The AI-assisted coding paradigm

AI-ASSISTED CODING FOR DEVELOPERS

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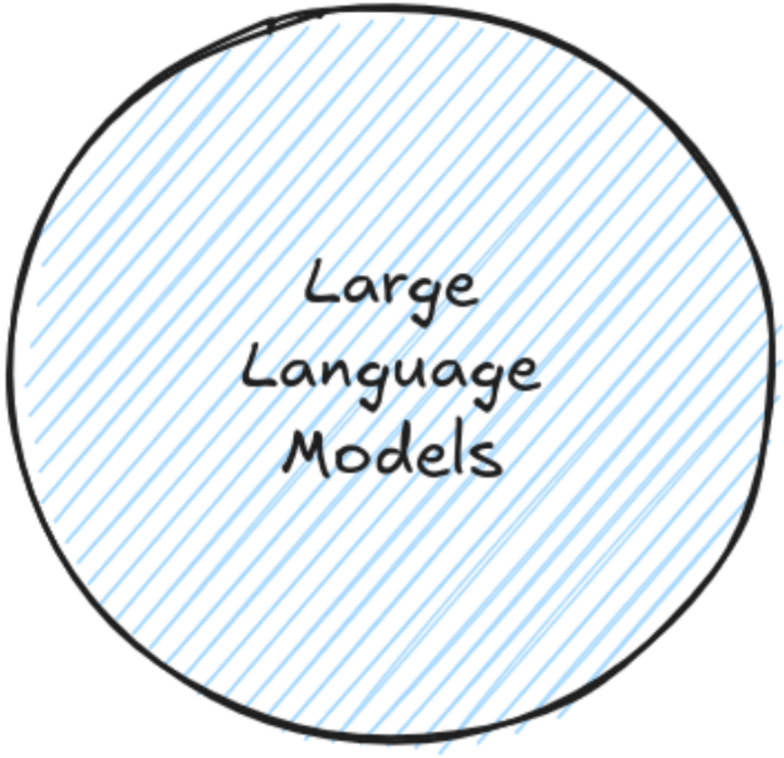
Course goals

- Define **how AI supports multiple coding tasks**
  - Code completion
  - Debugging
  - Test generation
  - Documentation
- Choose the right model for your coding needs
- ✂ Craft the best **prompts for coding purposes**
- Build **robust AI pipelines** to boost your coding productivity

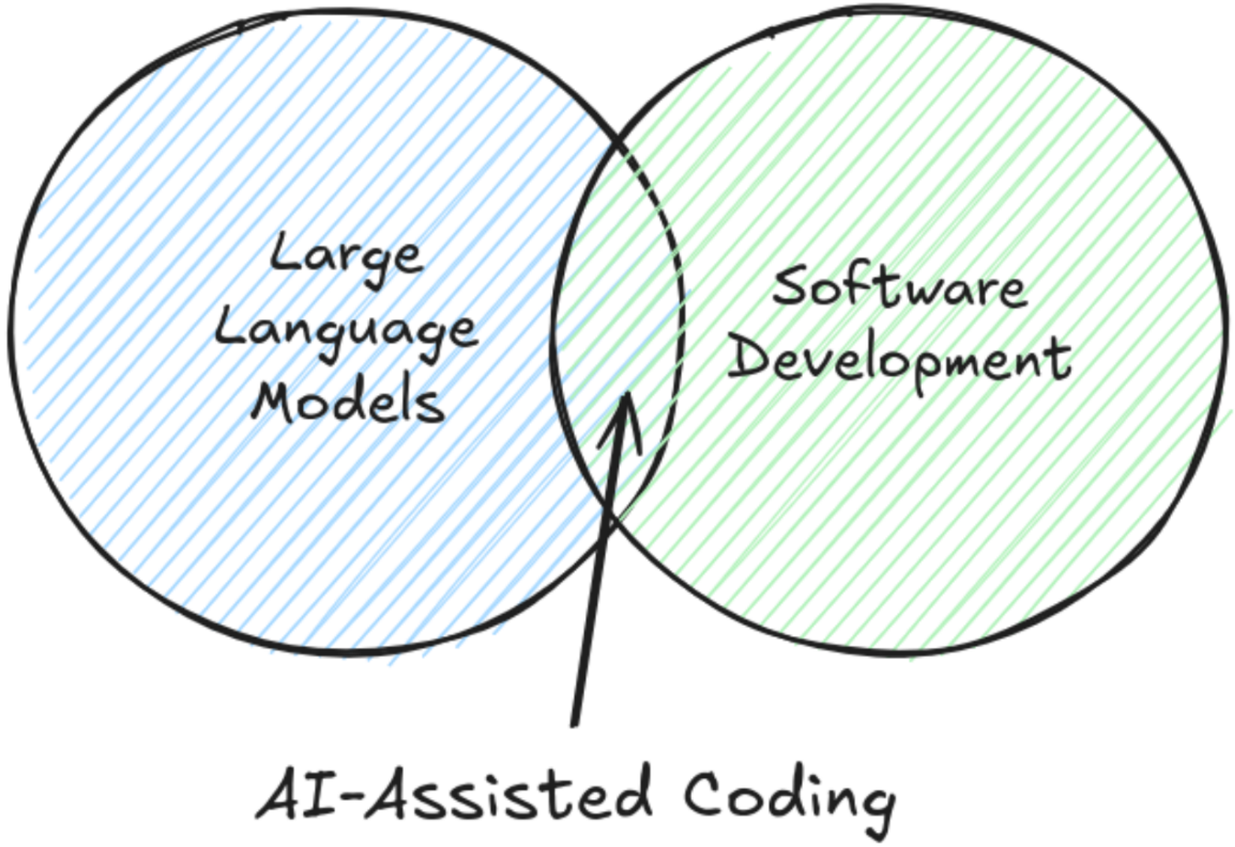
The AI-assisted coding paradigm



"Can you help me organizing a 2-day trip to Barcelona?"

