สยามชำนาญกิจ
SIAM CHAMNAN KIT

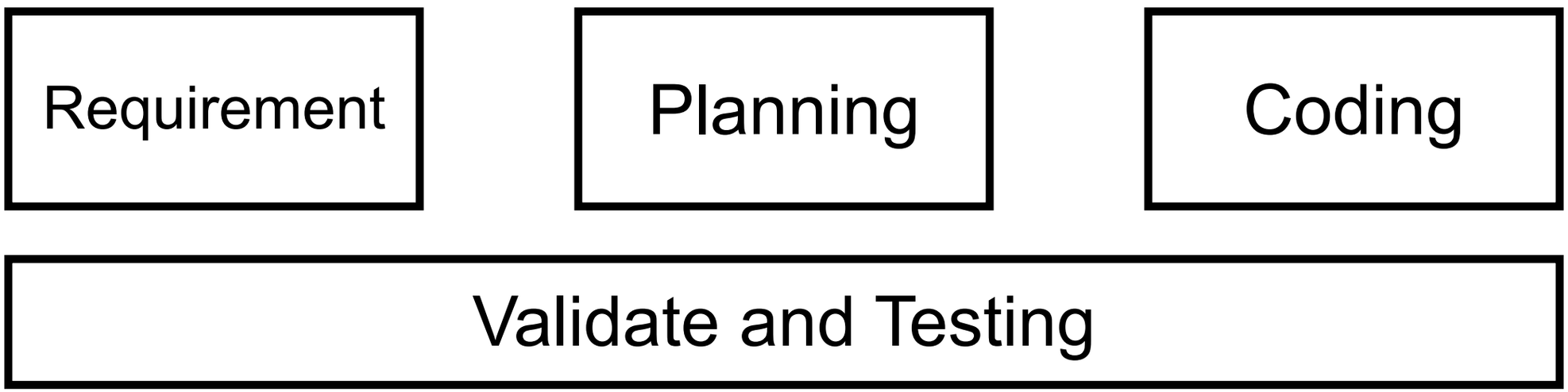
Coding with AI

https://github.com/up1/course-ai-coding-2026

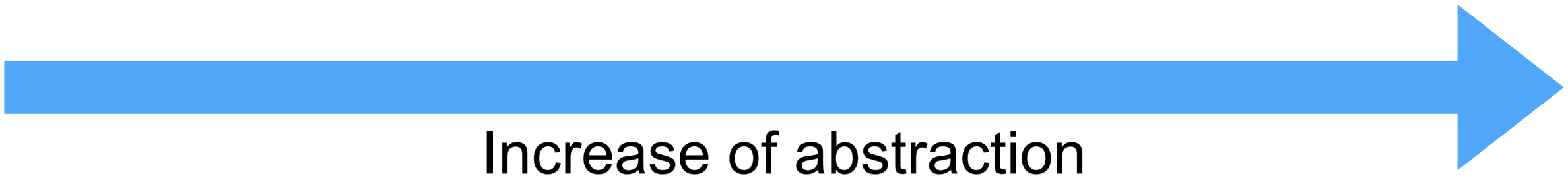
Coding with AI

Topics

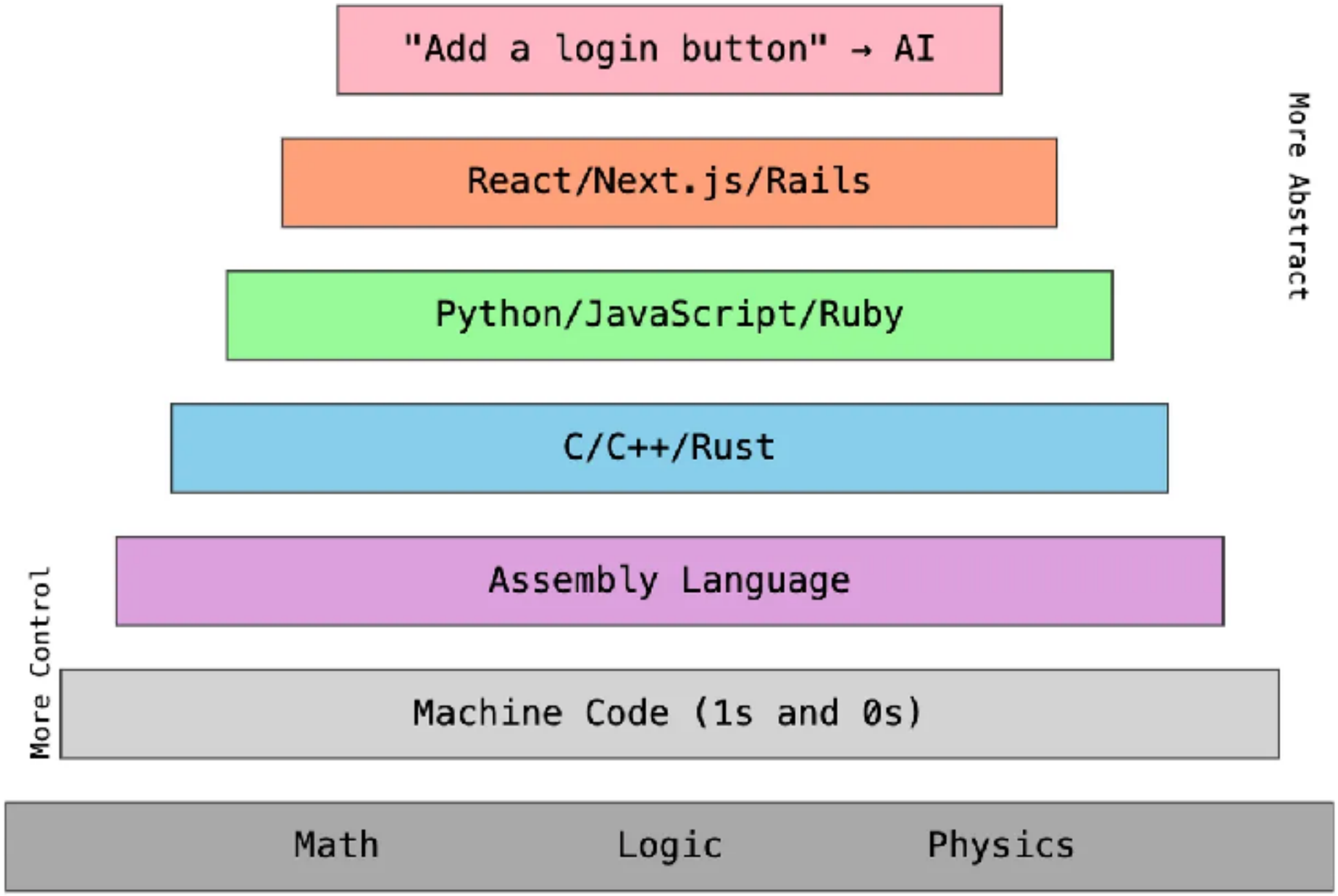
Programming/Coding workflow
Specification-Driven Development (SDD)
Model-Driven Development (MDD)
Coding with AI Agent workshop



History of Programming

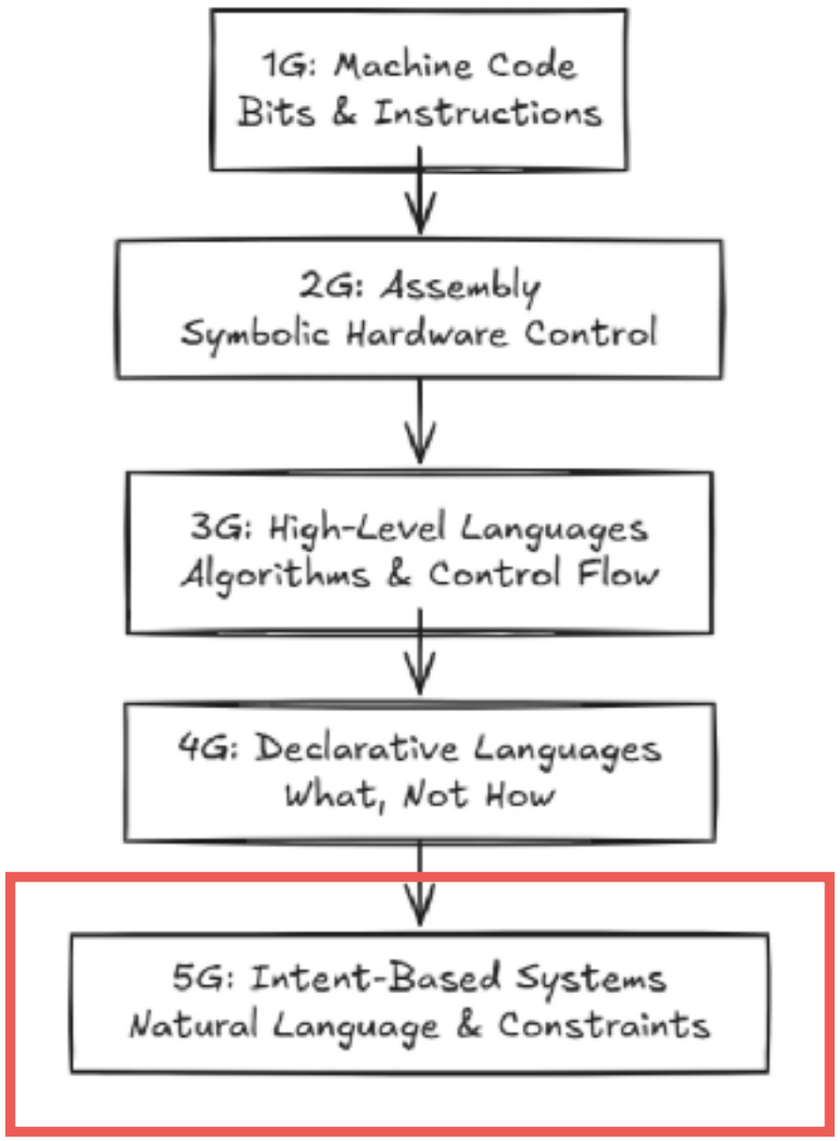


The Modern Tower of Abstraction



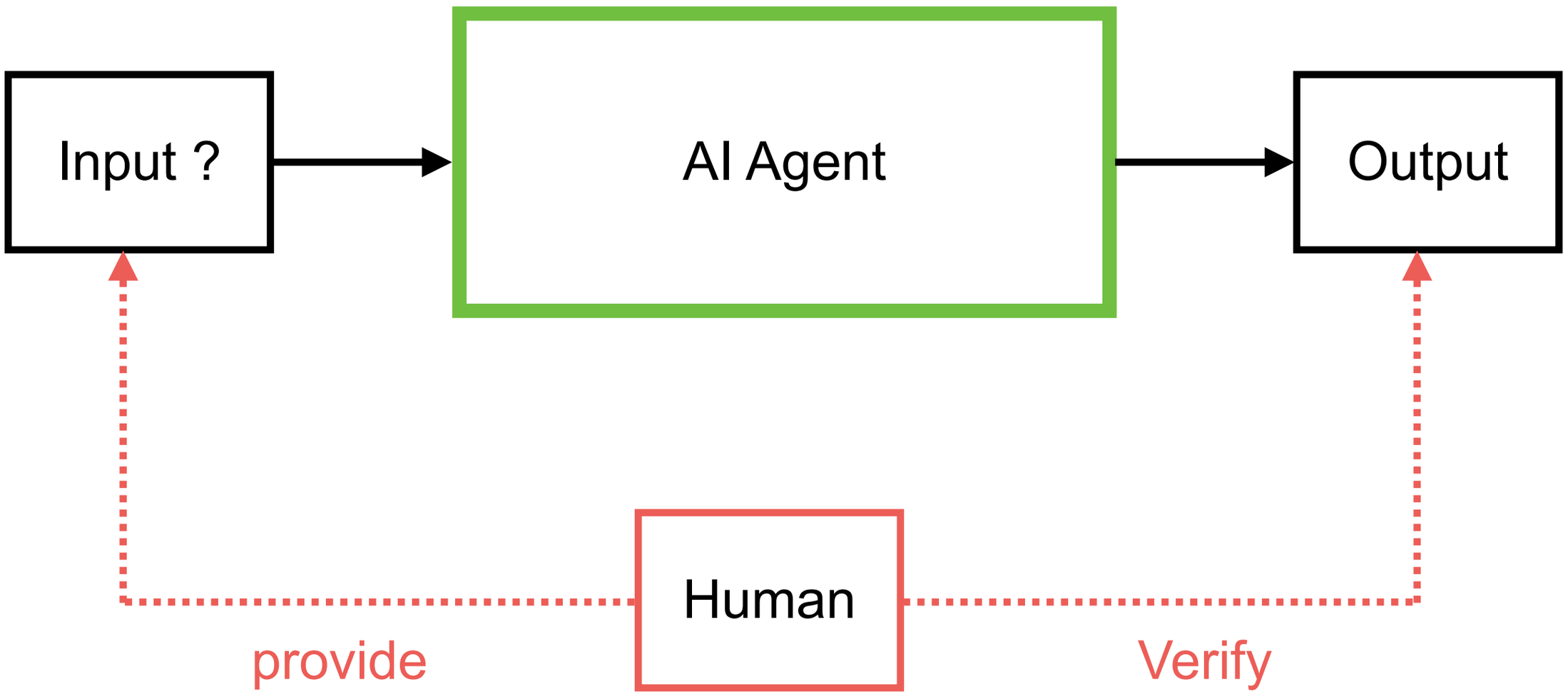
https://cline.bot/blog/from-assembly-to-ai-why-vibe-coding-is-just-another-chapter-in-our-abstraction-story

Generation of Programming languages

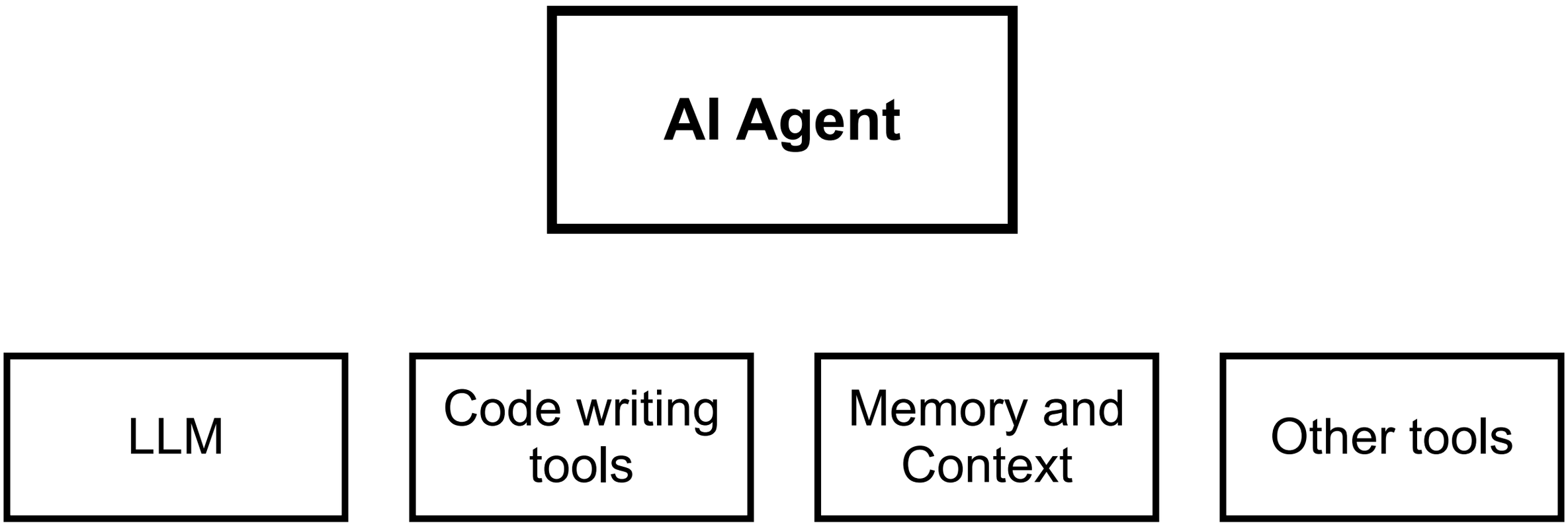


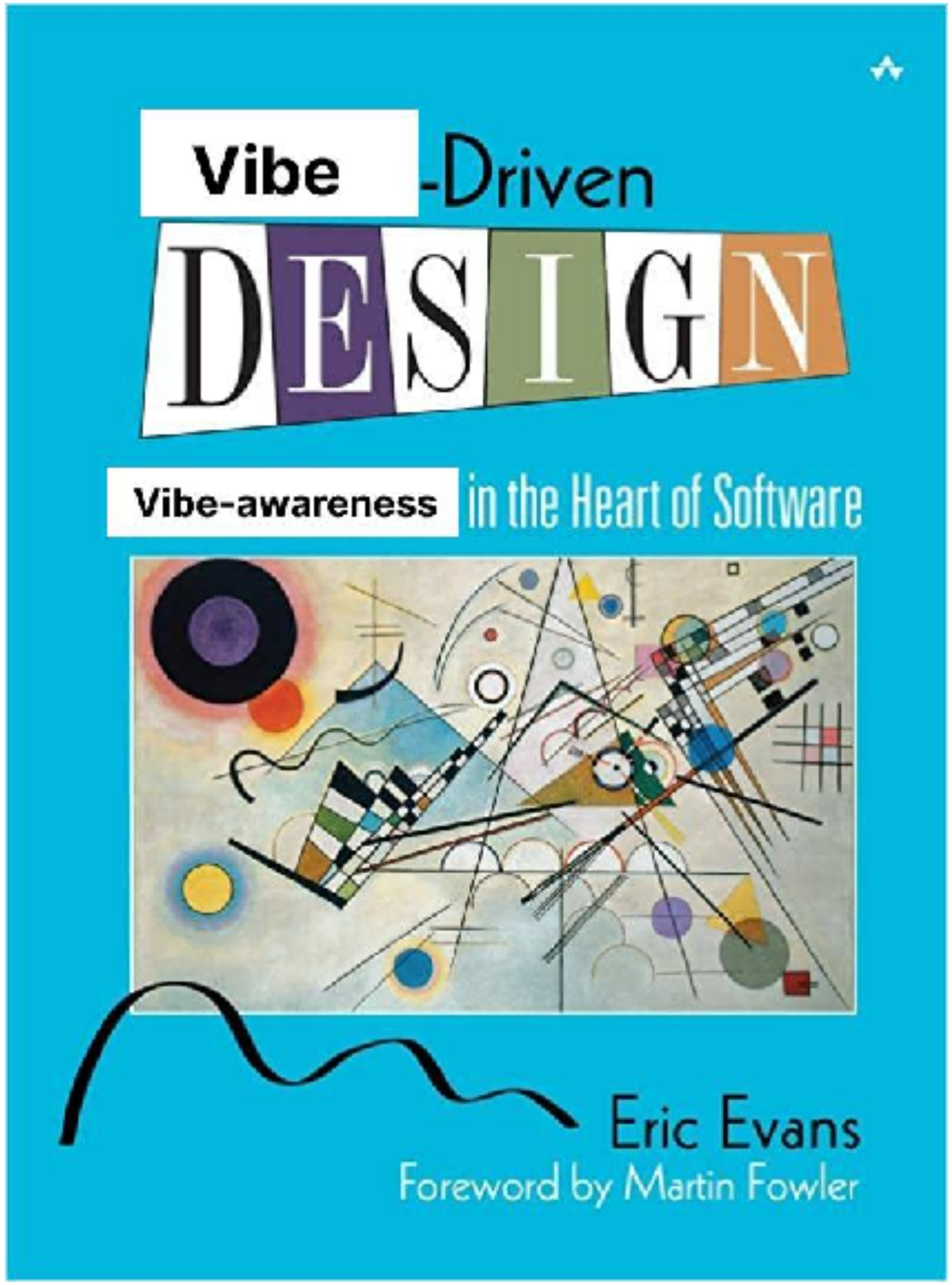
https://medium.com/@ajuatahcodingarena/generations-of-programming-languages-bed30d19ea8e

