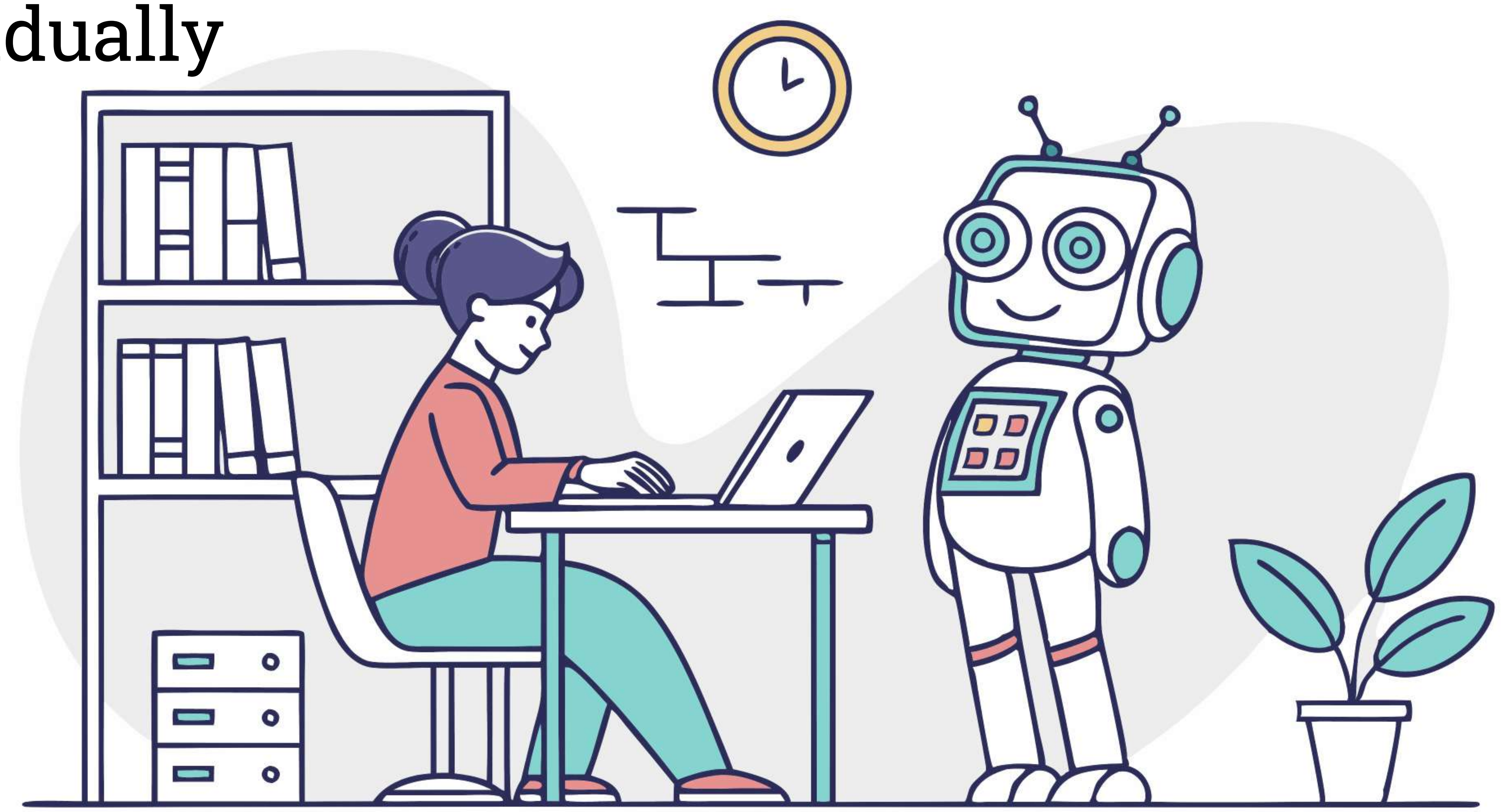
- AI tools enhance developer capabilities rather than replace them
- Focus on using AI to automate repetitive tasks and boost productivity
- The key is knowing when and how to leverage AI effectively