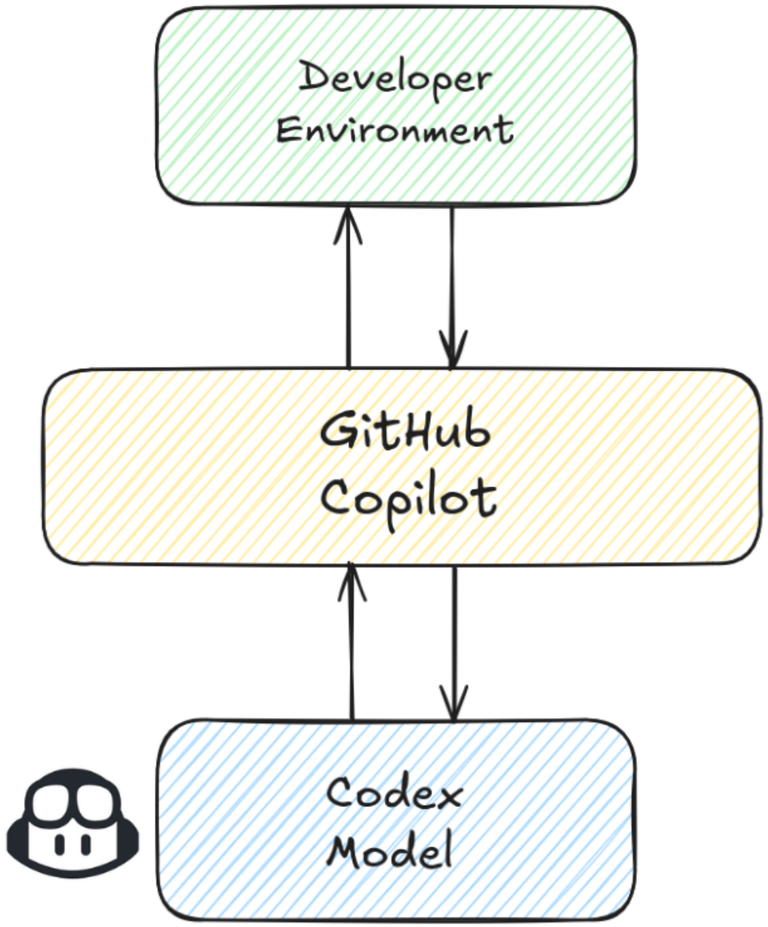
"I need to finish this function by tomorrow"

The AI-assisted coding paradigm

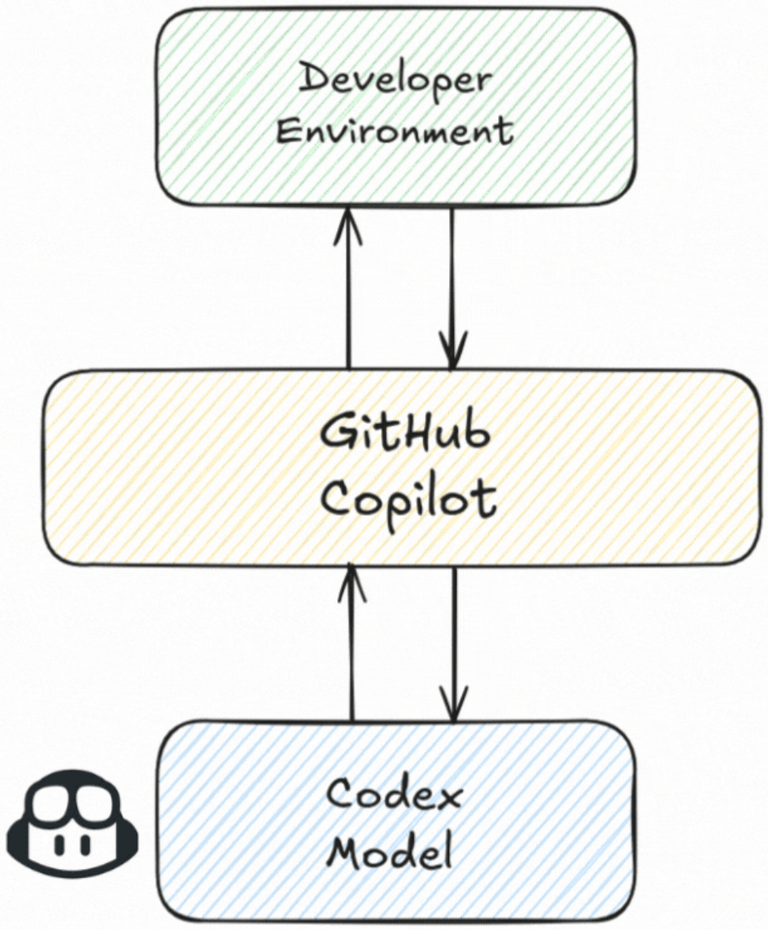


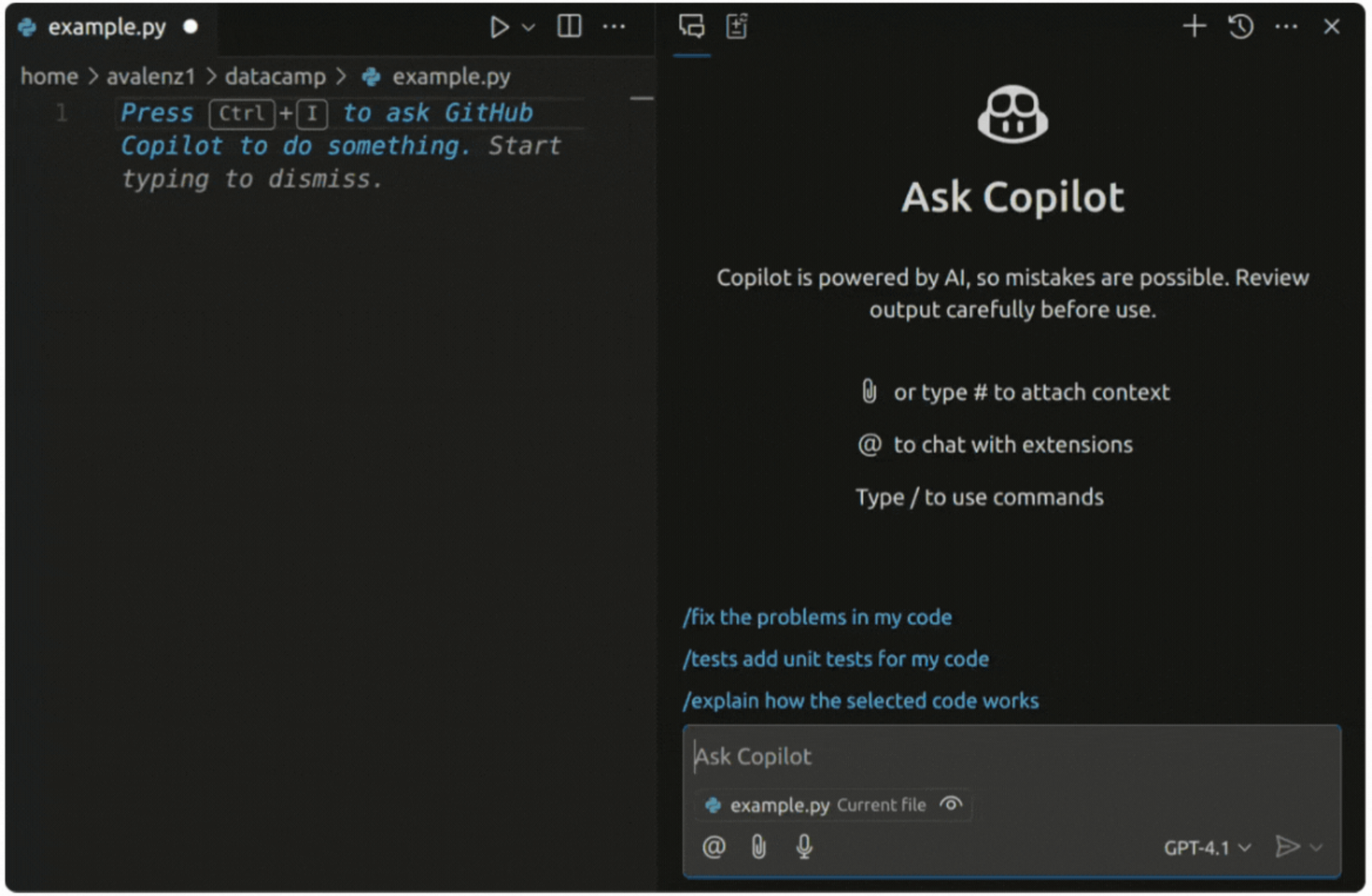
"Can you help me writing a C function that [...]?"