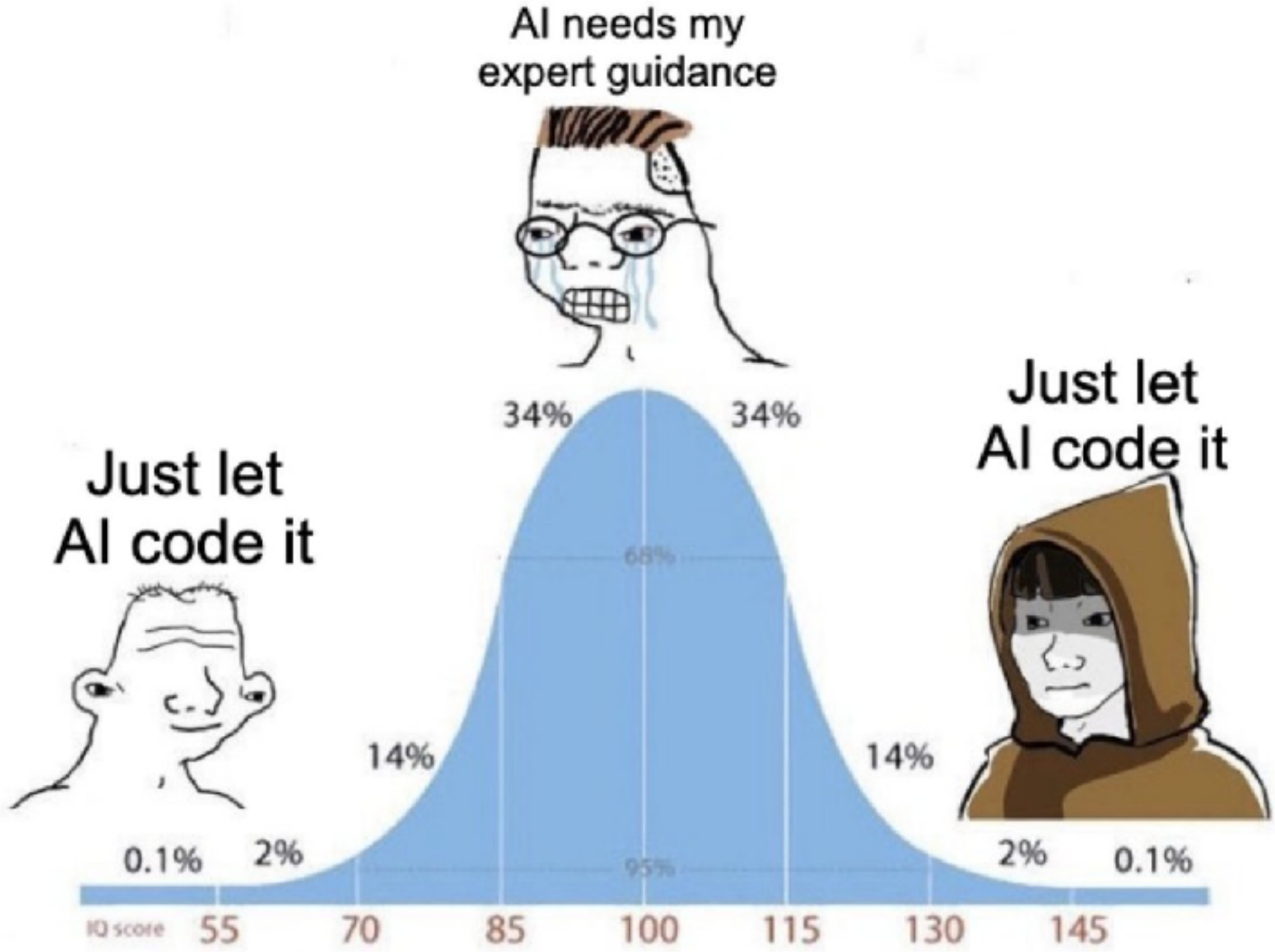
Coding with AI Agent



AI Agent for Coding







Andrej Karpathy
@karpathy

There's a new kind of coding I call "vibe coding", where you fully give in to the vibes, embrace exponentials, and forget that the code even exists. It's possible because the LLMs (e.g. Cursor Composer w Sonnet) are getting too good. Also I just talk to Composer with SuperWhisper so I barely even touch the keyboard. I ask for the dumbest things like "decrease the padding on the sidebar by half" because I'm too lazy to find it. I "Accept All" always, I don't read the diffs anymore. When I get error messages I just copy paste them in with no comment, usually that fixes it. The code grows beyond my usual comprehension, I'd have to really read through it for a while. Sometimes the LLMs can't fix a bug so I just work around it or ask for random changes until it goes away. It's not too bad for throwaway weekend projects, but still quite amusing. I'm building a project or webapp, but it's not really coding - I just see stuff, say stuff, run stuff, and copy paste stuff, and it mostly works.

6:17 AM · Feb 3, 2025 · **5.3M** Views

https://x.com/karpathy/status/1886192184808149383

Vibe Coding

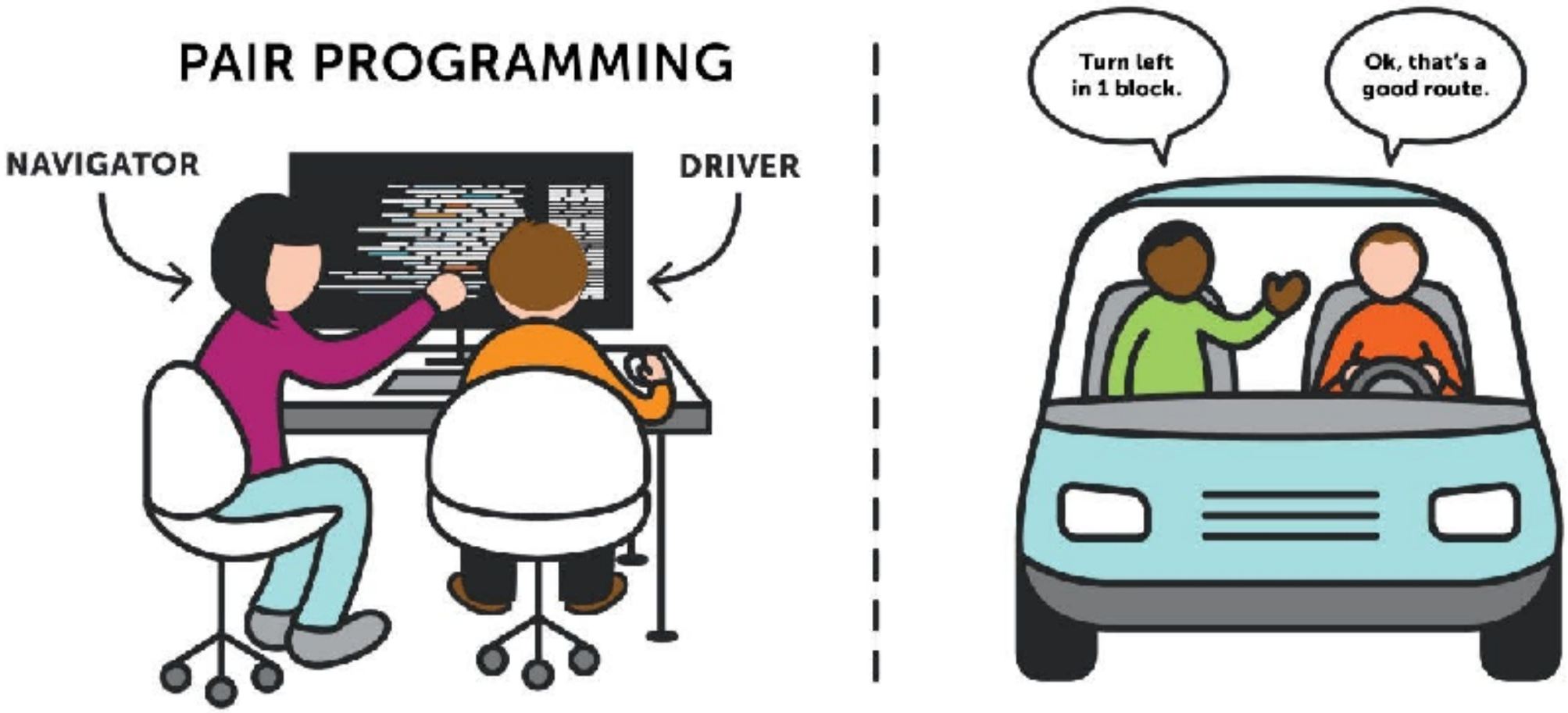
Software development practice that uses artificial intelligence (AI) to generate functional code from **natural language prompts**, accelerating development, and making app building more accessible, especially for those with limited programming experience

https://cloud.google.com/discover/what-is-vibe-coding

Types of Vibe coding ?

Pure vibe coding

Responsible AI-assist development



Reviews, Tests and Understands
with experience

Workflows ?

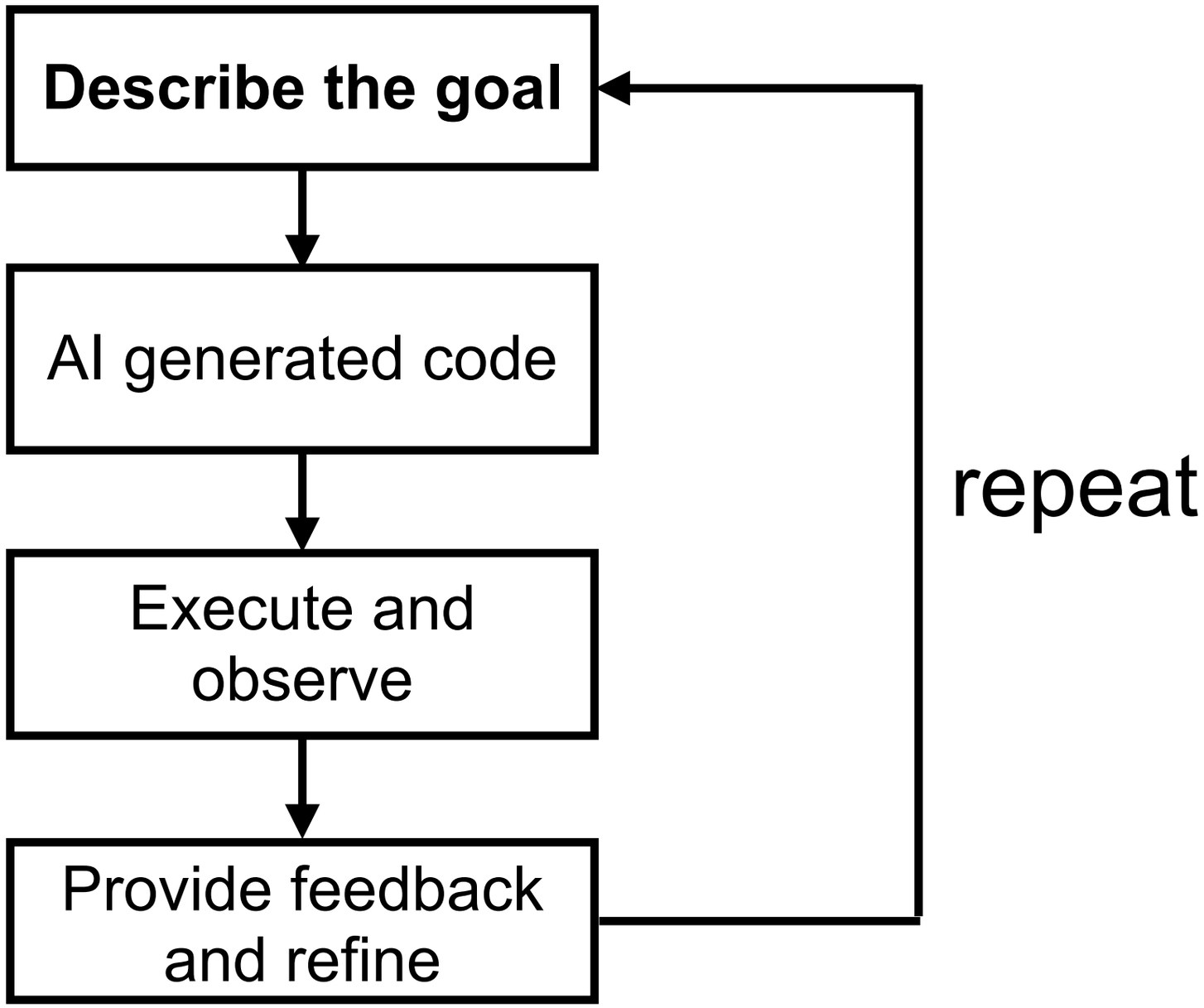
Application level

Code level

https://cloud.google.com/discover/what-is-vibe-coding

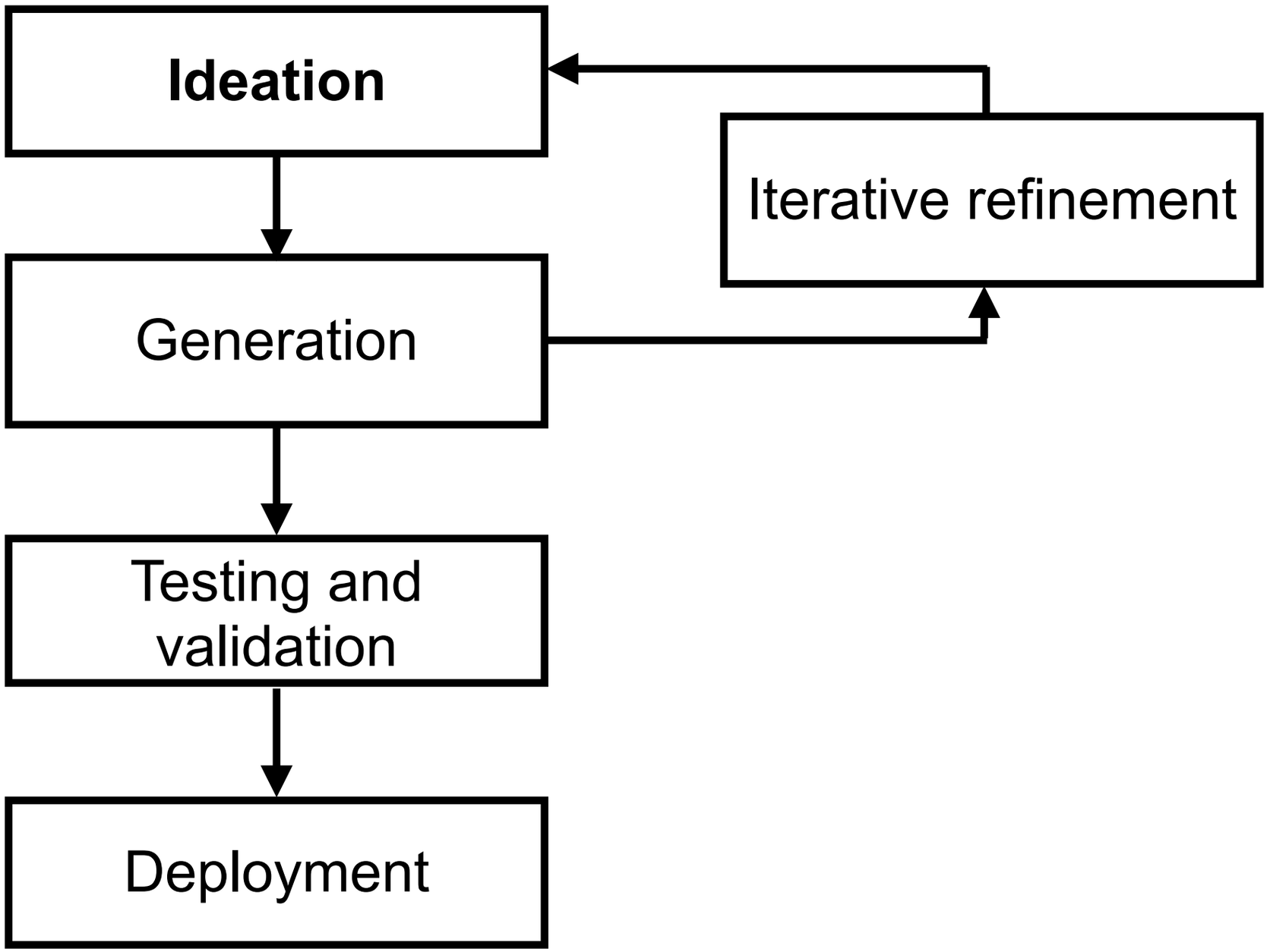
Code level workflow

Conversational loop to create a specific code



Application level workflow

Talking about high-level idea from concept to deployment



AI Agent for Coding

AI Agent for Coding

CLAUDE CODE

GitHub Copilot
Visual Studio Code

Antigravity

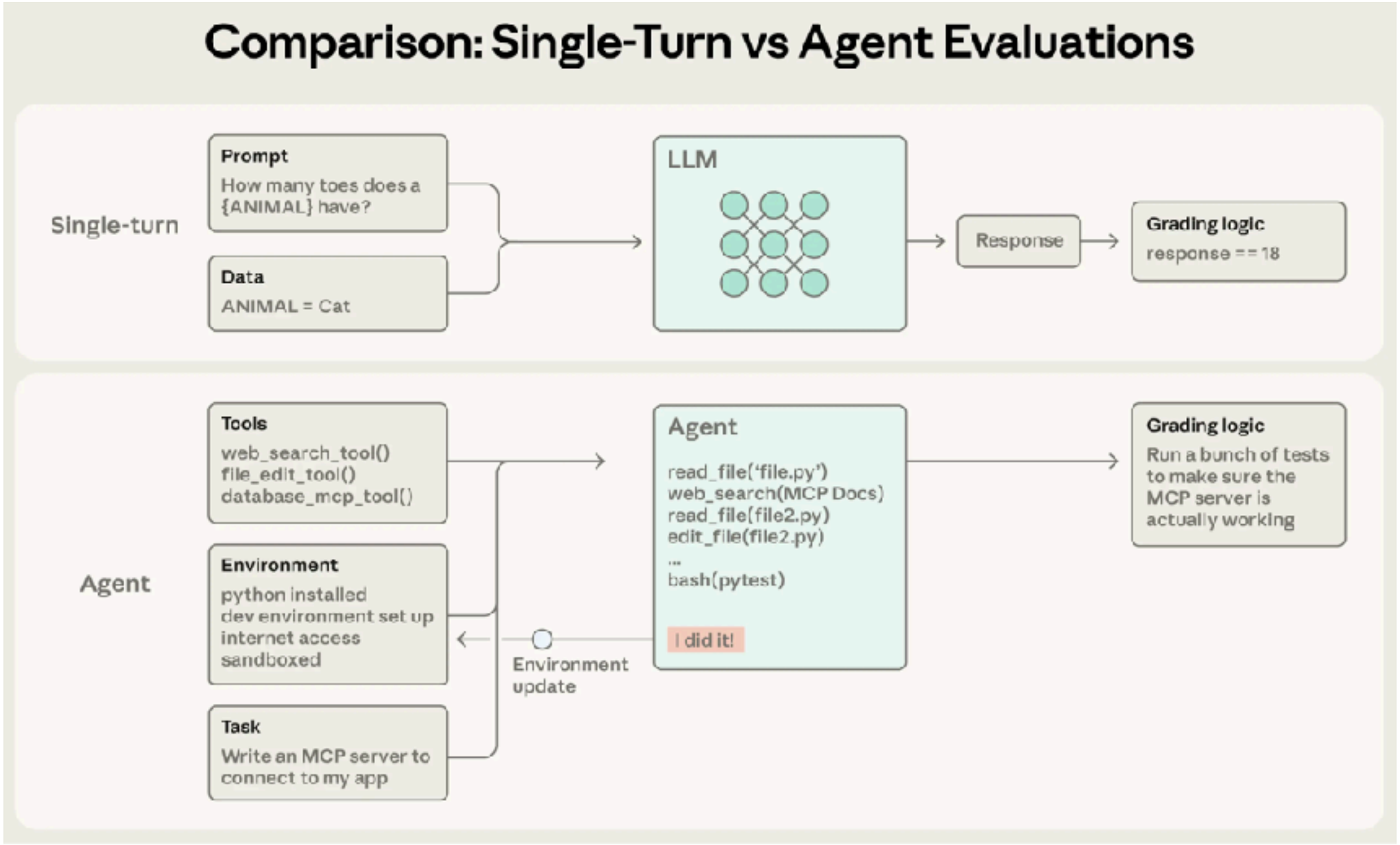
Cline

windsurf

opencode

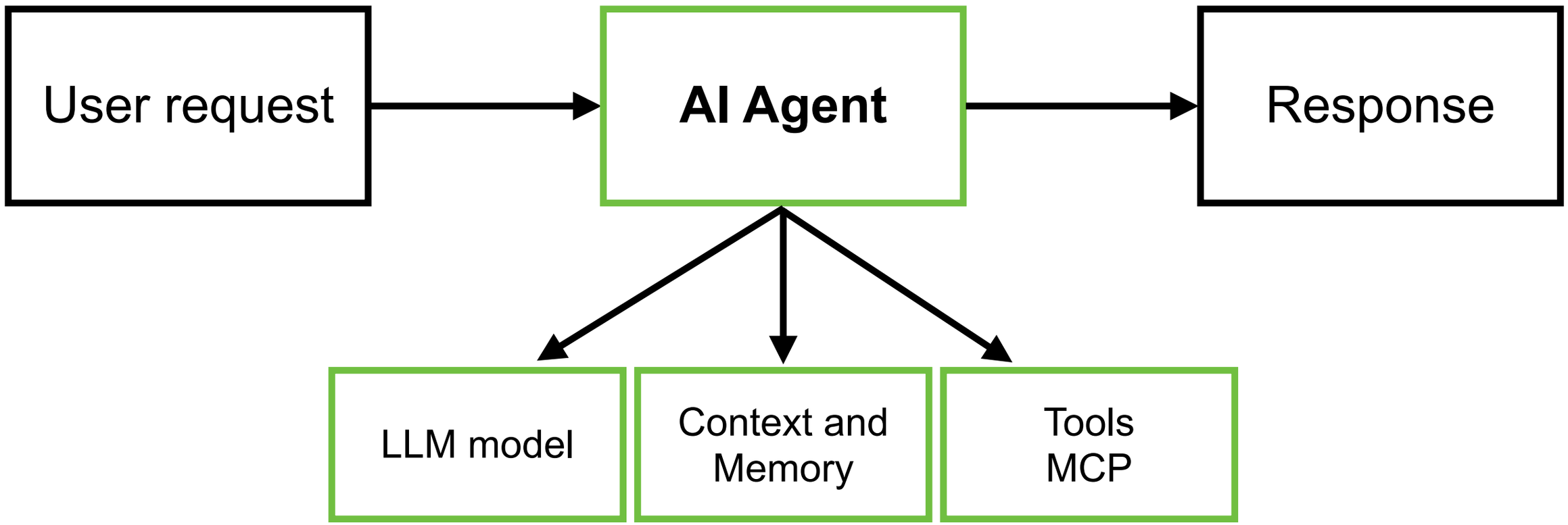
CURSOR

AI Agent for Coding



https://www.anthropic.com/engineering/demystifying-evals-for-ai-agents

Simple AI Agent



How to manage context or knowledge for Agent ?