KEY TAKEAWAYS

Best Practices for AI Integration

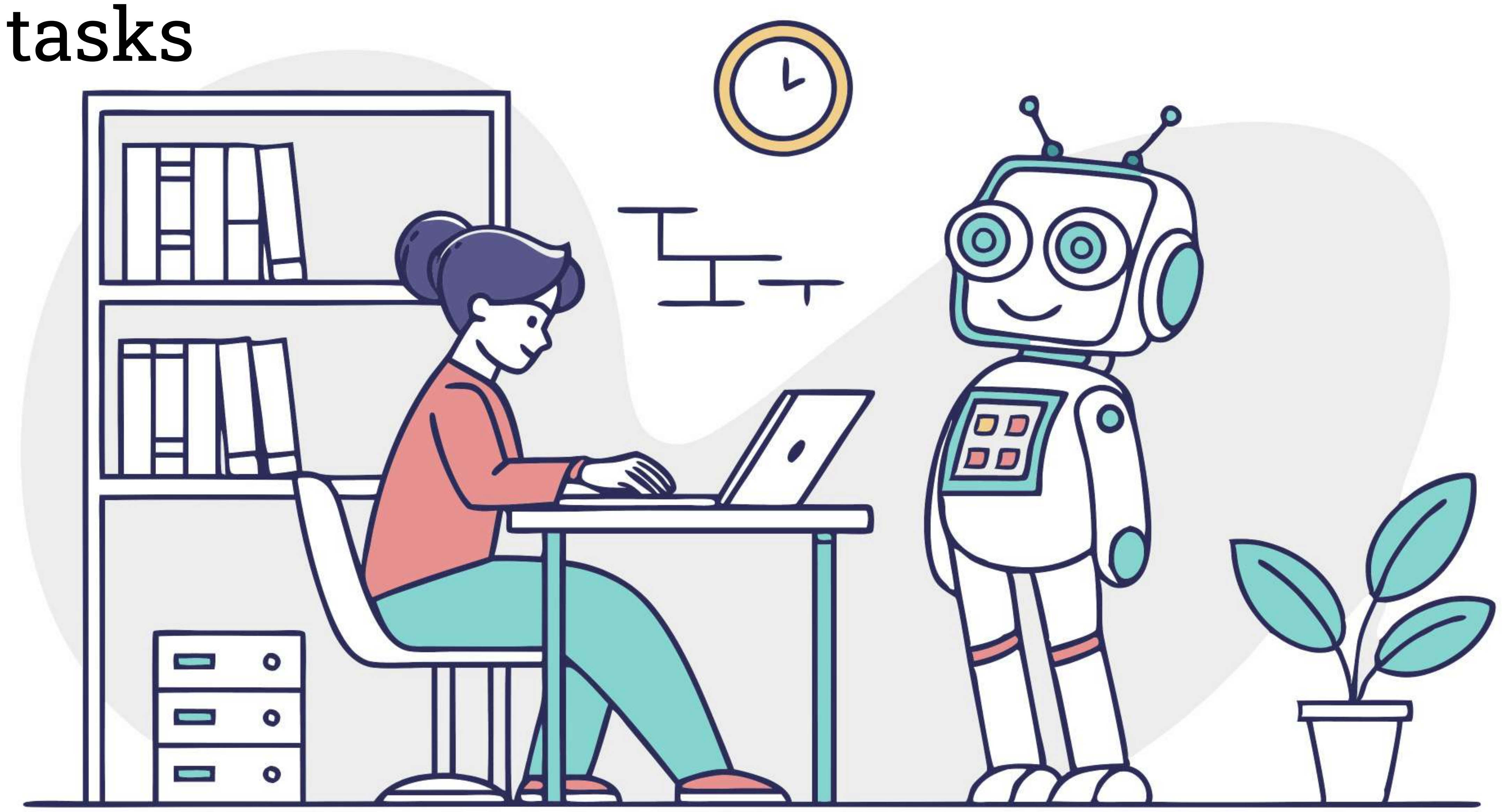
- Always review and understand AI-generated code
- Maintain strict security practices with sensitive information
- Use AI as a learning tool, not just a code generator
- Start with small, well-defined tasks and scale up gradually



KEY TAKEAWAYS

Practical Steps for Getting Started

- Begin with documentation and code review tasks
- Use AI for learning new technologies and concepts
- Integrate AI tools into your existing workflow gradually
- Develop a collection of reliable prompts for common tasks



THANK YOU

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