Coding models



Coding models





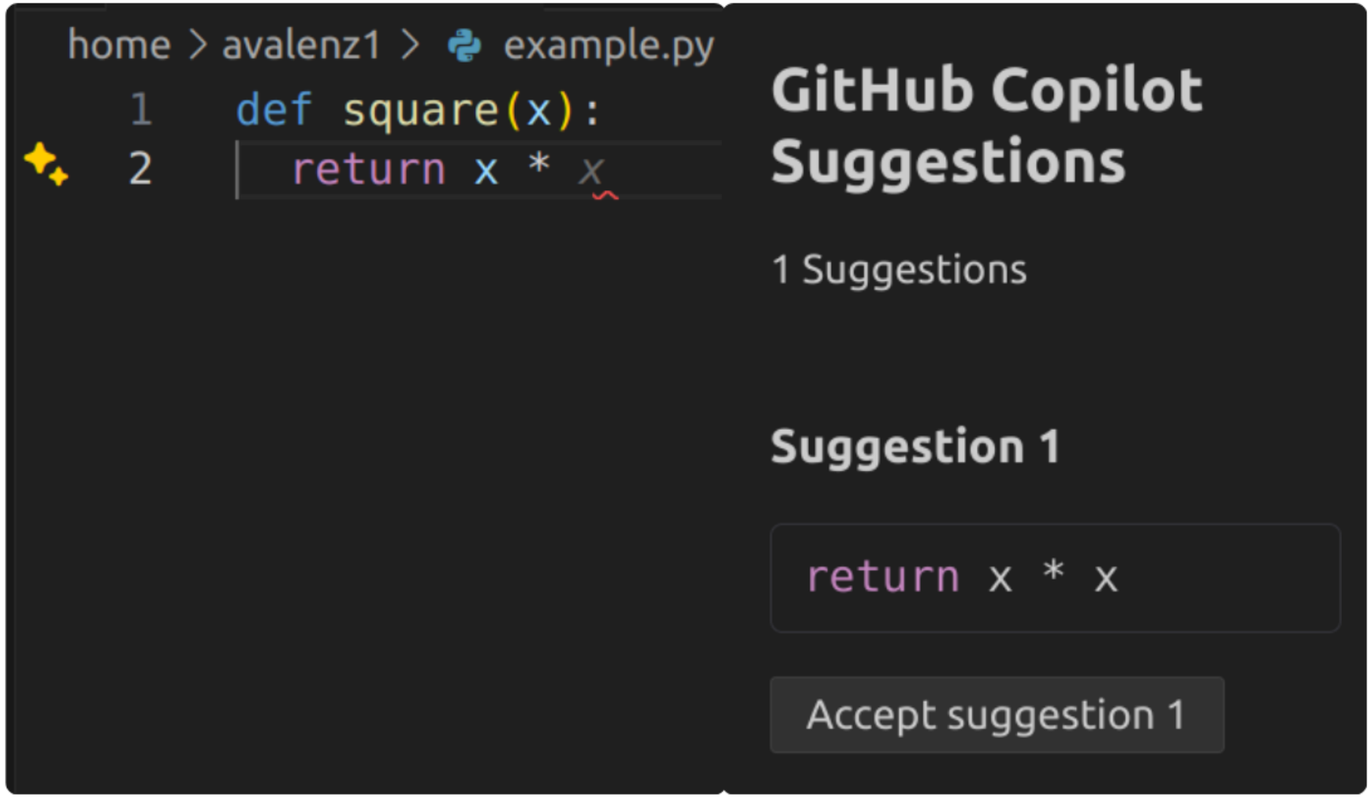
Coding models

User input

```
def square(x):
    return x *
```

x

Model suggestion



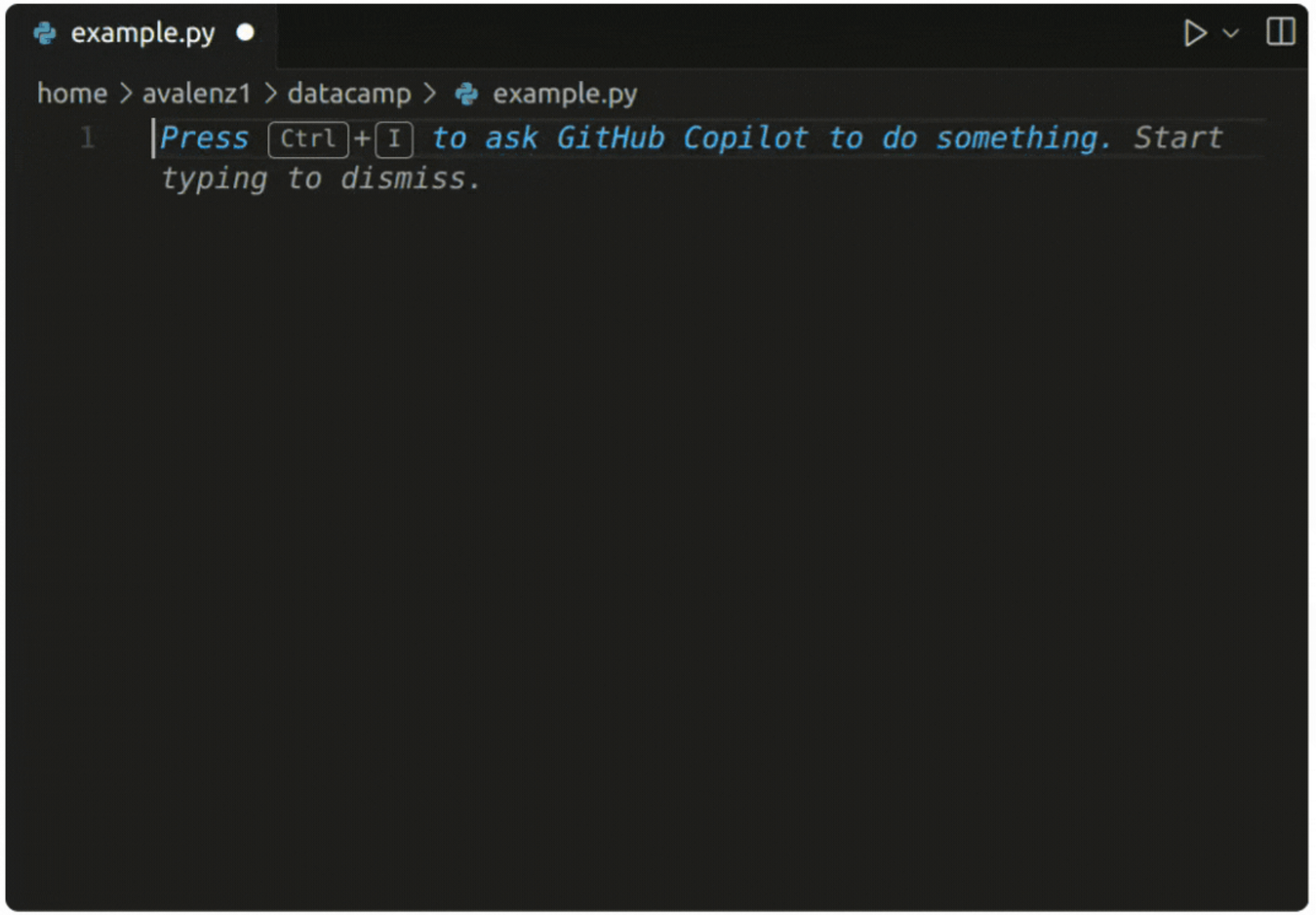
Coding models

User input:

"Write a Python function to compute the square of a value"

Model response:

```
def square(value):
  return value ** 2
```



Coding models

GPT

(OpenAI)

CodeGen

(Salesforce)

Coding models

General models (with coding capabilities)

GPT
(OpenAI)

Claude
(Anthropic)

Gemini
(Google)

Coding models

General models (with coding capabilities)

GPT
(OpenAI)

Claude
(Anthropic)

Gemini
(Google)

Code-specific models (fine-tuned for coding)

CodeGen
(Salesforce)

CodeLLaMa
(Meta AI,
LLaMa model)

DeepSeek-Coder
(DeepSeek,
DeepSeek model)

Choosing the model

Which model is best for my task?

Choosing the model

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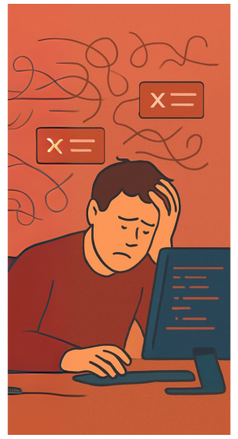