Types of Knowledge/Context ?

Shared context

Static Knowledge

Prompt engineering

Global Instructions

AGENTS.md

CLUDE.md

Task context

Dynamic Knowledge

Memory

Graph/Vector database

MCP tools

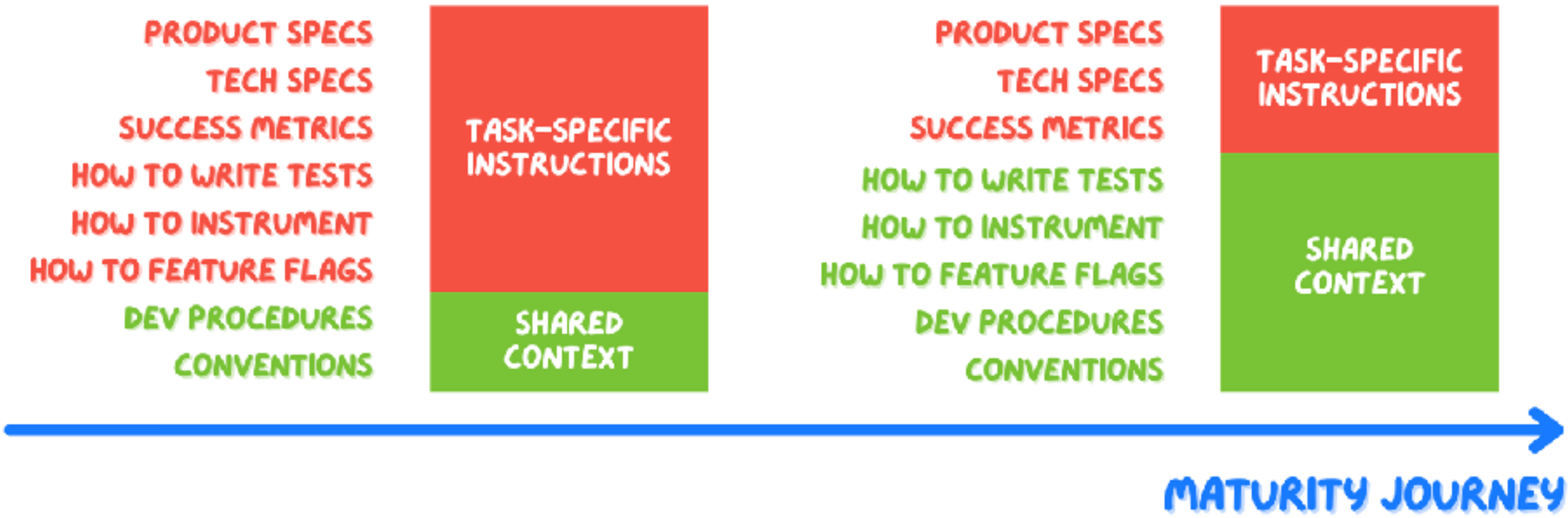
Specific Instructions

Agent SKILLs

Sub-agent

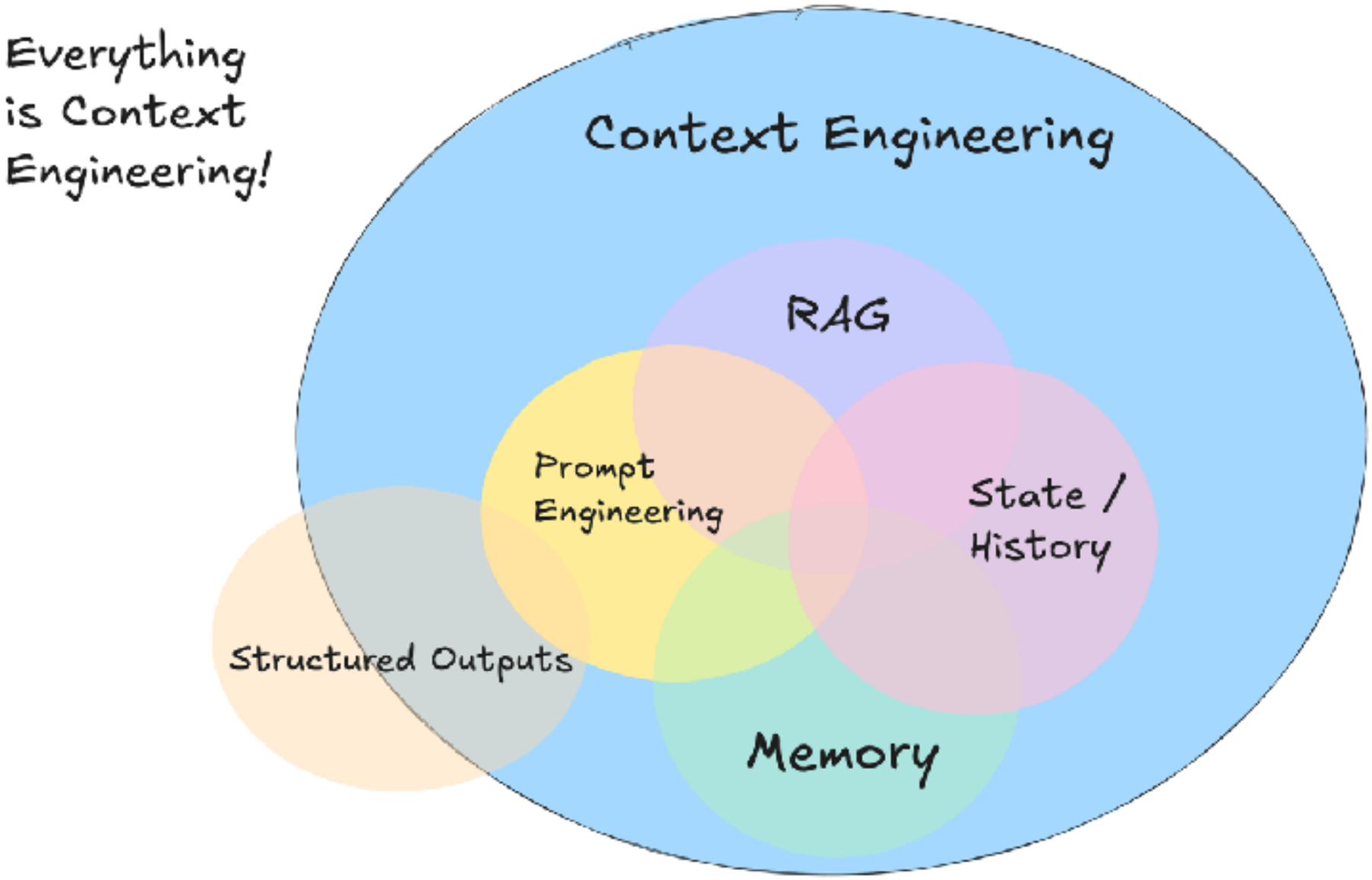
Context engineering ?

Types of Knowledge/Context ?



https://refactoring.fm/p/context-capabilities-and-tech-hubs

Context Engineering



https://www.promptingguide.ai/guides/context-engineering-guide

Context Engineering

Right information

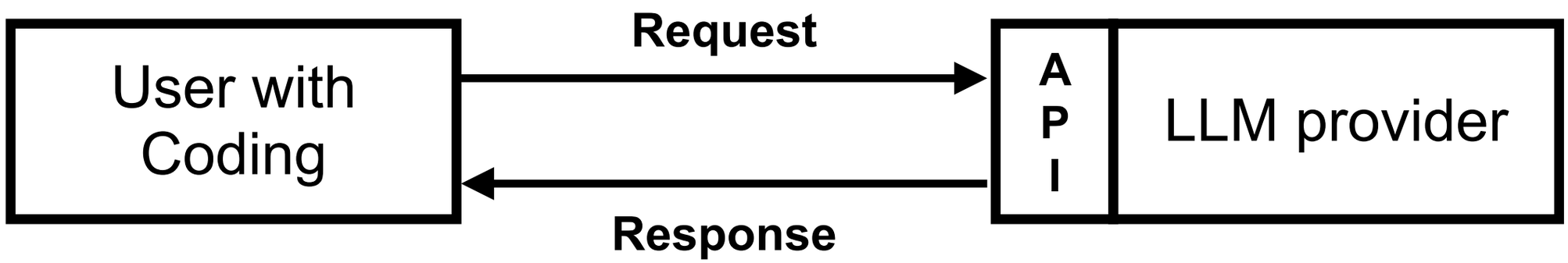
Right tools

Structured context

Context window size ?

Amount of text a model can process and remember at once time

Measure with **token**

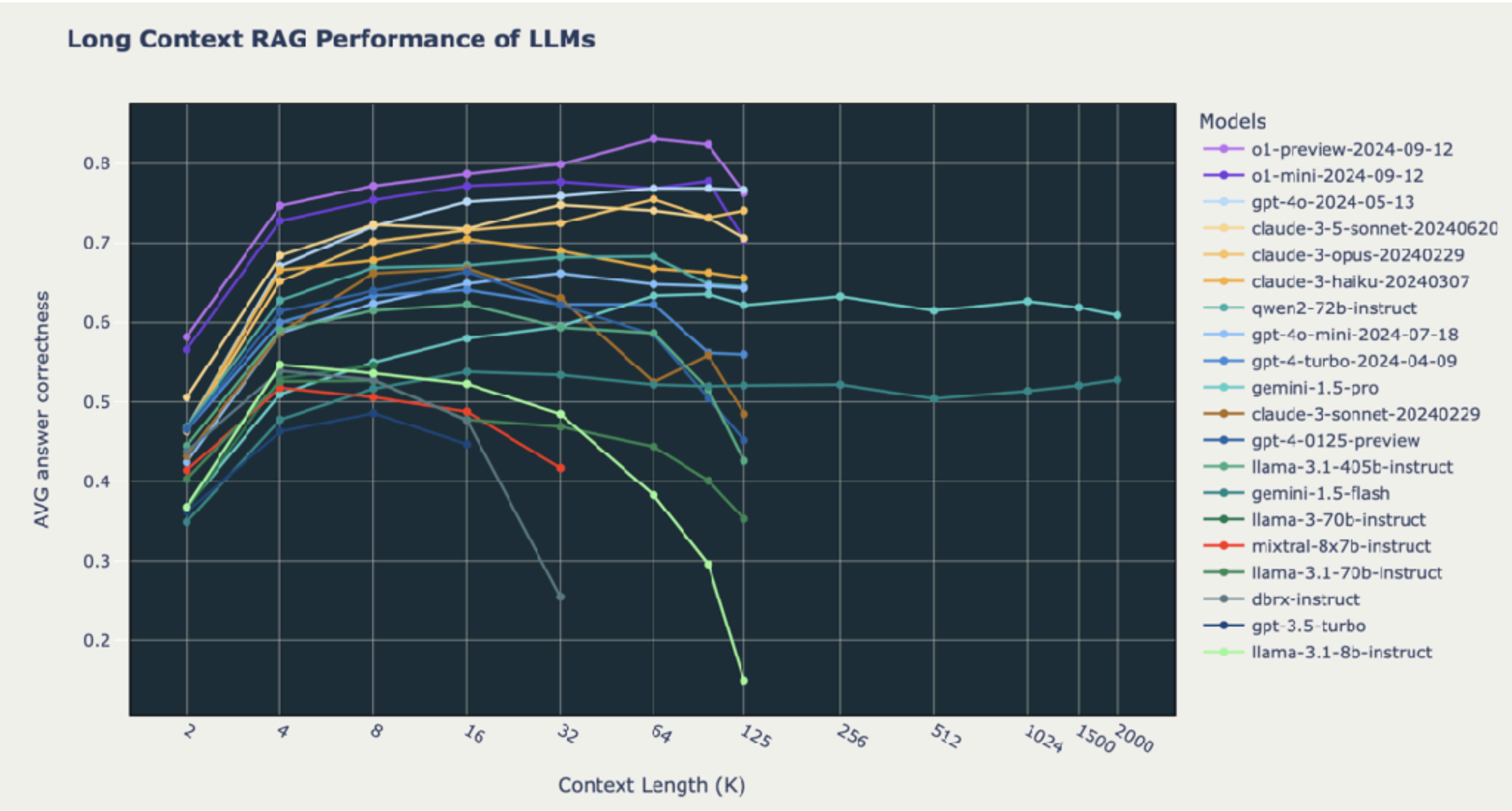


Context window size of models

Different models may have different window size

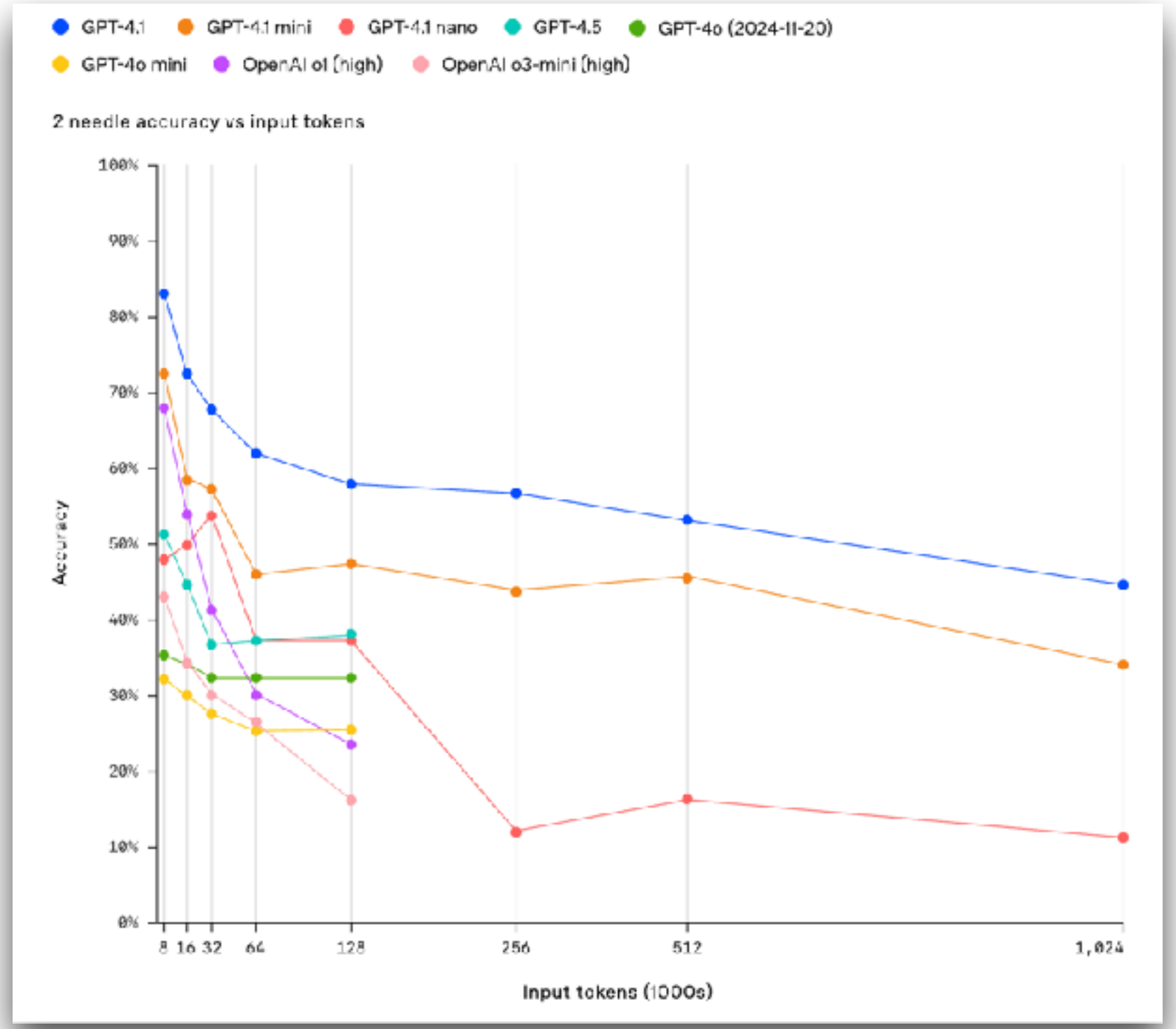
Model name	Context window size
GPT 4.1	1M
Gemini 1.5, 2.5	1M
Llama 4	1M
Claude Sonnet 3.7	200,000
o4	200,000

Long context LLM is better !!



https://arxiv.org/abs/2411.03538

Long context LLM is better !!