Task type	Best suited models
Complex tasks requiring deep reasoning	o-series, Claude Opus, Gemini Ultra



Choosing the model

Which model is best for my task?

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Complex tasks requiring deep reasoning	o-series, Claude Opus, Gemini Ultra
Simple tasks requiring low latency	o-mini, Gemini Flash

Choosing the model

Which model is best for my task?

Task type	Best suited models
Complex tasks requiring deep reasoning	o-series, Claude Opus, Gemini Ultra
Simple tasks requiring low latency	o-mini, Gemini Flash
General coding tasks	GPT, Claude Sonnet

Let's practice!

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Prompt engineering basics

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What is a prompt?

> ***Prompt:*** *The input or instruction we give to an AI model*

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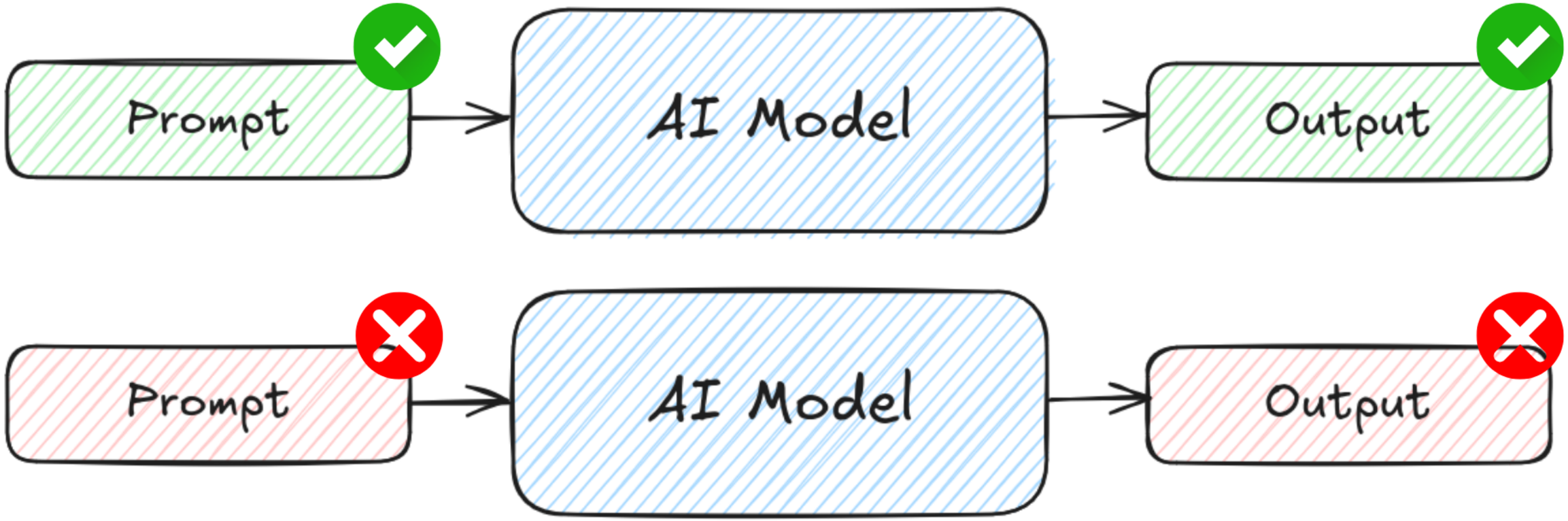

What is a prompt?