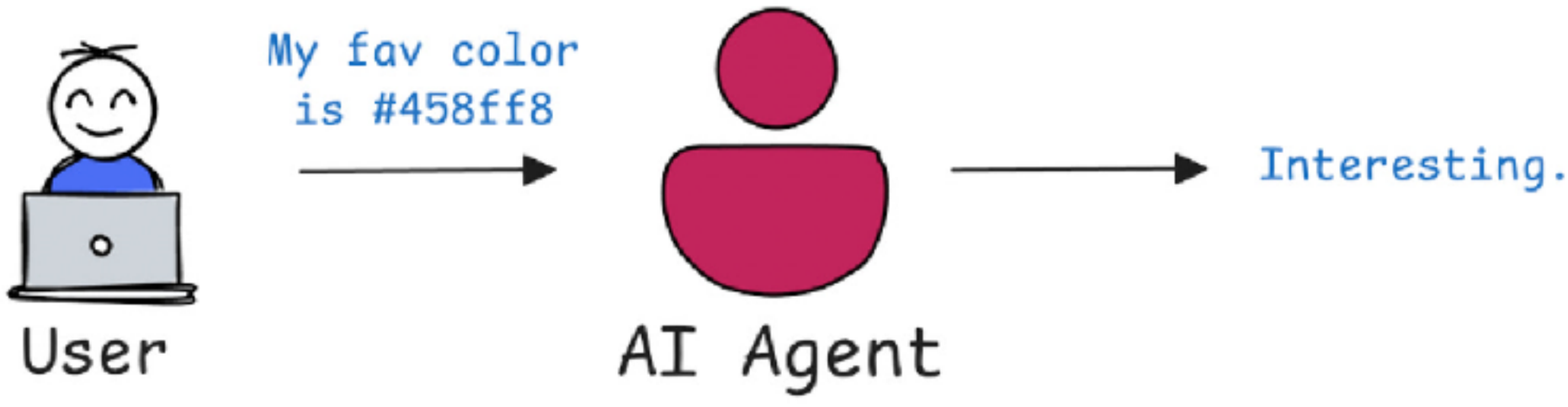


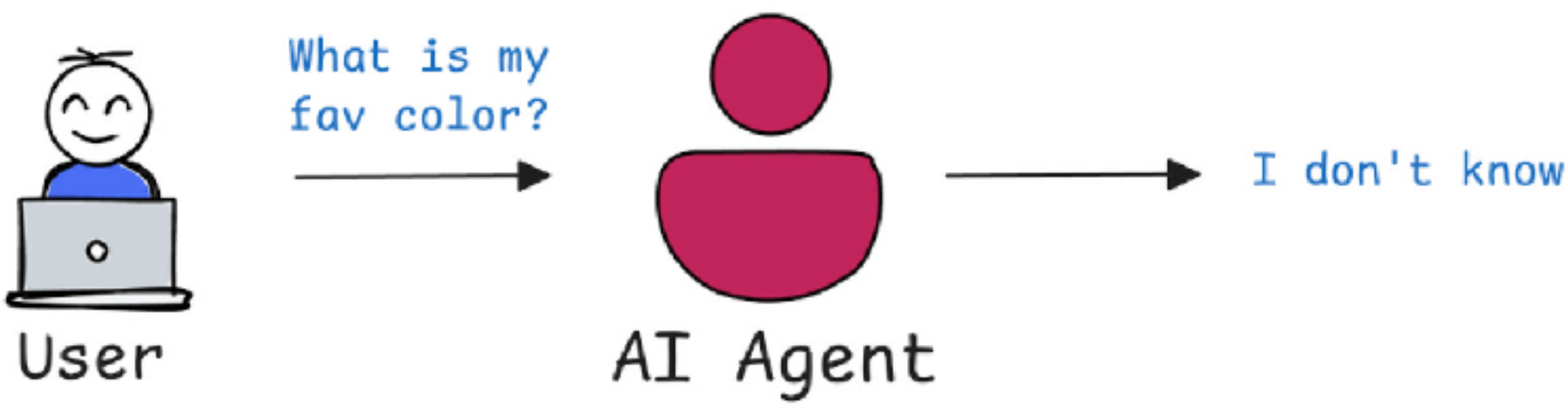
https://openai.com/index/gpt-4-1/

Better context == Better result

Agent Memory
Memory Bank

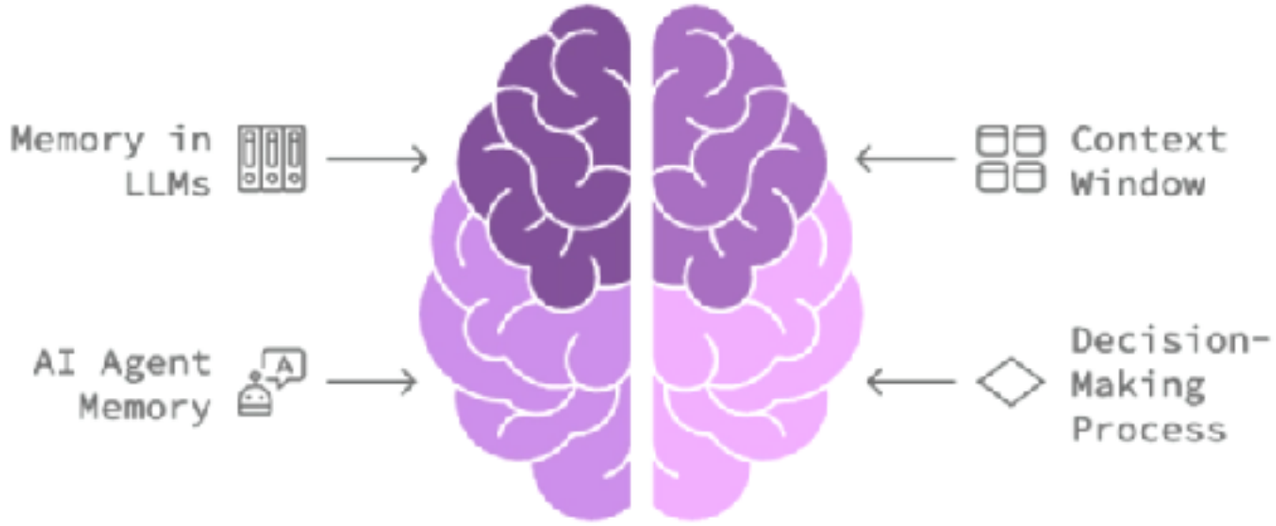
Interaction without memory





Why AI Agent memory important ?

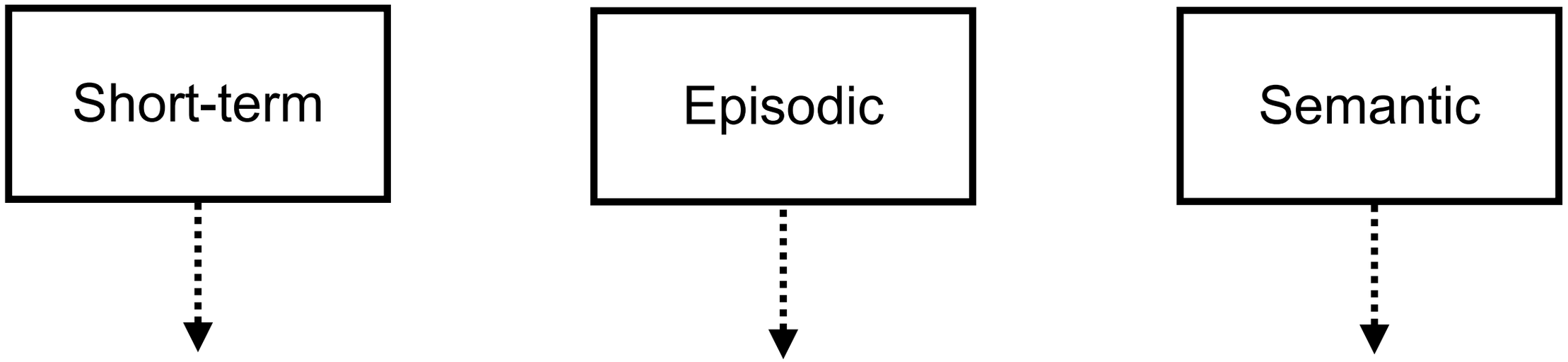
Enable personalized and context-aware interactions
Improve decision-making and adaptability
Enhance LLM’s performance and response



https://www.falkordb.com/blog/ai-agents-memory-systems/

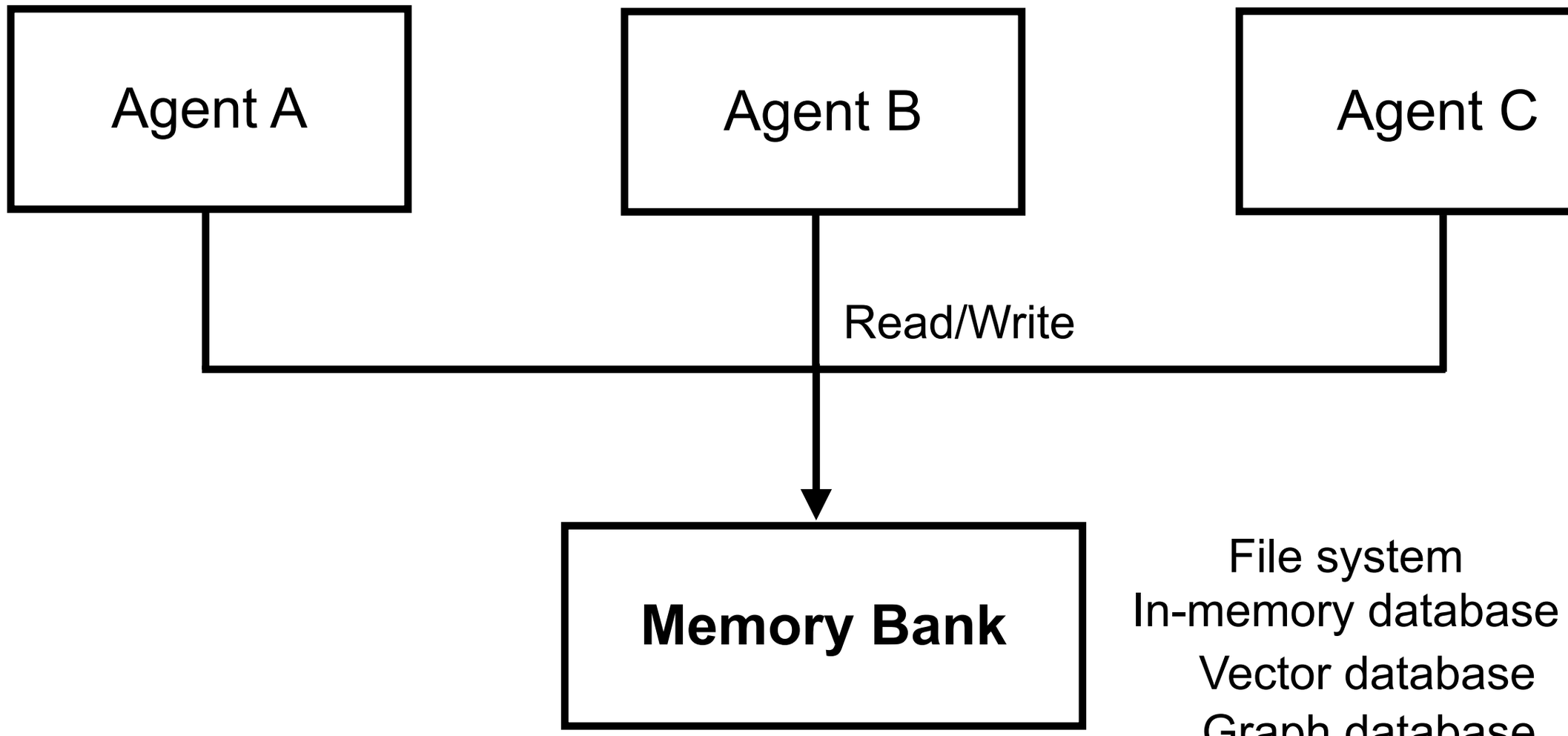
Types of Memory

To make intelligent decisions
Agents combine different types of memory



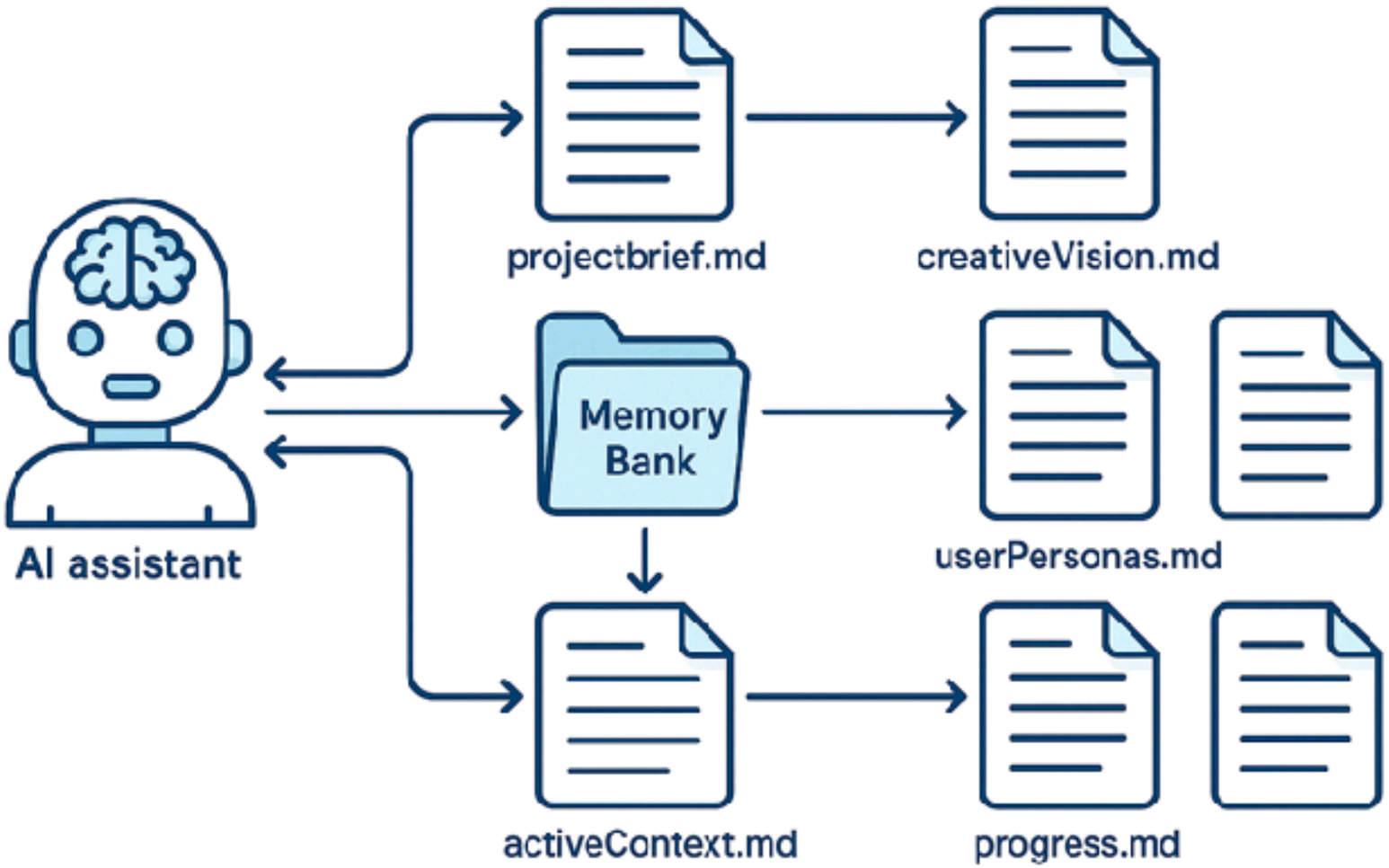
https://bhavishyapandit9.substack.com/p/how-memory-works-in-agentic-ai-a

Shared memory between Agent



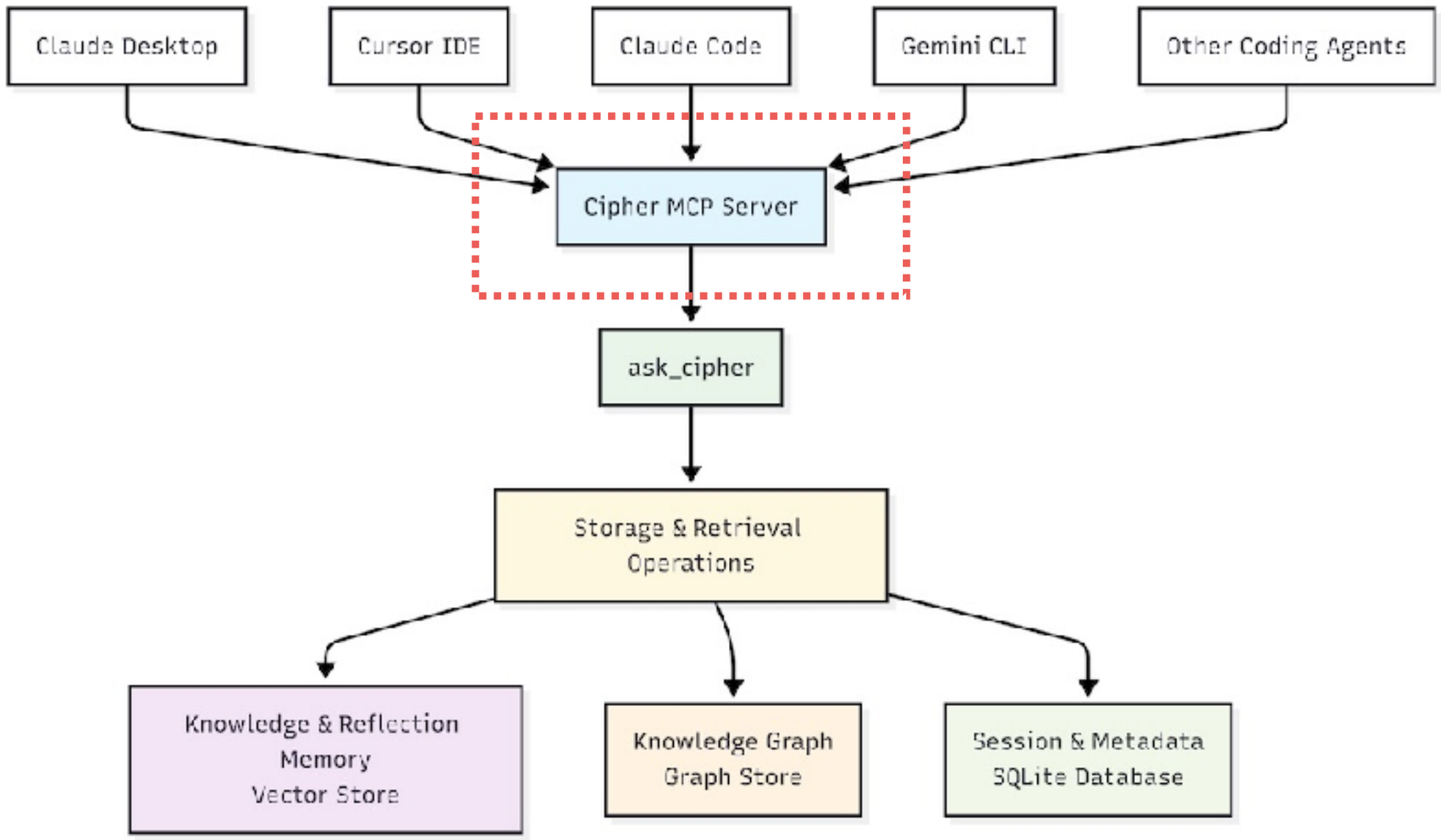
Cline Memory Bank

Working with file system



https://docs.cline.bot/prompting/cline-memory-bank

Memory Bank via MCP



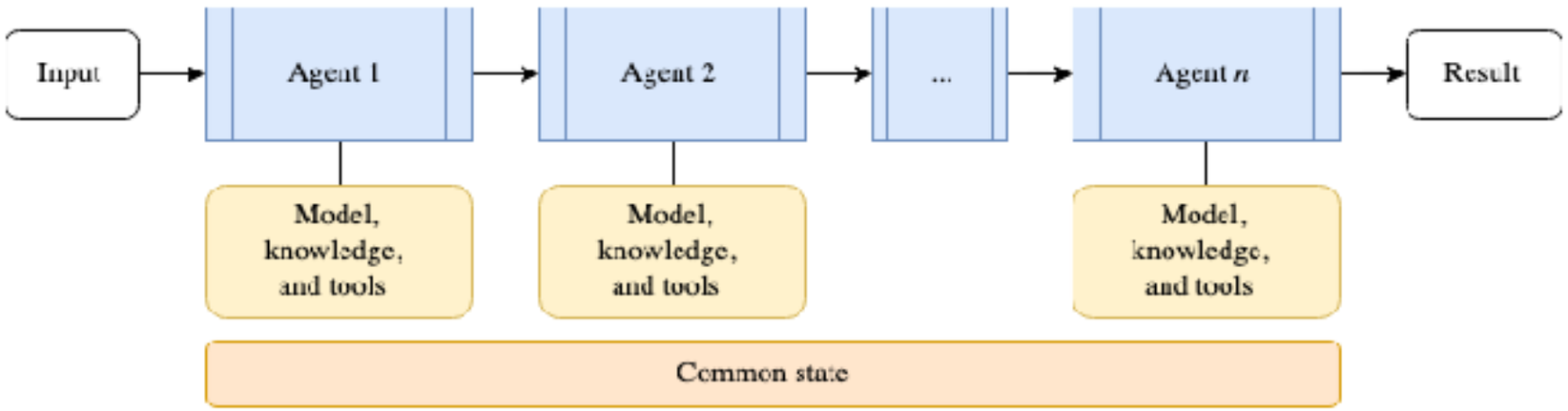
https://www.somkiat.cc/share-memory-for-ai-ide/

Sub-agent and Multi-agent !!