Driver: *"Where to?"*

Character: *"Anywhere"*

PROMPT: Vague, unclear for the model

What is a prompt?

Driver: *"Where to?"*

Character: *"Take me to 23 Main Street. Avoid the highway"*

PROMPT: Detailed, clear for the model

Prompt quality

Bad prompt

> "Fix this code"

Good prompt

> "Fix this Python function to handle division by zero errors. Keep the structure the same, and only change the except block"

Prompt quality

☺ Simple prompt

> "Generate a Python function to reverse a string"

Advanced prompt

> "Generate a Python function that reverses a string, handles Unicode characters, and ignores trailing whitespace"

Components of a prompt

PROMPT = **INSTRUCTION** + **CONTEXT** + **CONSTRAINT**

> *Fix this Python function to handle division by zero errors. Keep the structure the same, and only change the except block.*

Components of a prompt

INSTRUCTION

Fix this Python function

CONTEXT

to handle division by zero errors.

CONSTRAINT

Keep the structure the same, and only change the except block.

Let's practice!

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Adding context for smarter AI responses

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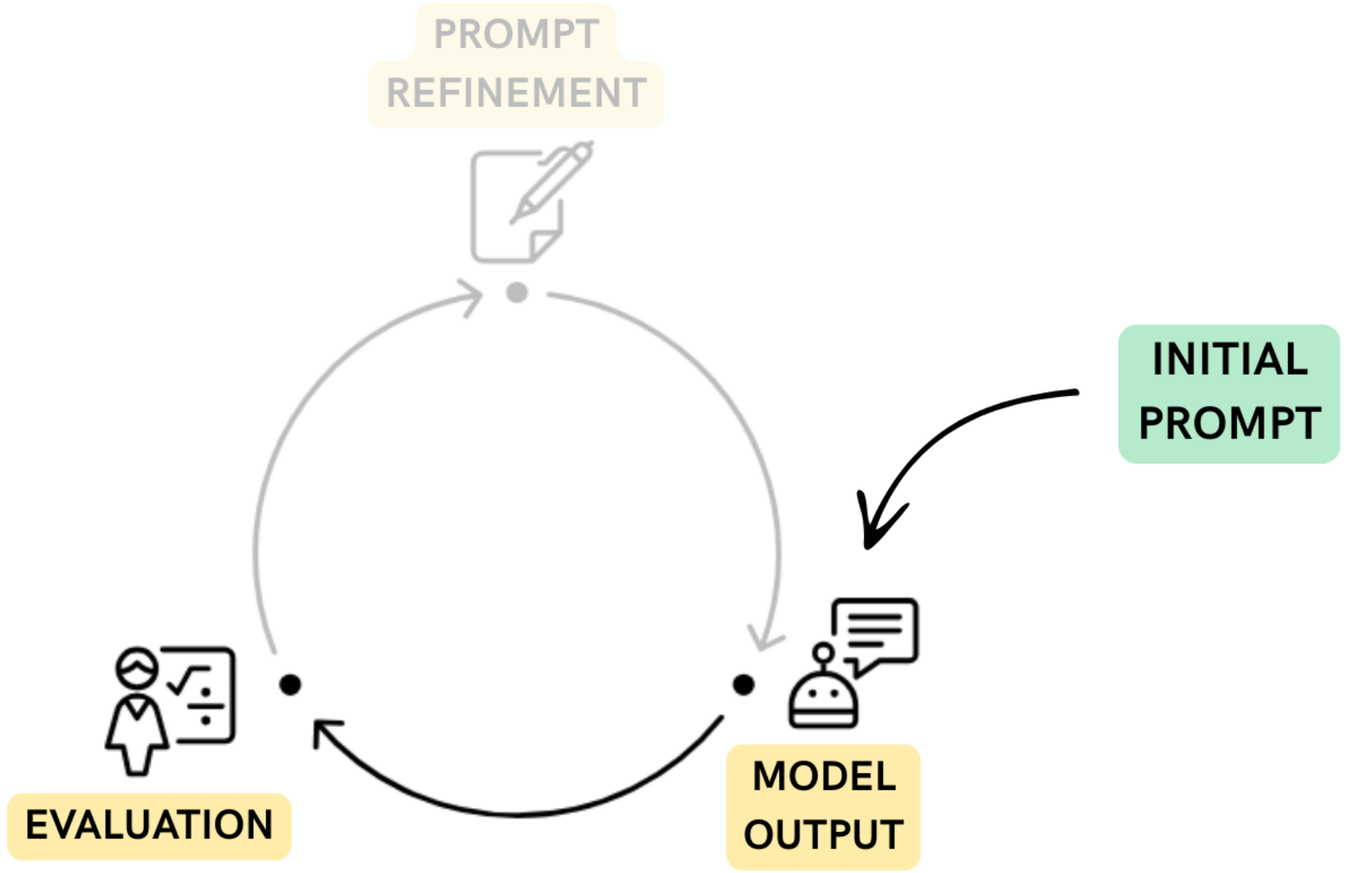
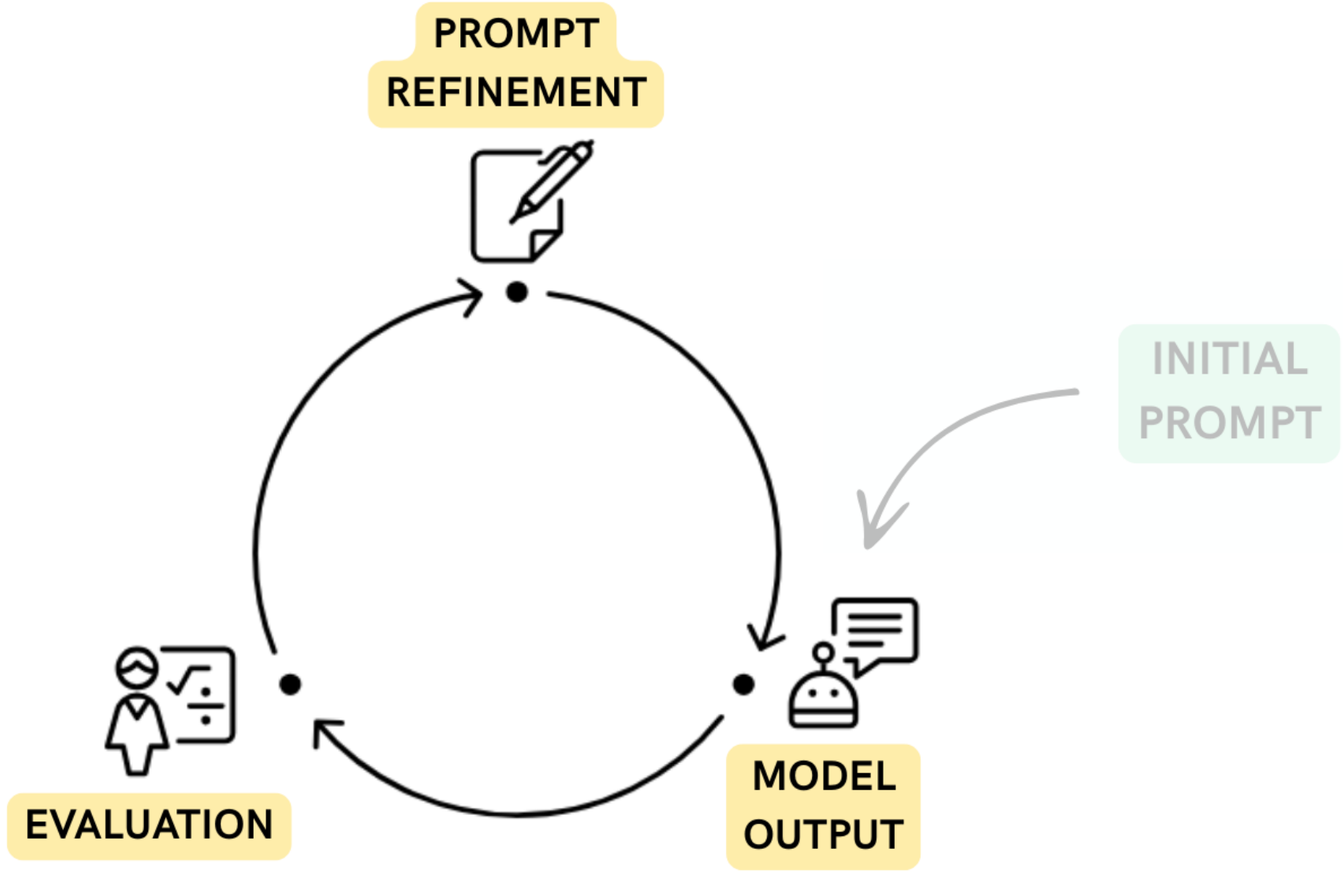
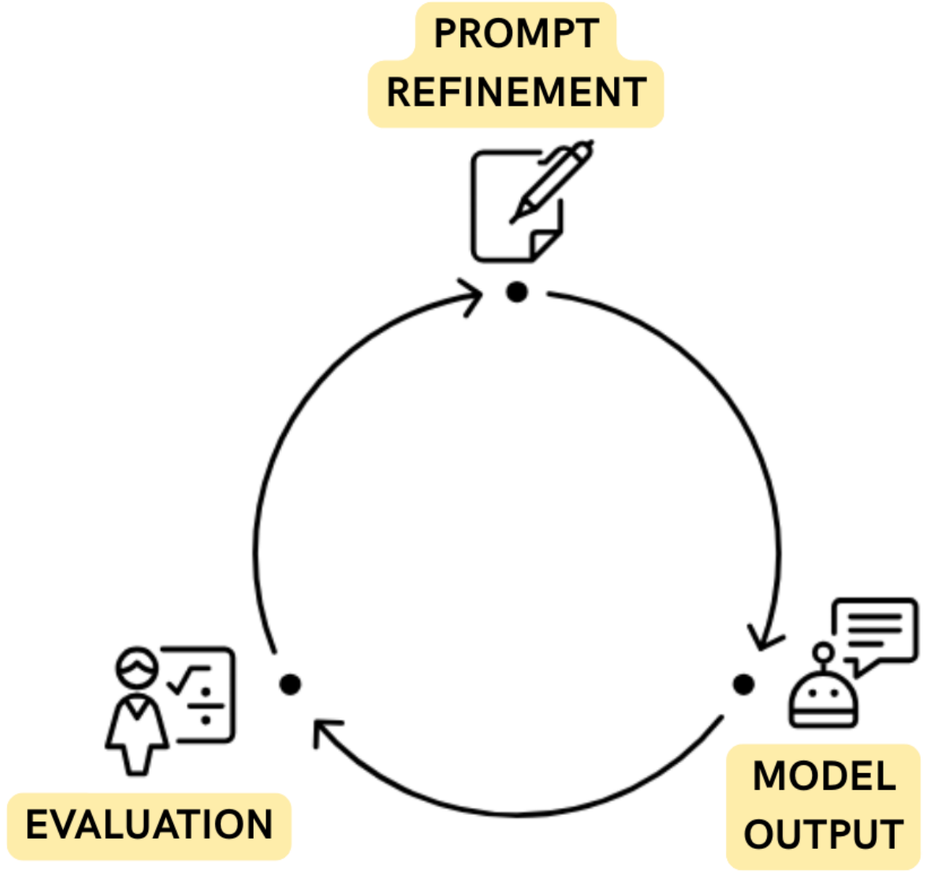
Prompt refinement

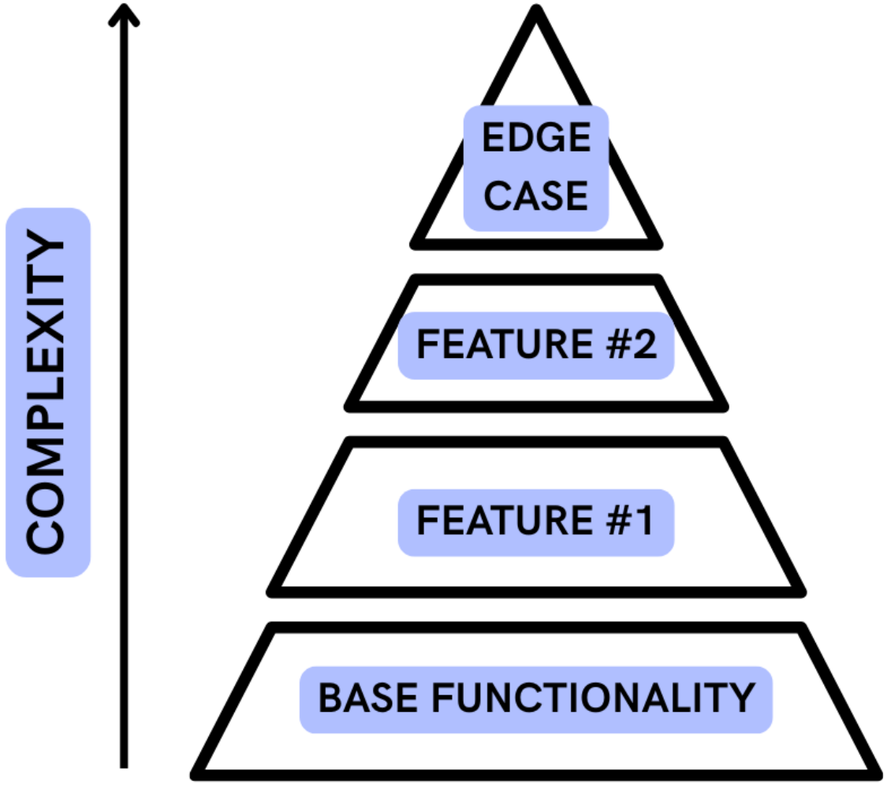


Prompt refinement

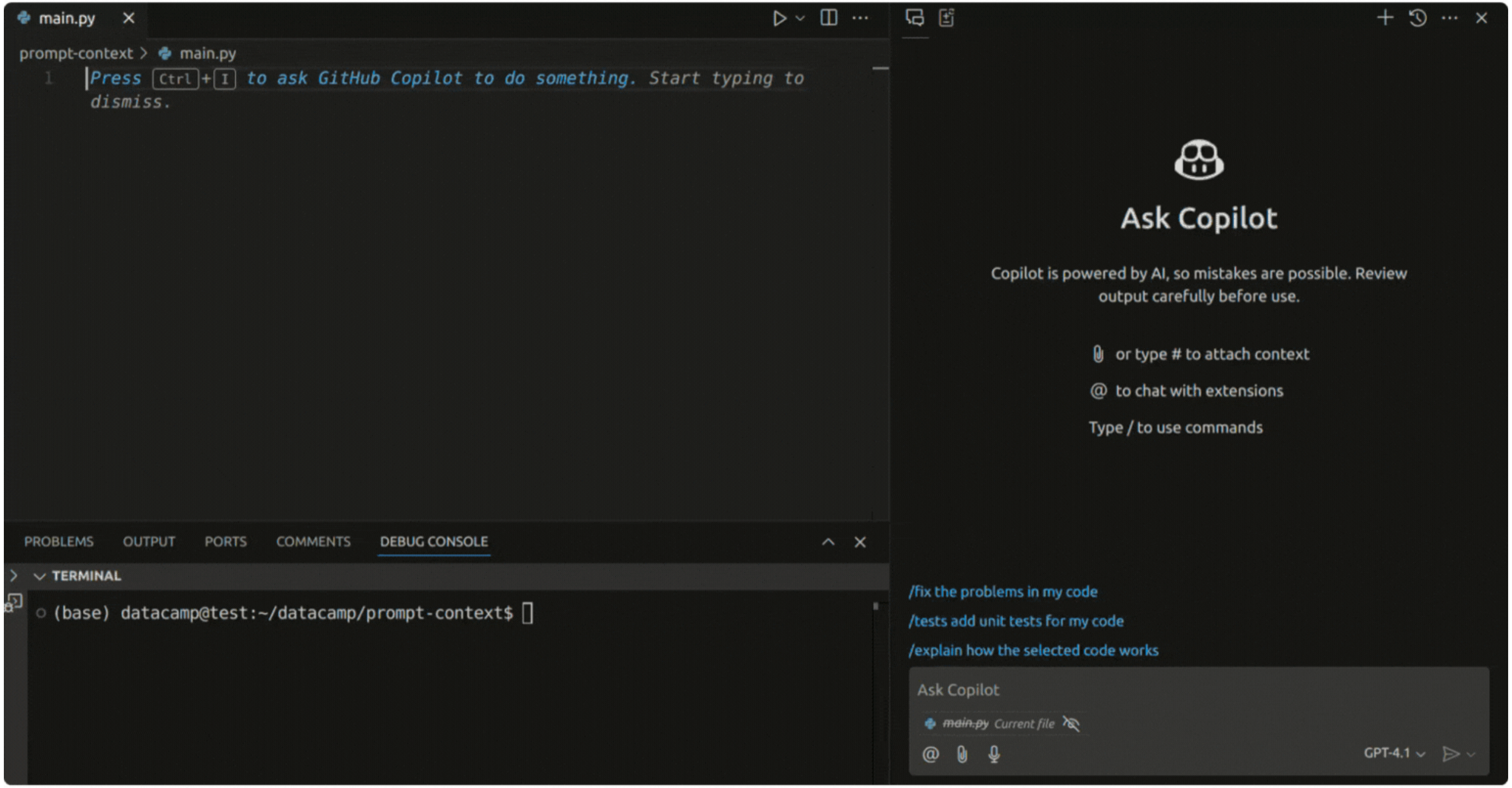


Prompt refinement



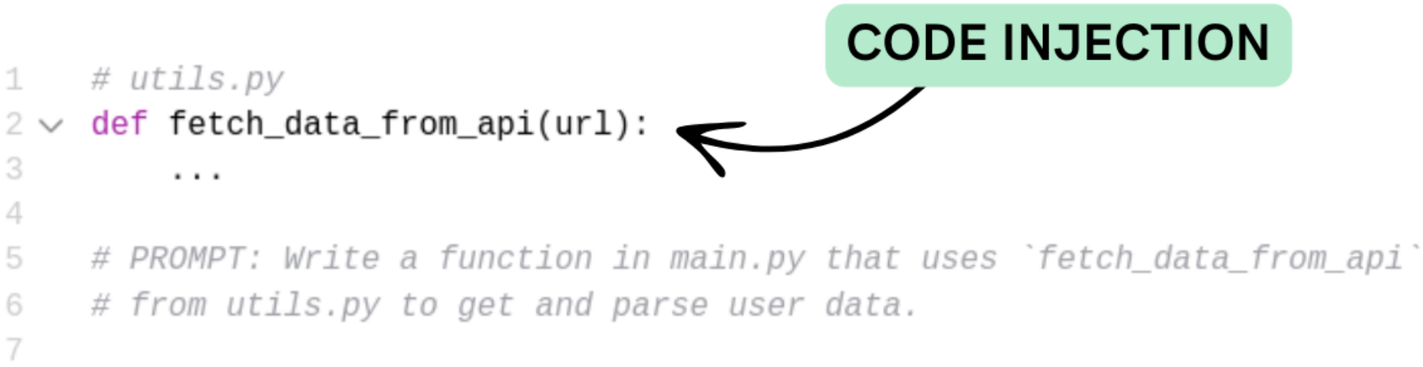


Prompt refinement



Contextual prompting

> *Providing the right context so the model has all the necessary information to complete the task.*