Reduce size of knowledge !!

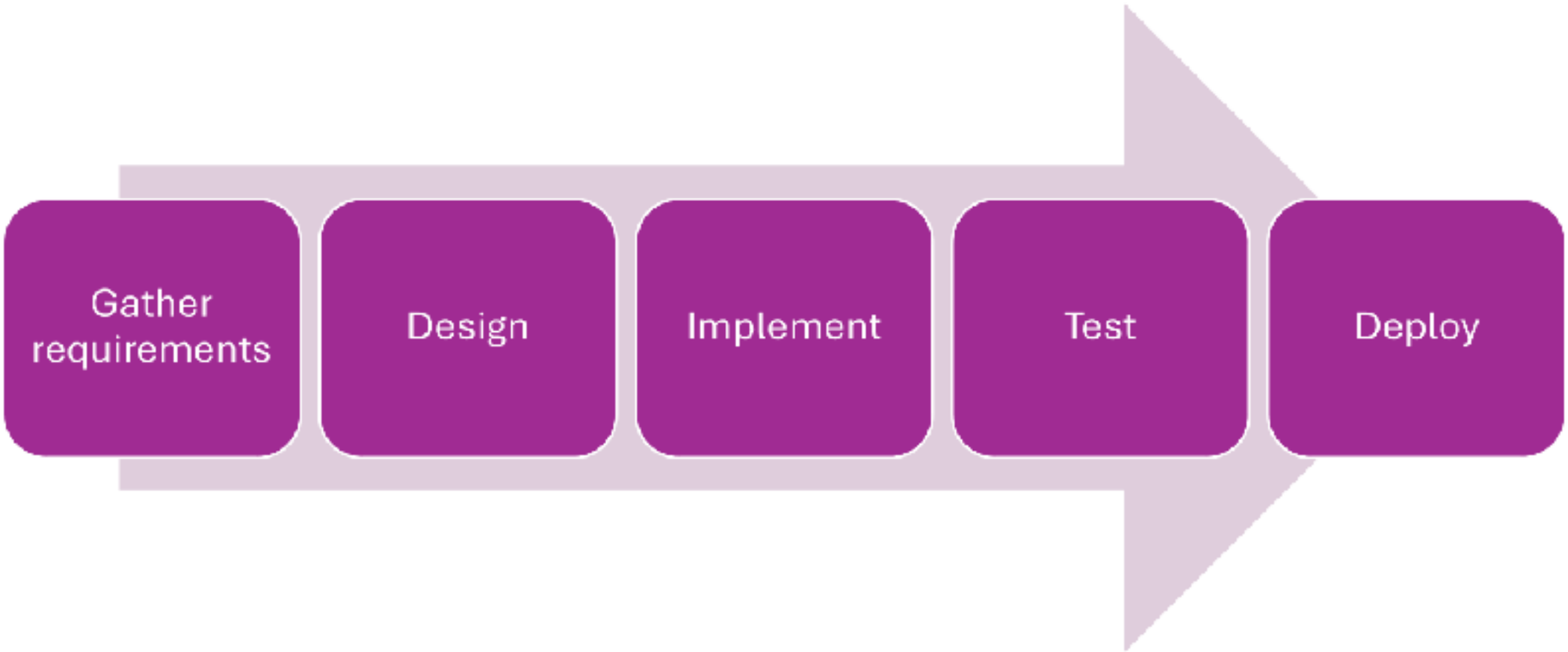
Monolith to Multi-agent

Specialization
Scalability
Maintainability
Optimization



https://learn.microsoft.com/en-us/azure/architecture/ai-ml/guide/ai-agent-design-patterns

Design your Agents ?



https://devblogs.microsoft.com/dotnet/introducing-microsoft-agent-framework-preview/

Design your Agents ?

Each step may contain subtasks
Different specialists have different steps
Progress isn’t always linear

Bugs found during testing may send back to implementation

Design your Agents ?

Full Stack Agent !!

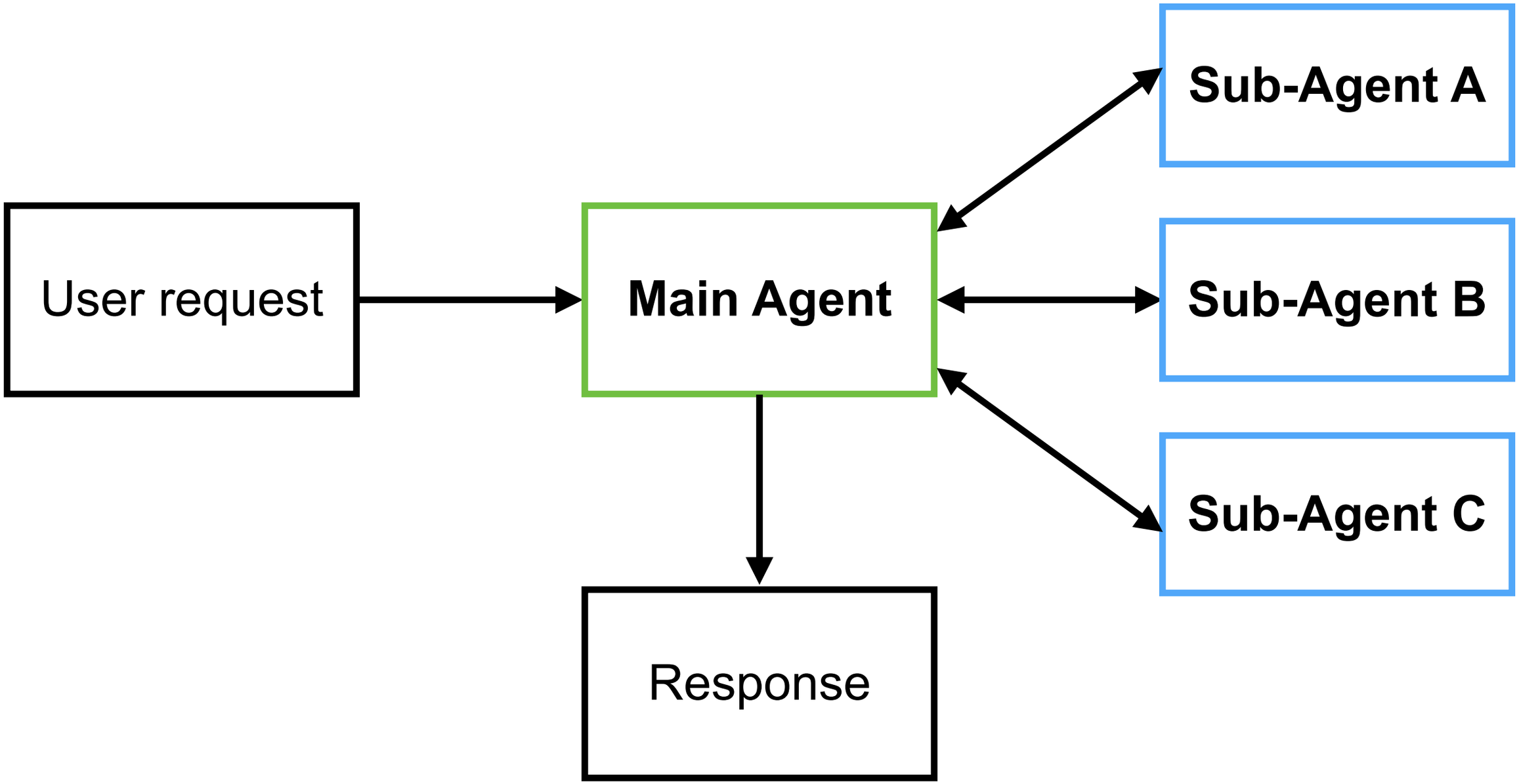
Frontend

Backend

Database

Multi AI Agents !!

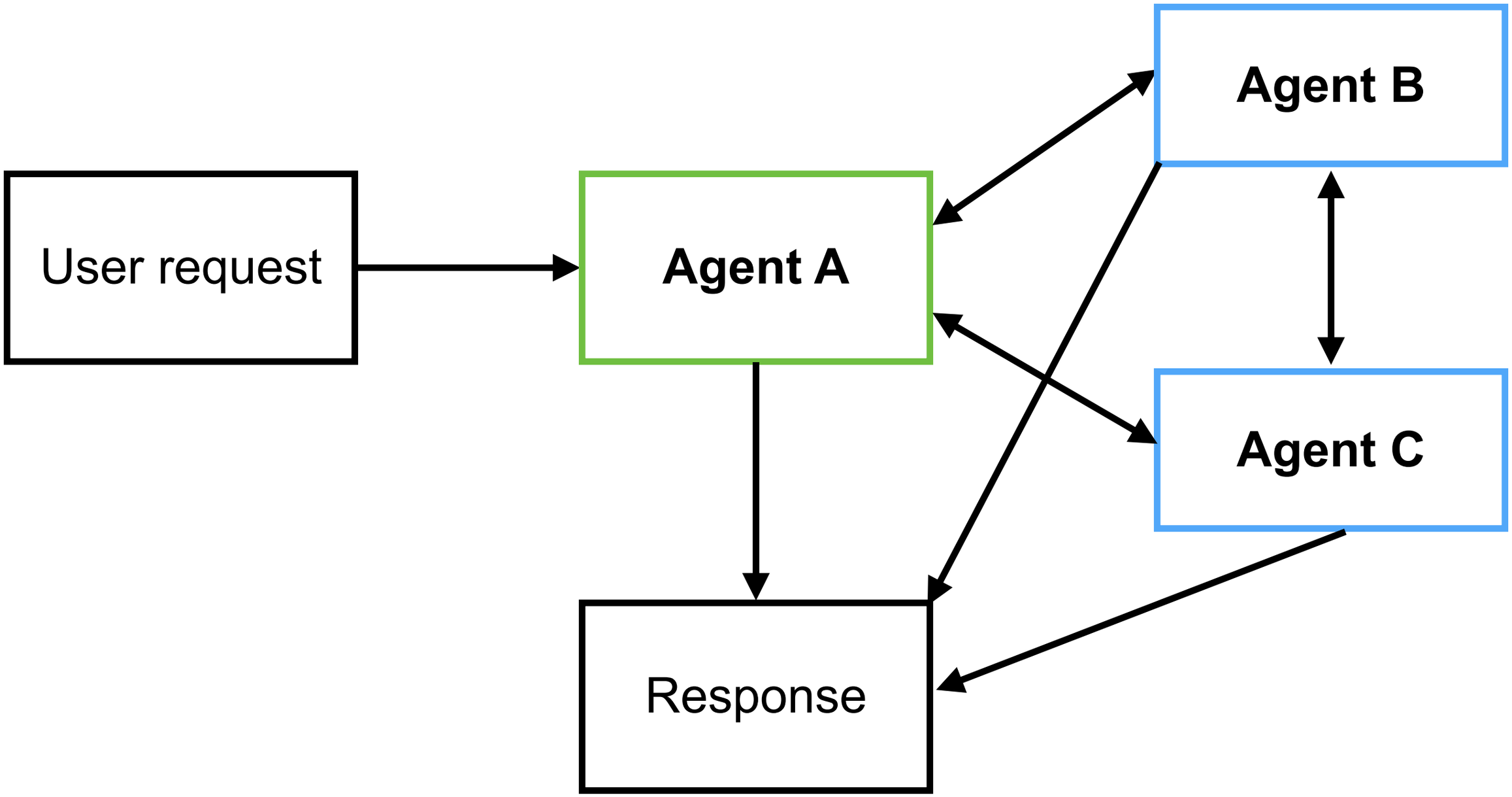
Sub-agent with **centralized** orchestration



https://www.blog.langchain.com/choosing-the-right-multi-agent-architecture/

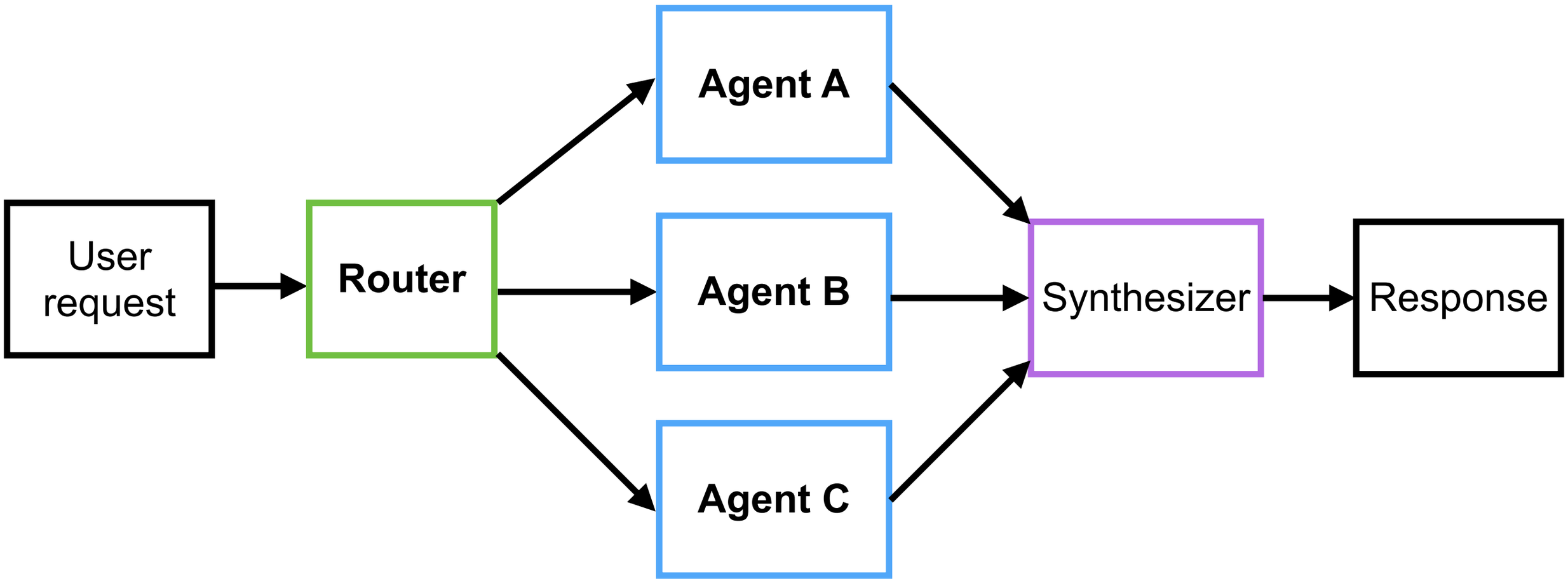
Multi AI Agents !!

State-driven transitions based-on conversation context



Multi AI Agents !!

Router and parallel run



Prompt vs Agent Skills ?

↓

Command

https://agentskills.io/

Agent Skills

Moving from a paradigm of
“prompt” to “programming by instruction”