Contextual prompting

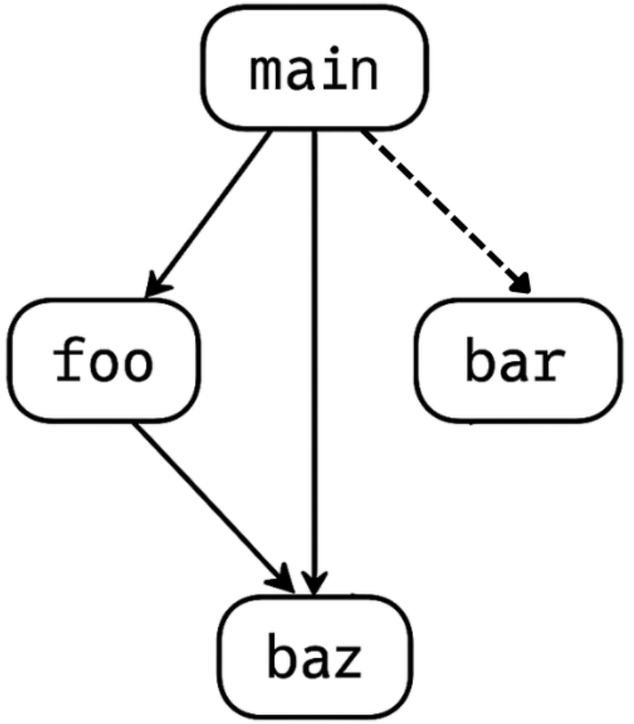
> *Providing the right context so the model has all the necessary information to complete the task.*

CODE INJECTION

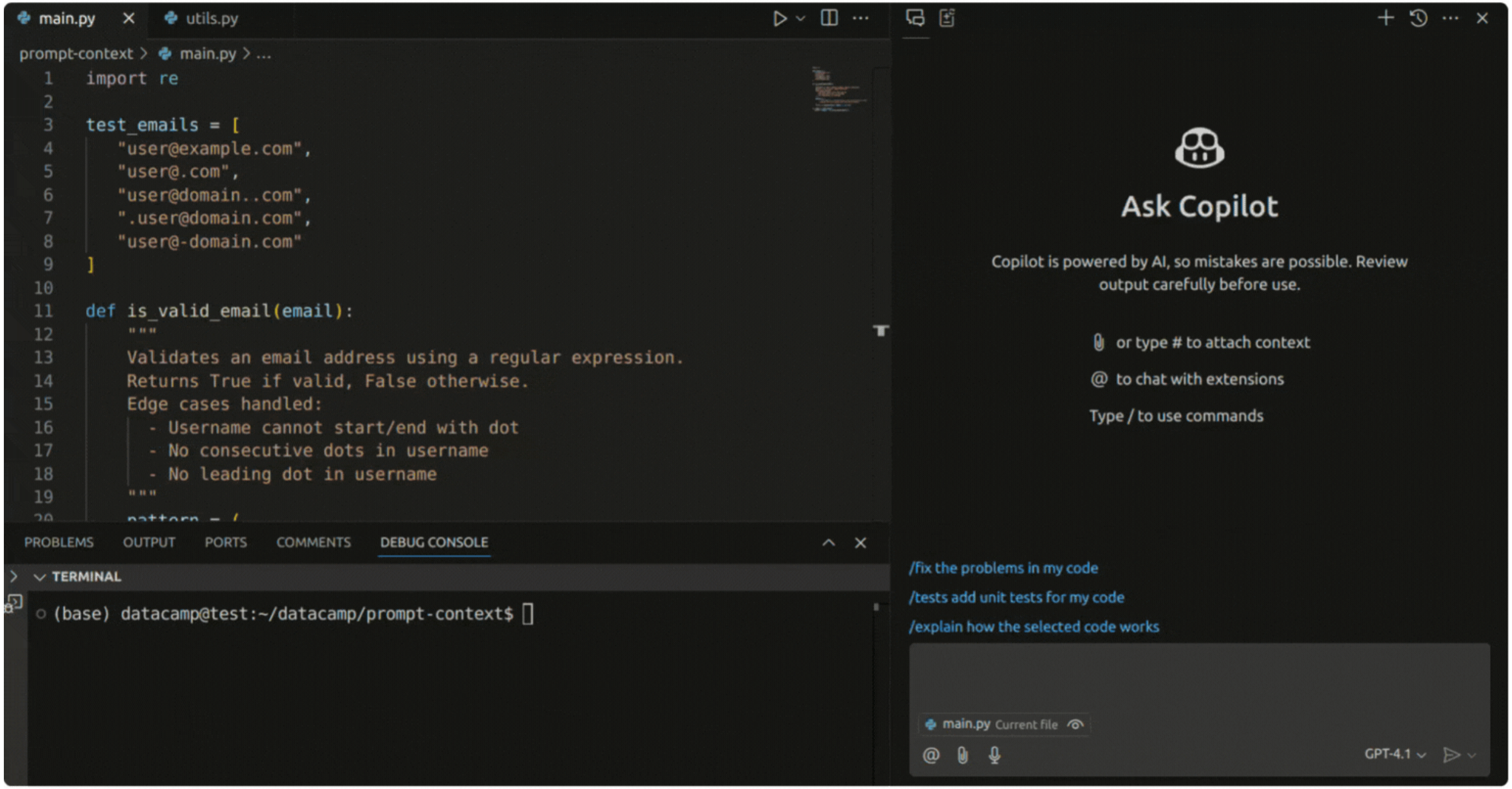
```python
# utils.py
def fetch_data_from_api(url):
    ...

# PROMPT: Write a function in main.py that uses `fetch_data_from_api`
# from utils.py to get and parse user data.
```

CALL GRAPH



Contextual prompting



Contextual prompting

Minimal prompt: "I am getting a ConnectionError in my python script. How can I fix it?"

Model response:

To help you fix the `ConnectionError`, please follow these steps:

1. **Check your internet connection** – Make sure your machine is online.
2. **Verify the URL/host** – Ensure the URL or host you are connecting to is correct and reachable.
3. **Handle exceptions** – Use a `try-except` block to catch and handle `requests.exceptions.ConnectionError` if you are using the `requests` library.
4. **Check firewall/proxy settings** – Ensure your network/firewall/proxy is not blocking the connection.
5. **Update dependencies** – Make sure your libraries (like `requests`) are up to date:

```
pip install --upgrade requests
```

6. **Retry logic** – Implement retry logic for transient errors.

Contextual prompting

Full context: "I am getting the following error in my python script: `<paste error message>` . How can I fix it?"

Model response:

Let's practice!

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