Agent loads specialized prompts and knowledge on-demand

Specialized task

Reduce repetition

Compose capabilities

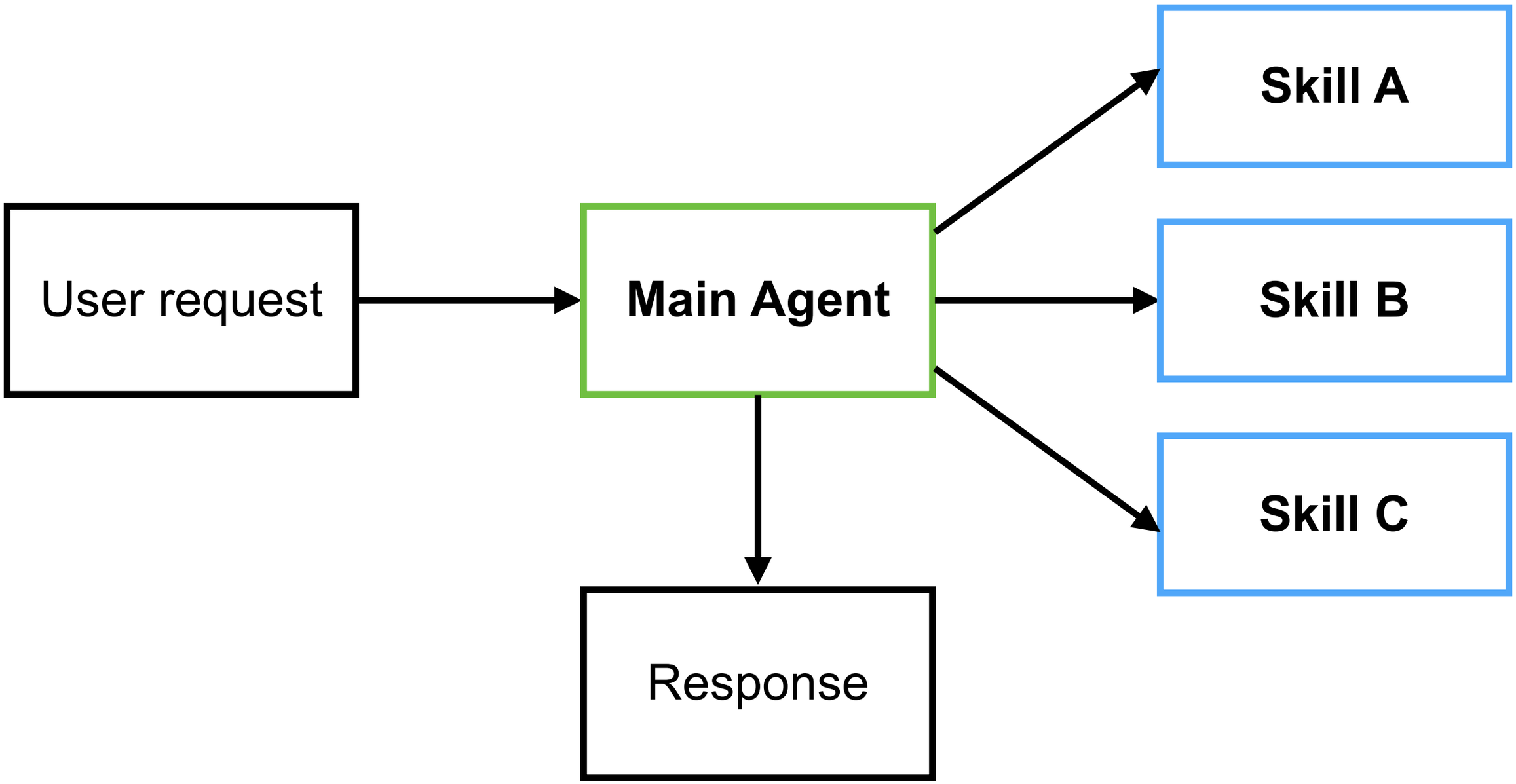
Efficient loading

Interoperability

https://agentskills.io/

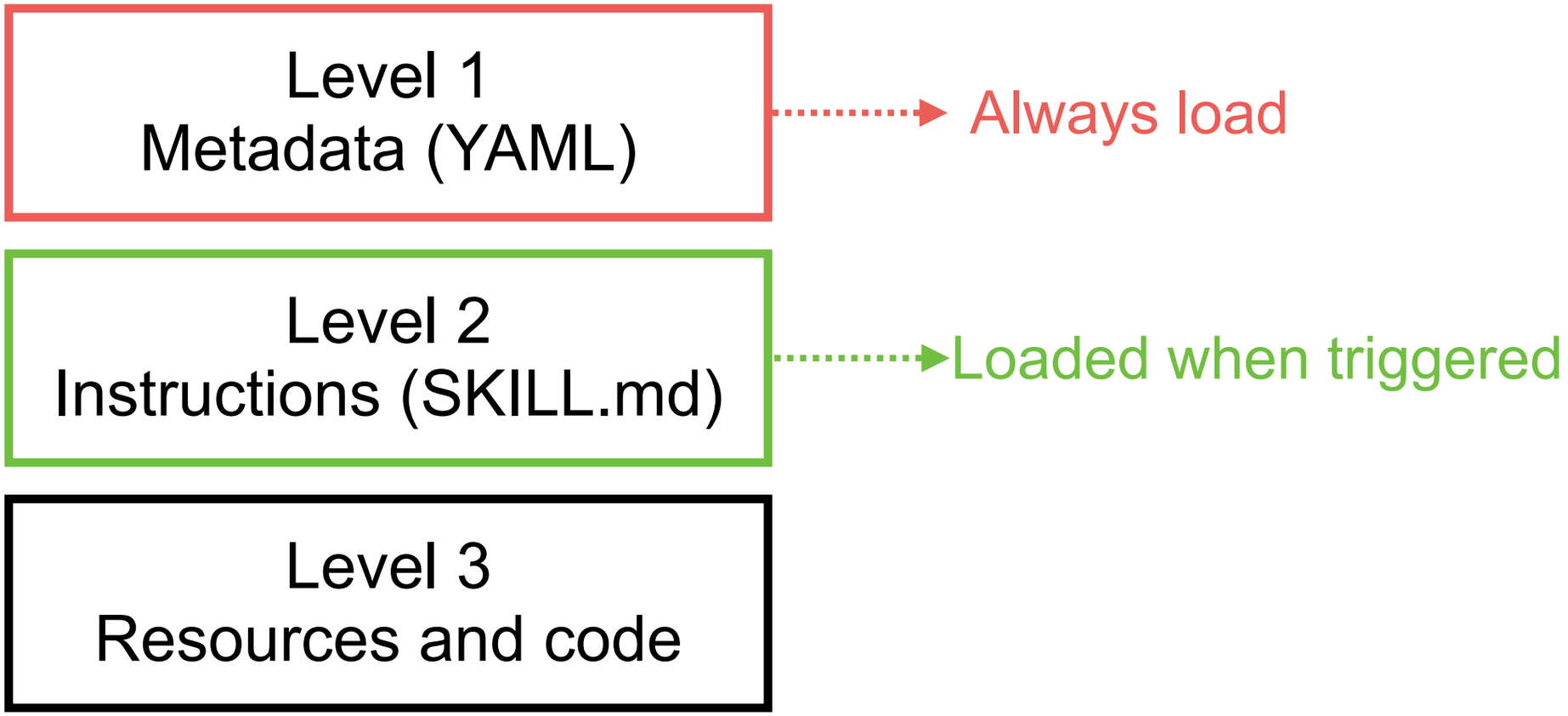
Agent with Skills

Load skills on-demand from context



https://www.blog.langchain.com/choosing-the-right-multi-agent-architecture/

Structure of Agent Skills



https://agentskills.io/

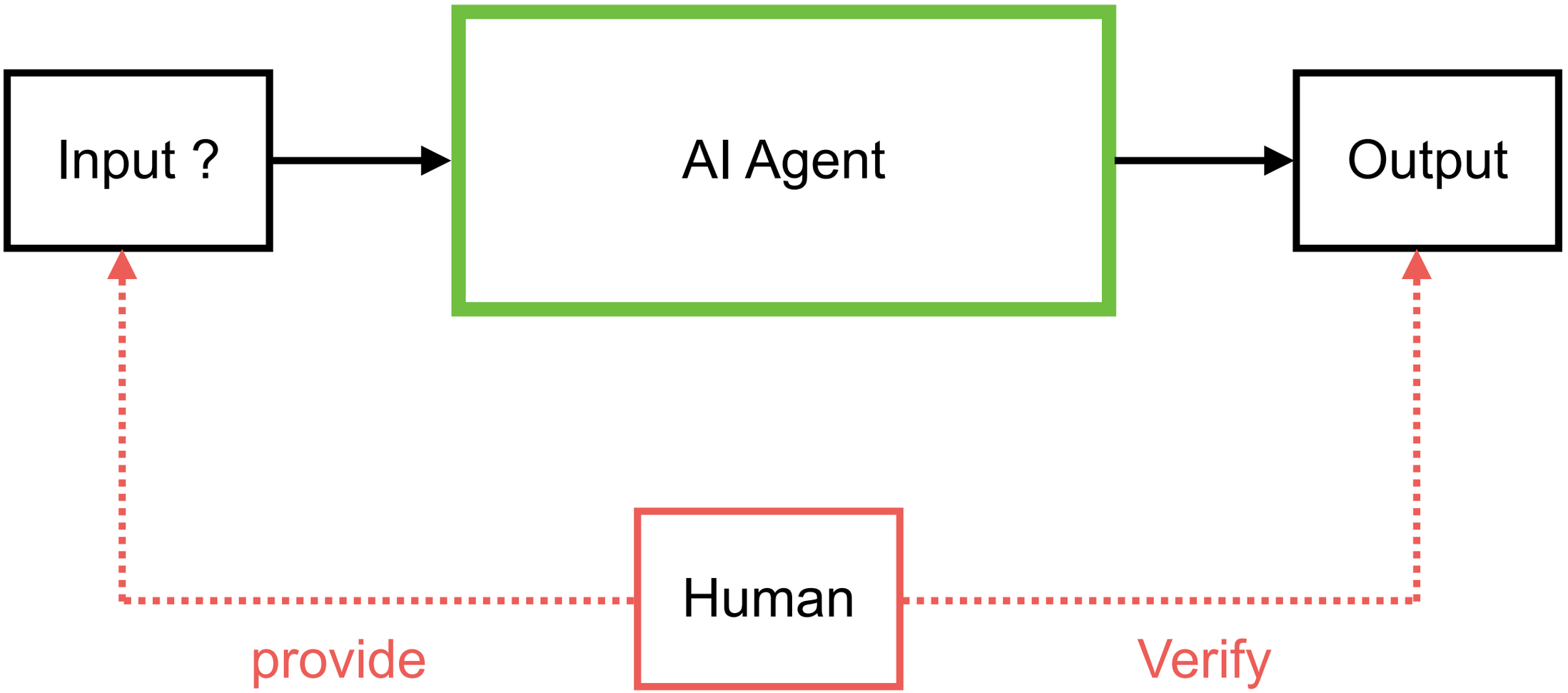
Prompt vs Skill

Features	Prompt	Agent Skills
Persistence	Ephemeral (chat-specific)	Persistent (Useable cross conversation)
Activation	Manual by user	Automatic (Triggered by context)
Structure	Unstructured text/ instruction	Structured markdown File system-based
Context load	Full instruction	Load only when needed
Token cost	Higher (Repeated usage)	Lower (Load on-demand)
Use case	One-time, creative quick query	Repeatable workflows Specialized tasks

https://agentskills.io/

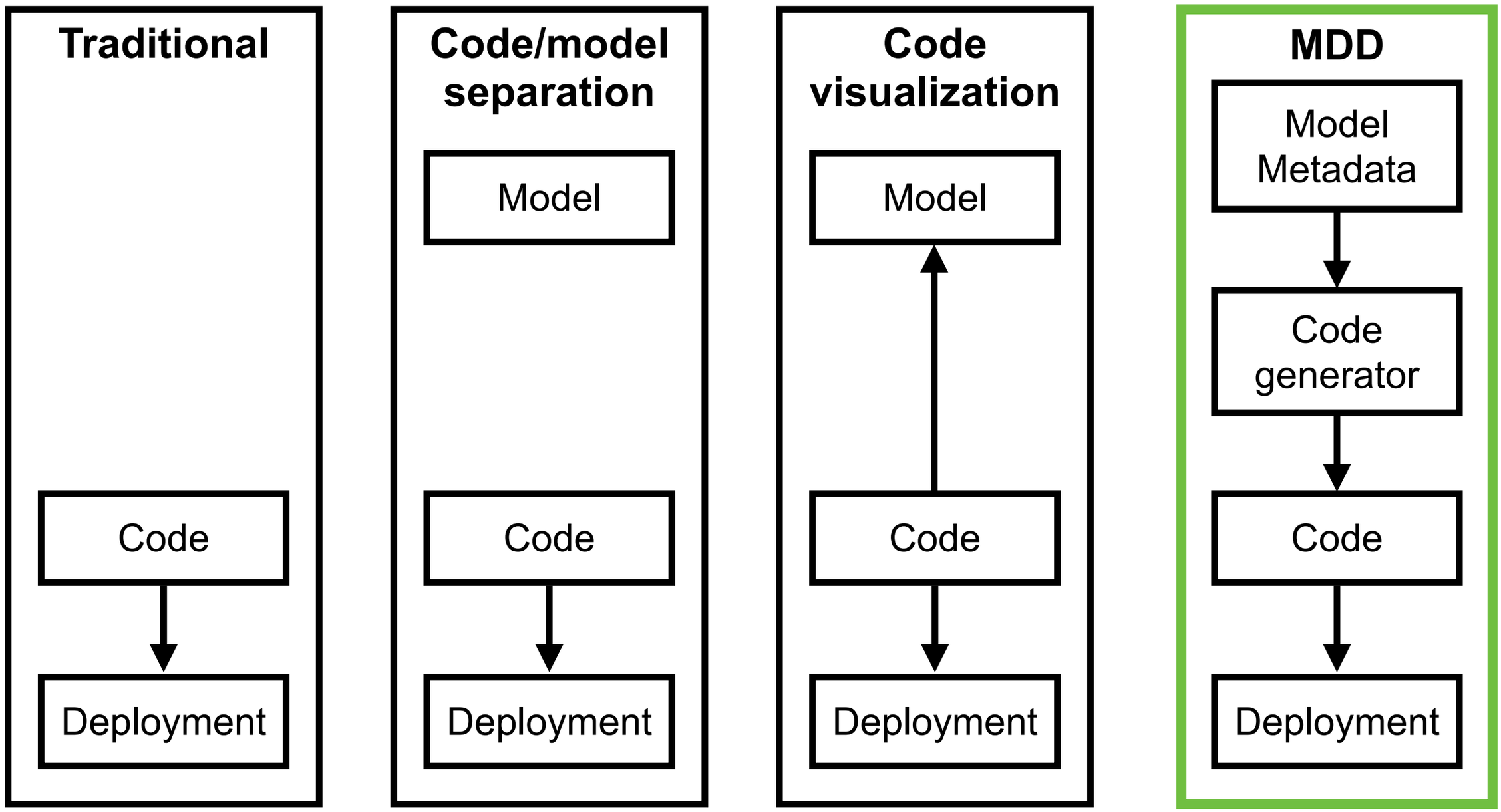
How to provide inputs ?

How to provide inputs ?



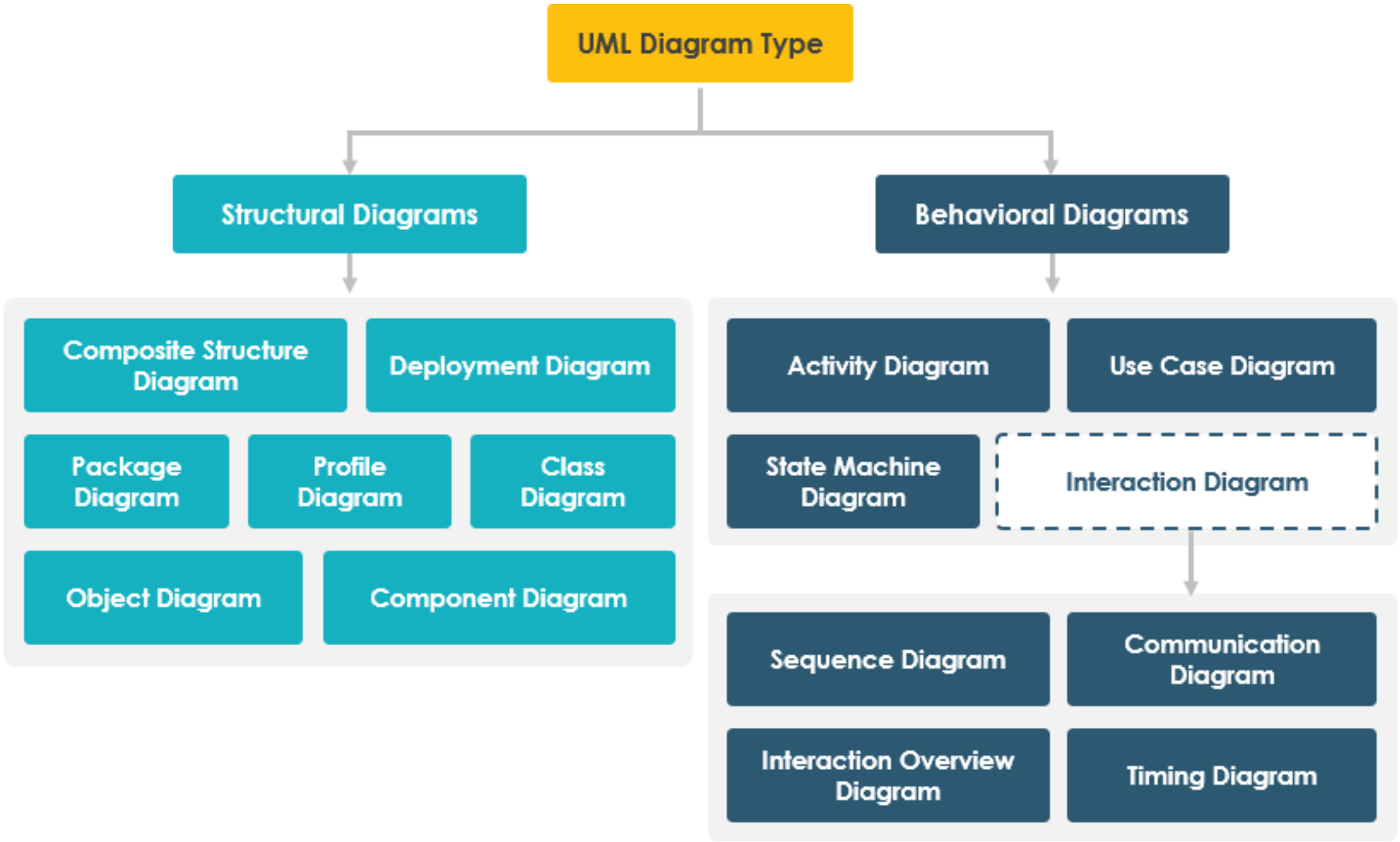
Model-Driven Development (MDD)

Traditional coding to MDD



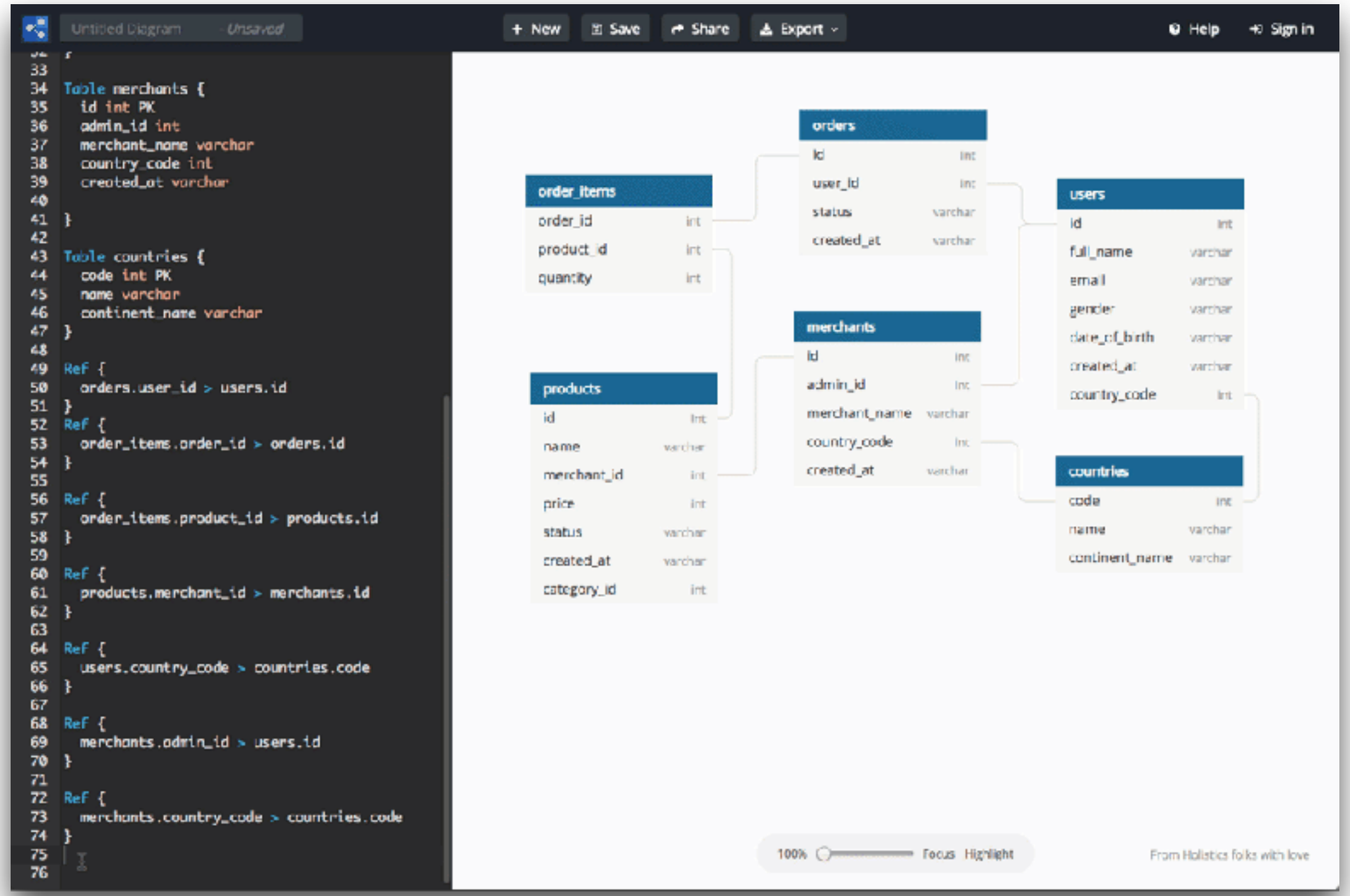
https://arxiv.org/abs/2410.18489

UML Diagrams !!



https://www.visual-paradigm.com/guide/uml-unified-modeling-language/behavior-vs-structural-diagram/

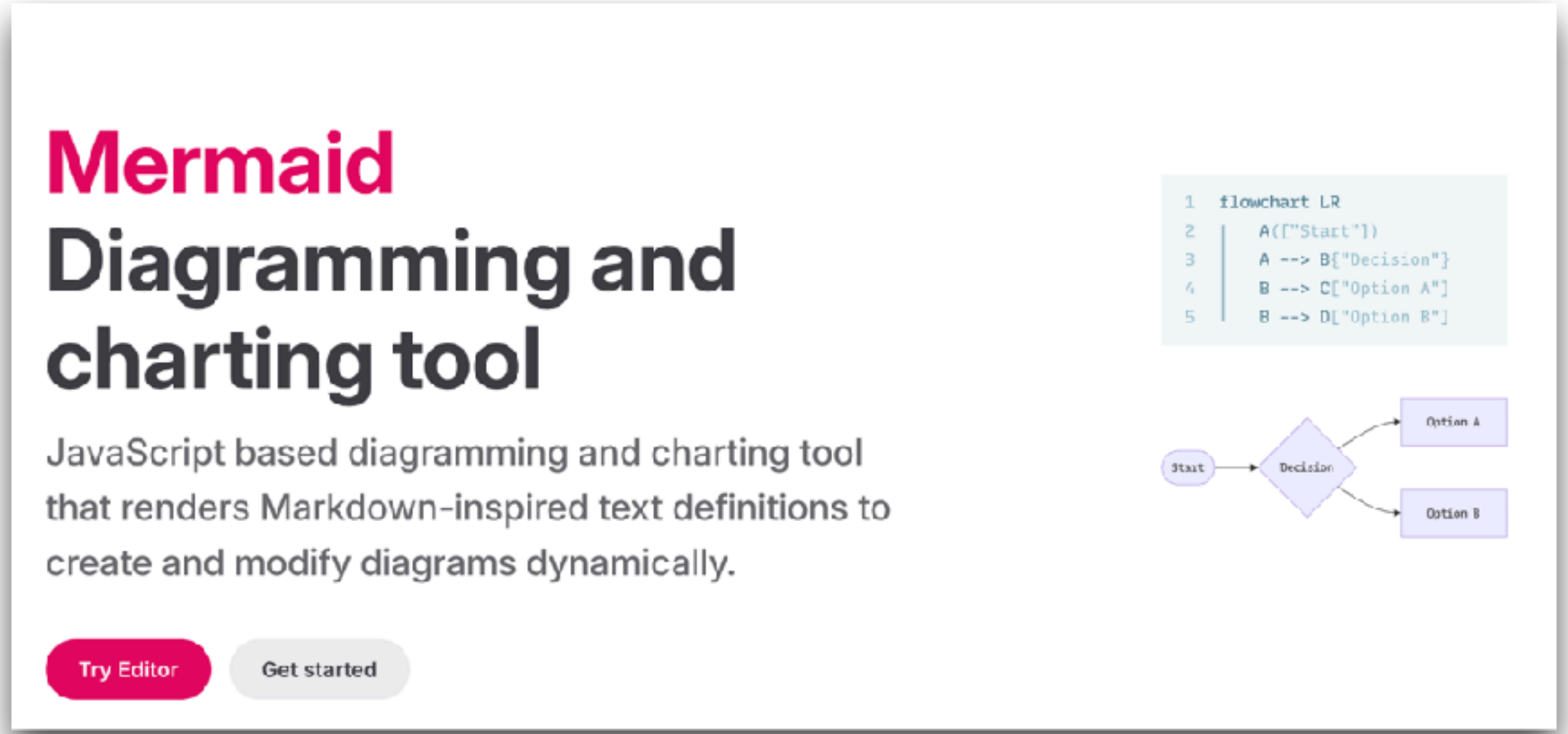
ER Diagrams for Database !!



https://dbml.dbdiagram.io/home/

Mermaid Diagram

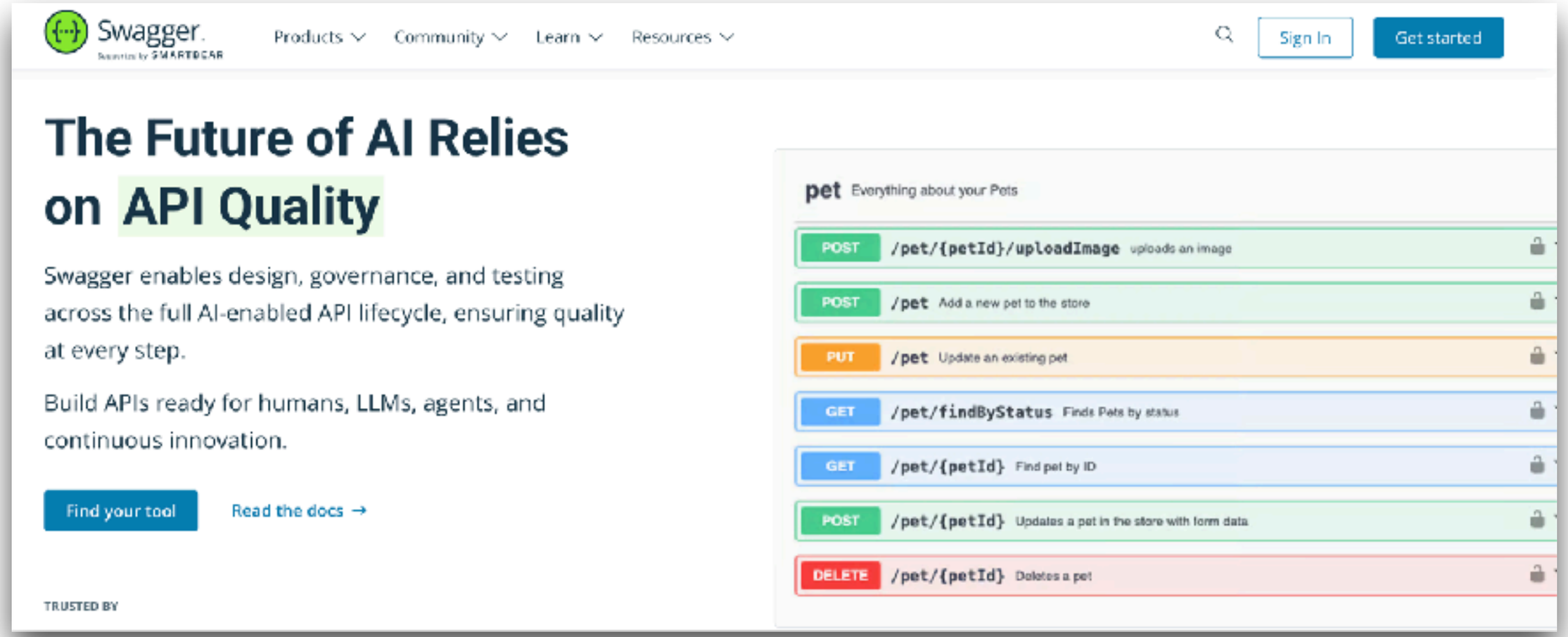
Diagram as a Code (AI-friendly)



https://mermaid.js.org/

Swagger or OpenAPI

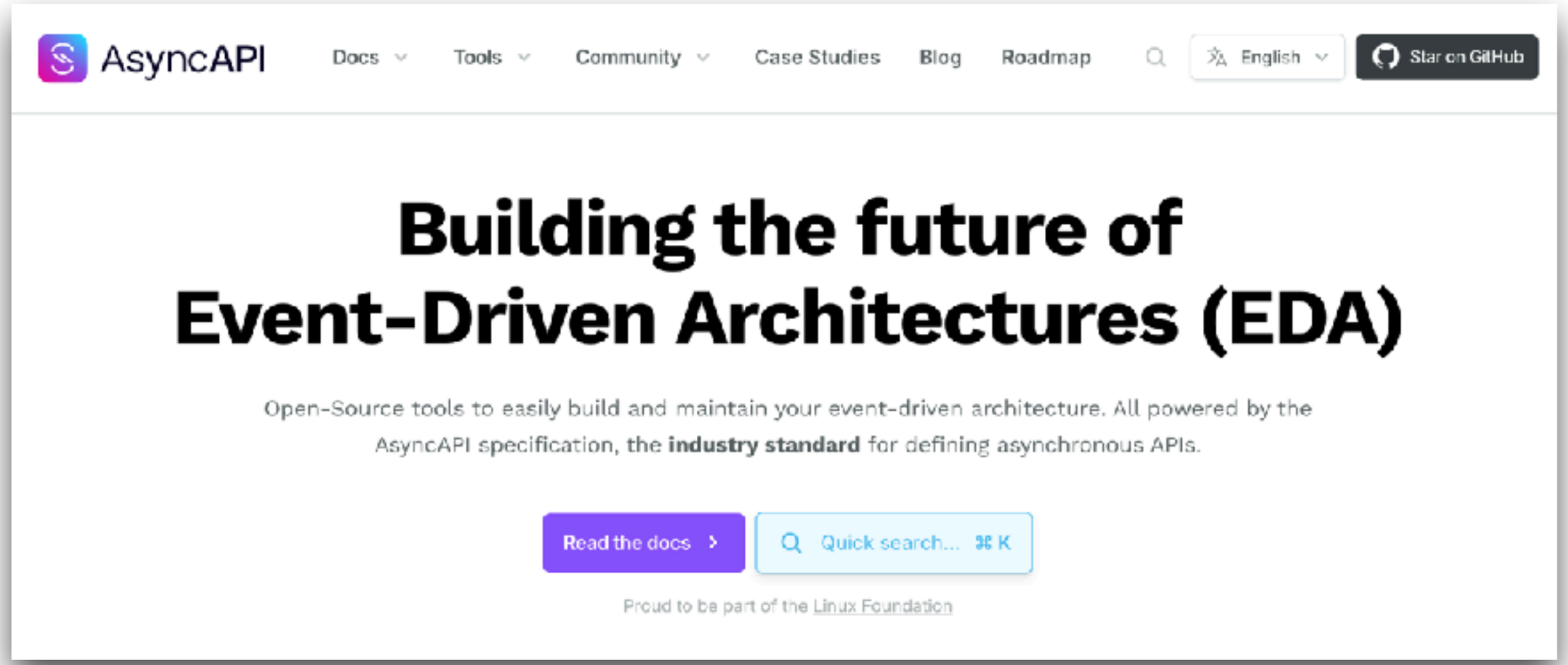
Standardized specification for describe REST APIs



https://swagger.io/

AsyncAPI

Standardized specification for describe asynchronous and event-driven APIs (Kafka, AMQP, WebSocket)



https://www.asyncapi.com/

JSONSchema

Declarative language used to annotate
and validate the structure, constraints and data type of
JSON documents

Data validation	Documentation	Automated testing

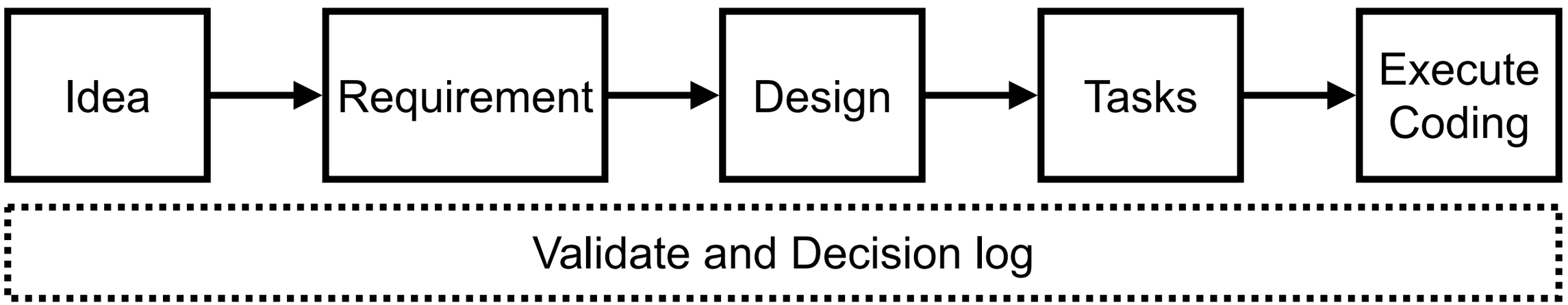
https://json-schema.org/

Specification-Driven Development (SDD)

SDD ?

Specification or Documentation-First

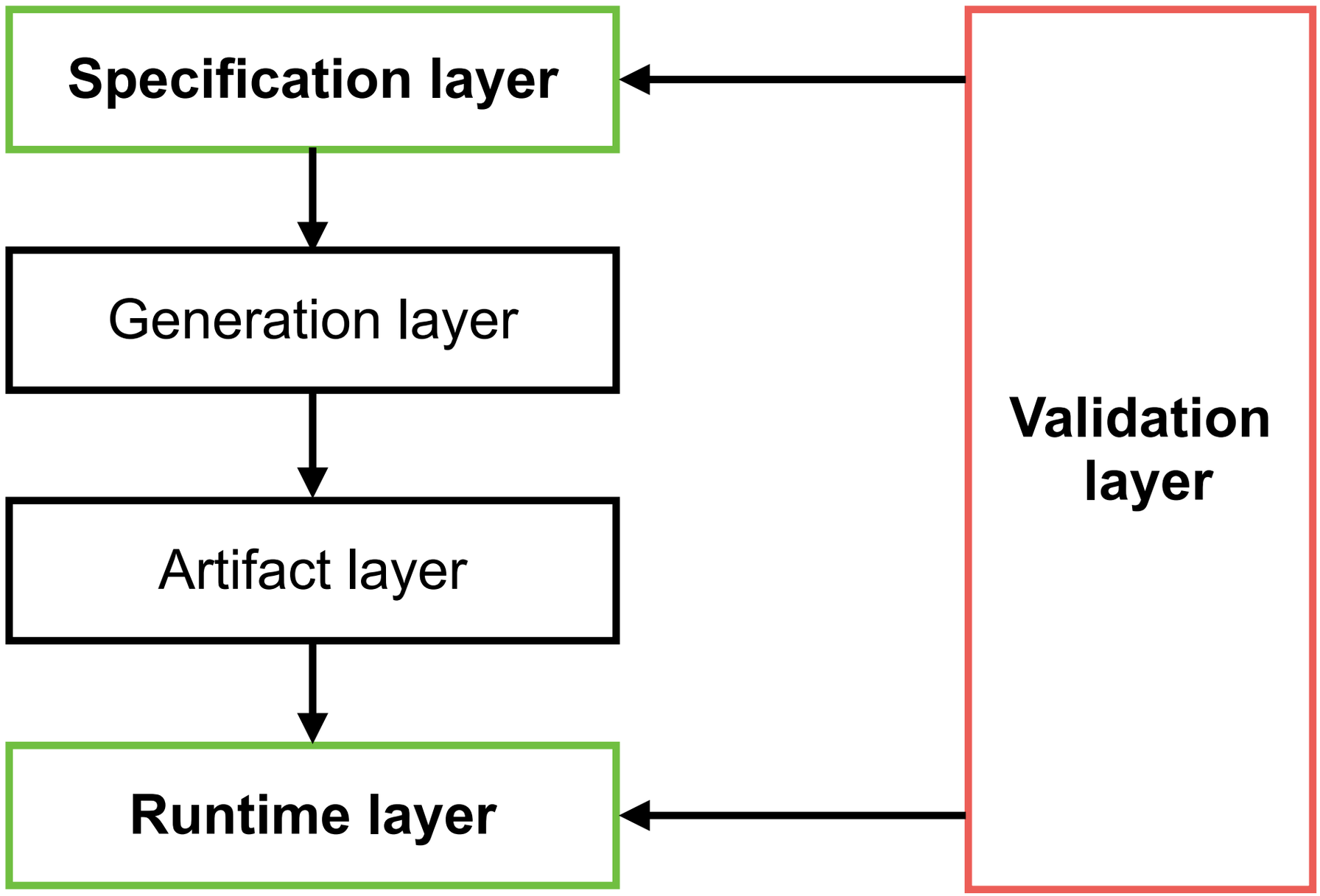
Modern software development approach where detailed, structure specifications are created before writing code



Types of Specification ?

User requirements
Design documents
Interface contracts (UI, API)
Data schemas
Validation rules
Data/business flows
Security policy and constraints
Resources and performance constraints

SSD Architecture



https://www.infoq.com/articles/spec-driven-development

MDD + SDD == Better result

When to use SDD ?

No one-size-fit-all !!

Low complexity

High complexity

https://medium.com/google-cloud/benefits-and-challenges-of-spec-driven-development-and-how-antigravity-is-changing-the-game-3343a6942330

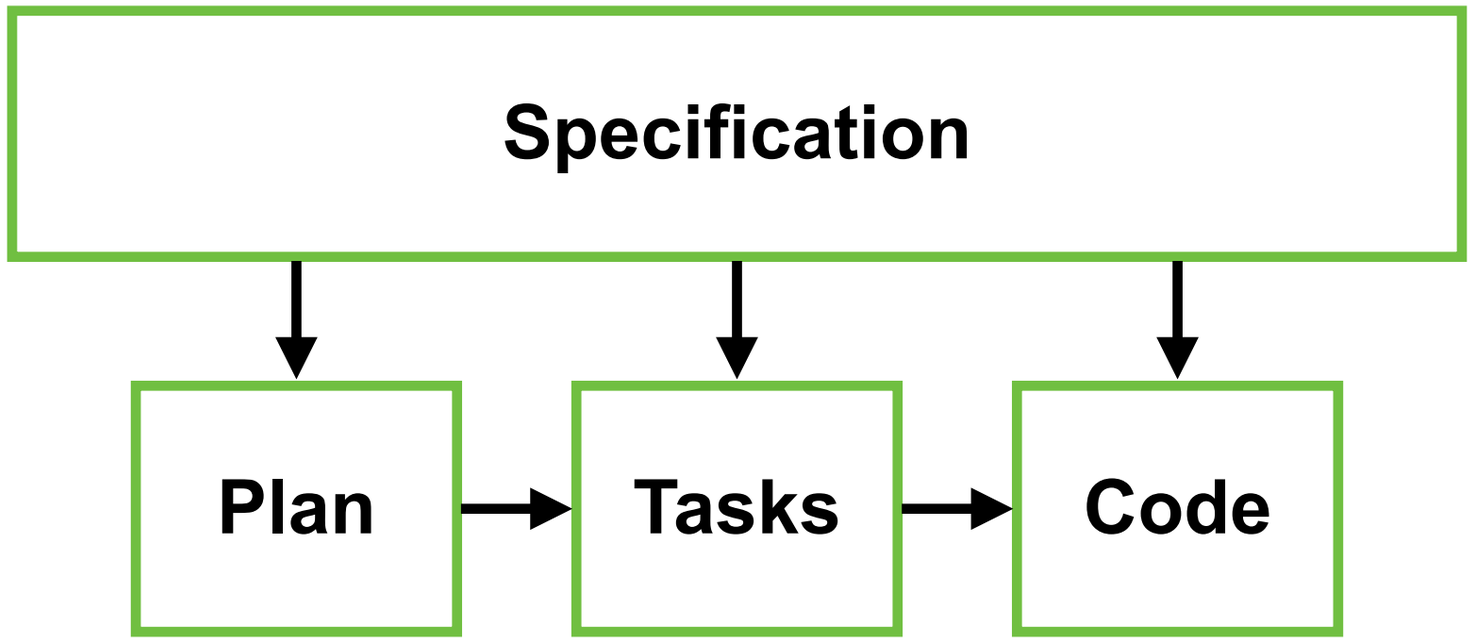
SDD Tools ?

GitHub Spec-kit

Open Spec

Kiro.dev

Tessl



Try by yourself !!

Frontend
Web application

Backend
RESTful API +
Database

Write specification

Coding

Run and Test !!

Frontend
Web application

Backend
RESTful API +
Database

Vercel React Skill

Write spec or feature

Prompt or command

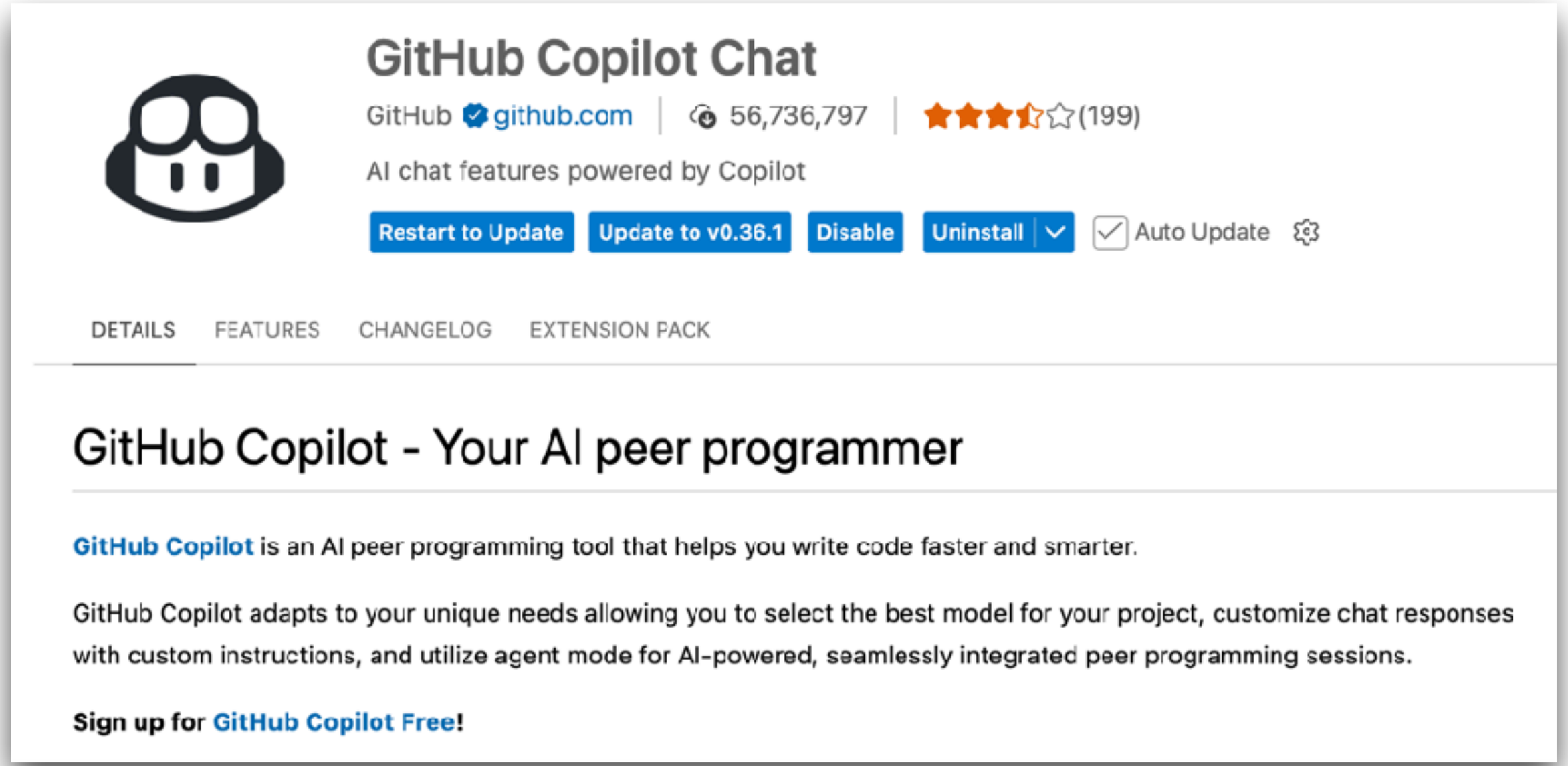
Working with MCP

Frontend Web application	**Backend** RESTful API + Database
Vercel React Skill	Global instruction
Write spec or feature	Write spec or feature
Prompt or command	Prompt or command
Working with MCP	Working with MCP

Workshop with
VS Code + GitHub Copilot Chat

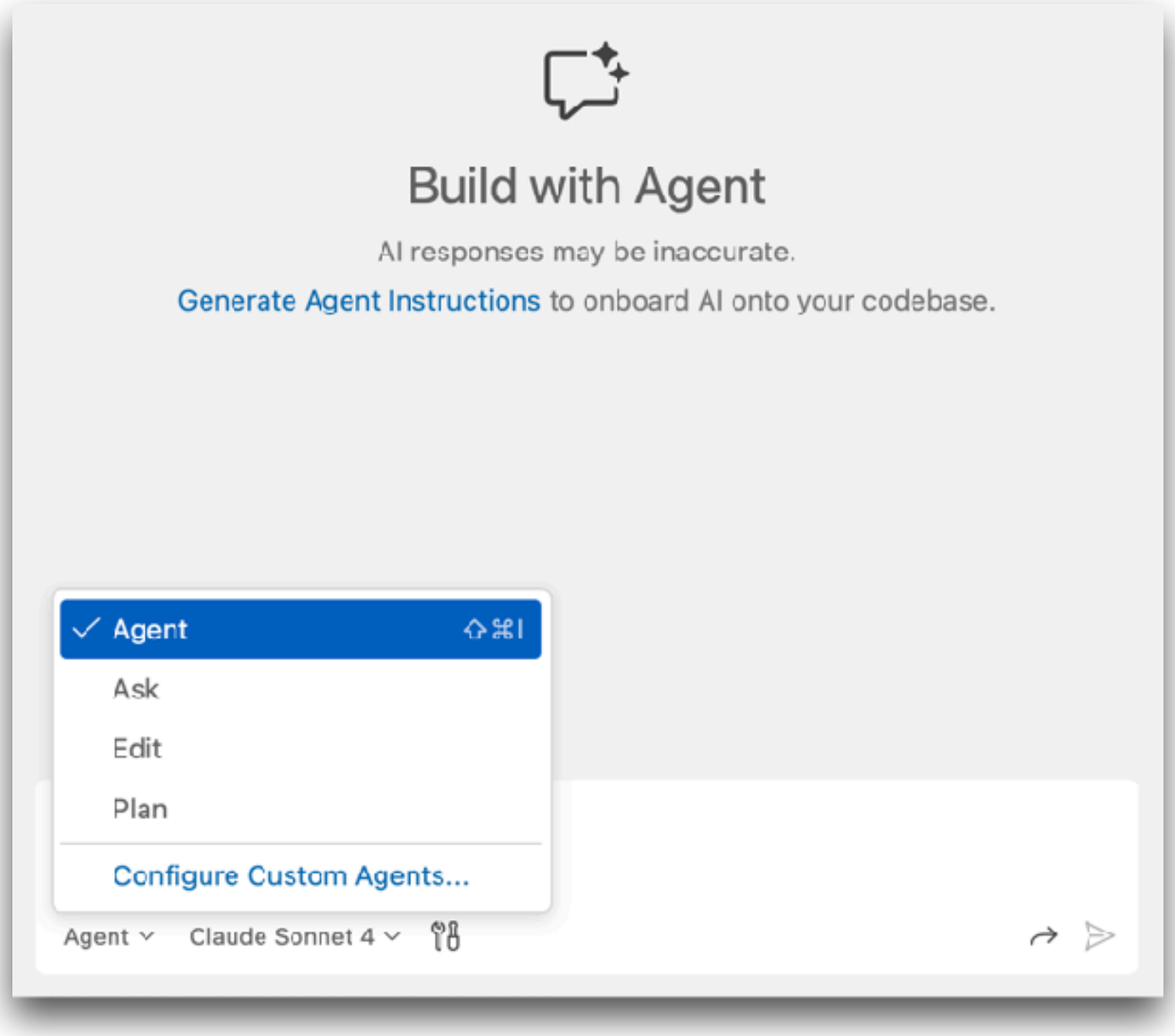
https://code.visualstudio.com/docs/copilot/chat/getting-started-chat

Install extension in VS Code



https://marketplace.visualstudio.com/items?itemName=GitHub.copilot-chat

Hello Copilot Chat in VS Code



Copilot Chat Modes

Agent

Ask

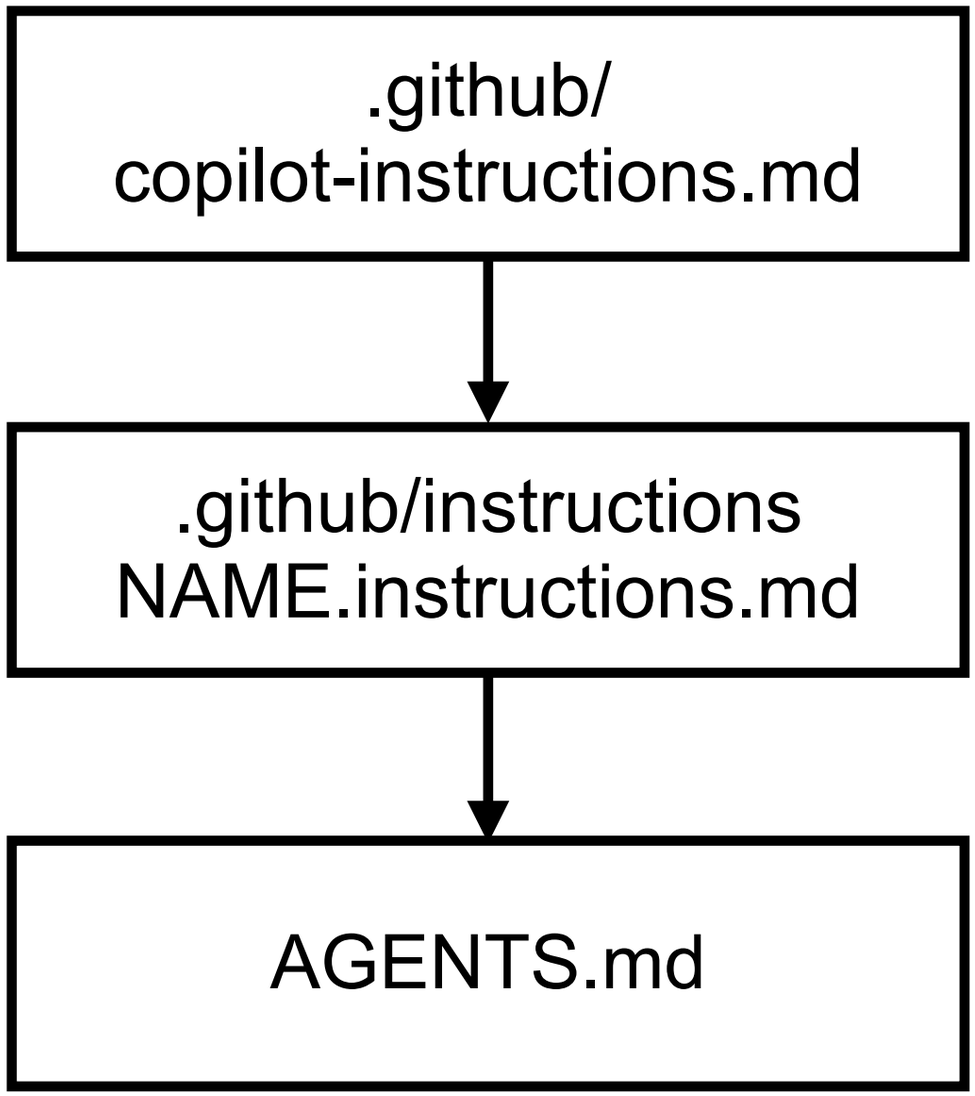
Edit

Plan

Custom Agent

https://code.visualstudio.com/docs/copilot/customization/custom-agents

Custom instructions !!



Disable by default in VS Code

https://docs.github.com/en/copilot/how-tos/configure-custom-instructions/add-repository-instructions

Customization !!

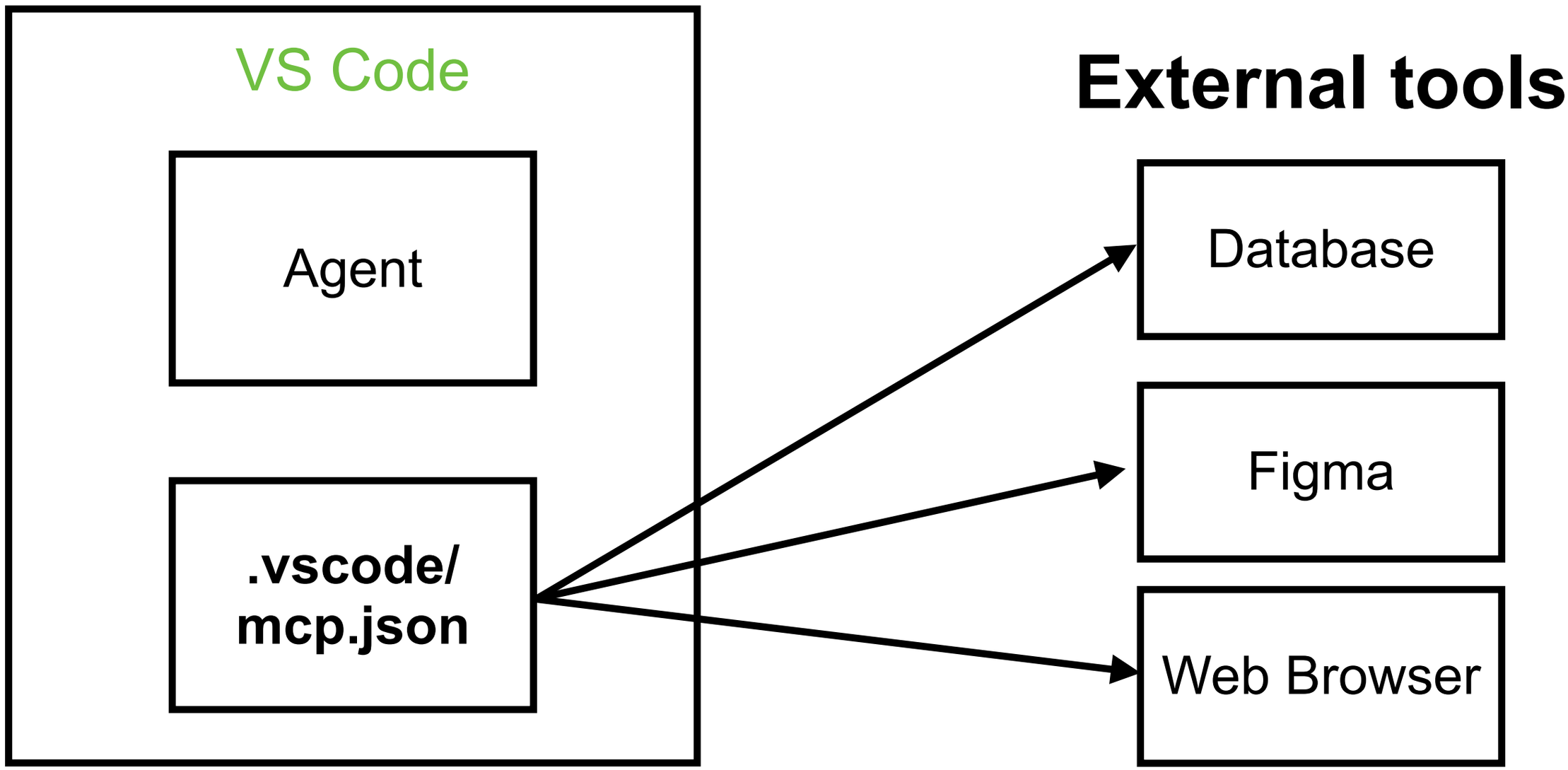
Agent

Instruction

Prompts

Skills

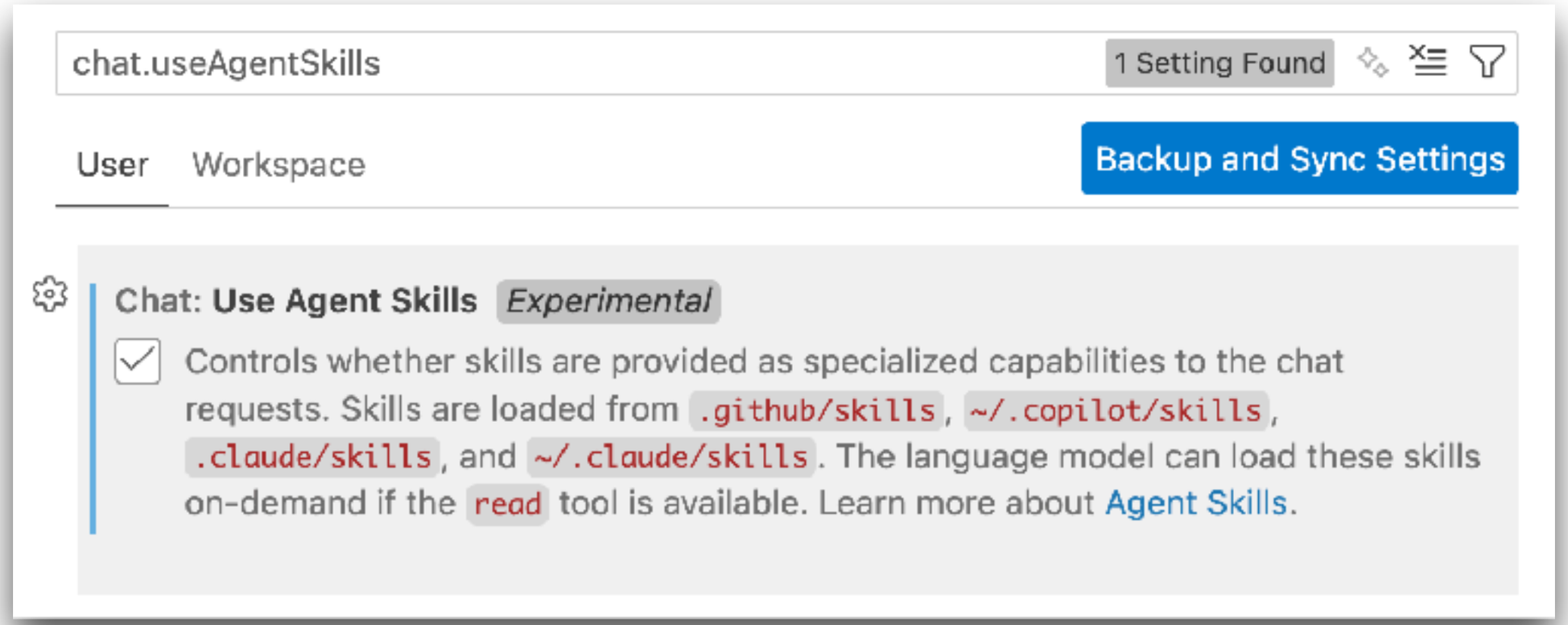
Working with MCP



https://code.visualstudio.com/docs/copilot/customization/custom-agents

Enable Agent Skills in VS Code

Setting => “**chat.useAgentSkills**”
Create skills in “**.github/skills/name/SKILL.md**”



https://code.visualstudio.com/docs/copilot/customization/agent-skills

Workshop with Claude Code

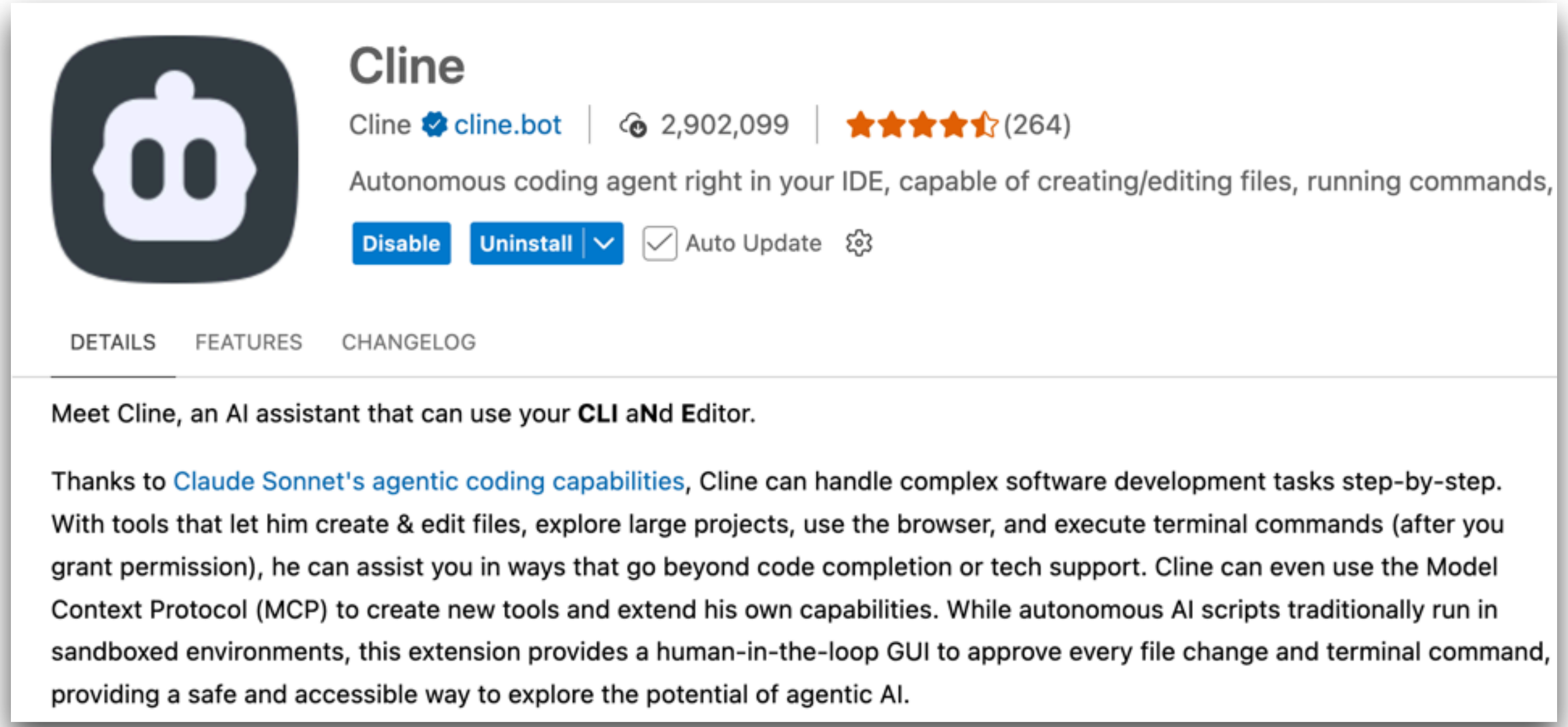
https://claude.com/product/claude-code

npm install -g @anthropic-ai/claude-code

Workshop with VS Code + Cline

https://cline.bot/

Install extension in VS Code



https://marketplace.visualstudio.com/items?itemName=saoudrizwan.claude-dev

Q/A