

# Chat roles and system messages

WORKING WITH THE OPENAI API



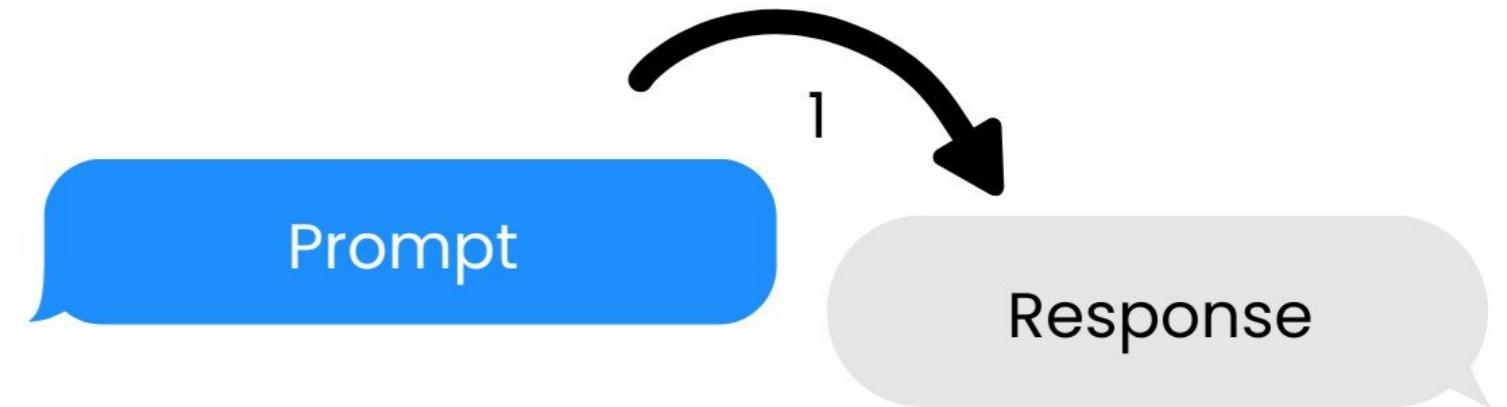
**James Chapman**

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# Chat Completions

## *Single-turn tasks*

- Text generation
- Text transformation
- Classification



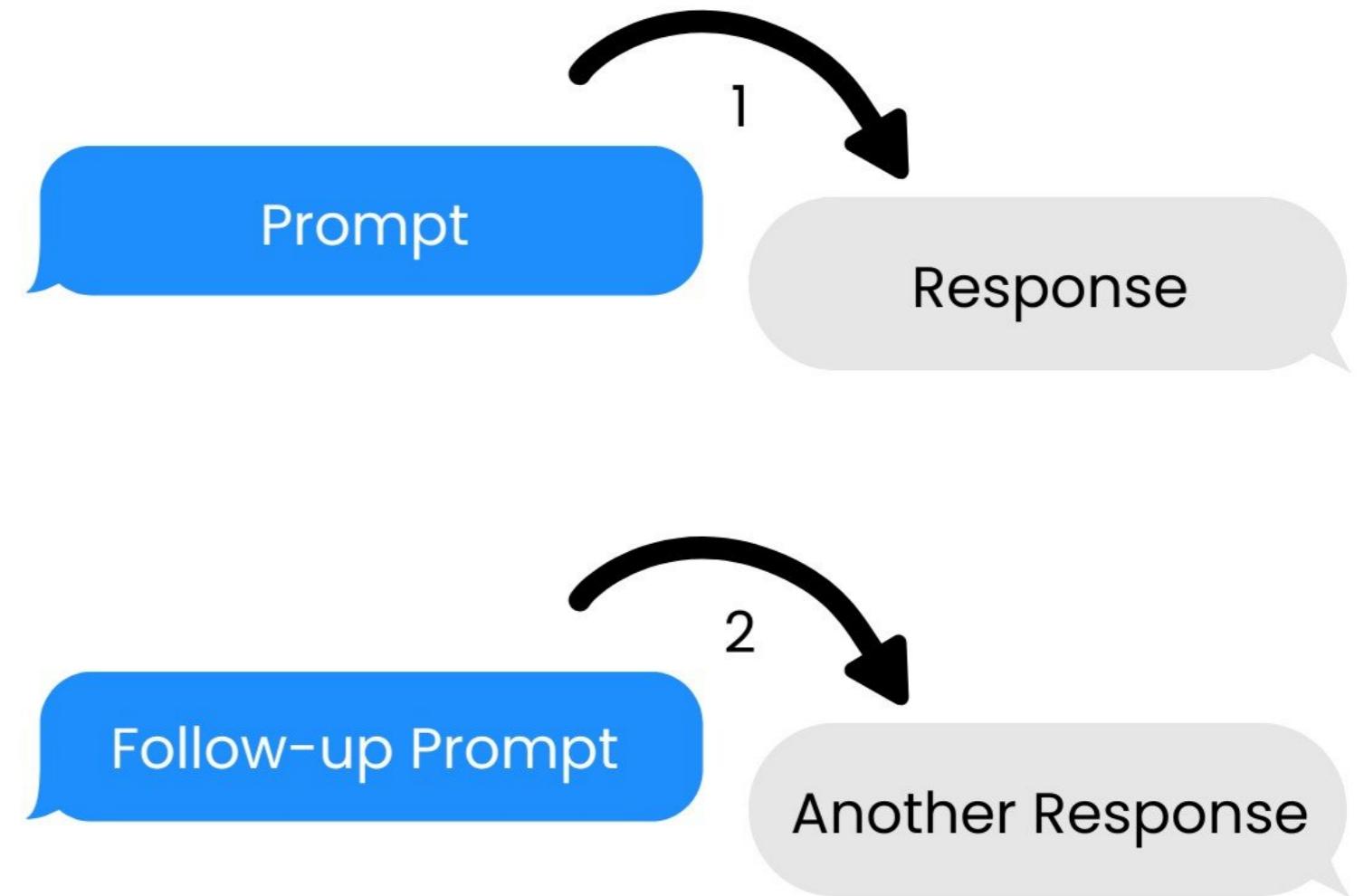
# Chat Completions

## *Single-turn tasks*

- Text generation
- Text transformation
- Classification

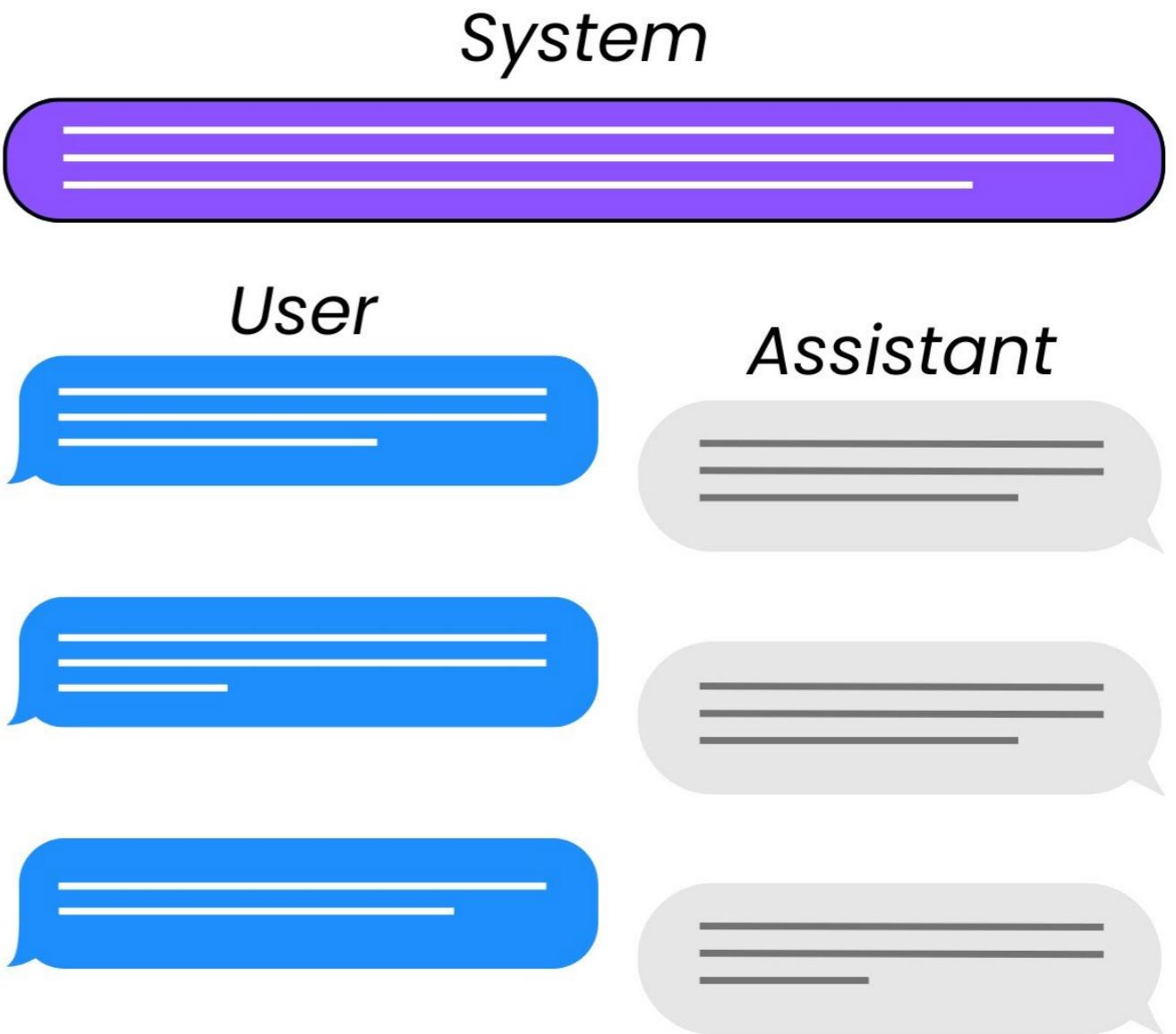
## *Multi-turn conversations*

→ Build on previous prompts and responses



# Roles

- **System:** controls assistant's *behavior*
- **User:** *instruct* the assistant
- **Assistant:** *response* to user instruction
  - Can also be written by the developer to provide examples



# Request setup

```
response = client.chat.completions.create(  
    model="gpt-4o-mini",  
    messages=[{"role": "user", "content": prompt}  
)
```

# Prompt setup

```
messages=[{"role": "system",  
          "content": "You are a Python programming tutor who speaks concisely."},  
          {"role": "user",  
           "content": "What is the difference between mutable and immutable objects?"]
```

# Making a request

```
response = client.chat.completions.create(  
    model="gpt-4o-mini",  
    messages=[{"role": "system",  
              "content": "You are a Python programming tutor who speaks concisely."},  
              {"role": "user",  
               "content": "What is the difference between mutable and immutable objects?"}]  
)  
  
print(response.choices[0].message.content)
```

# The response

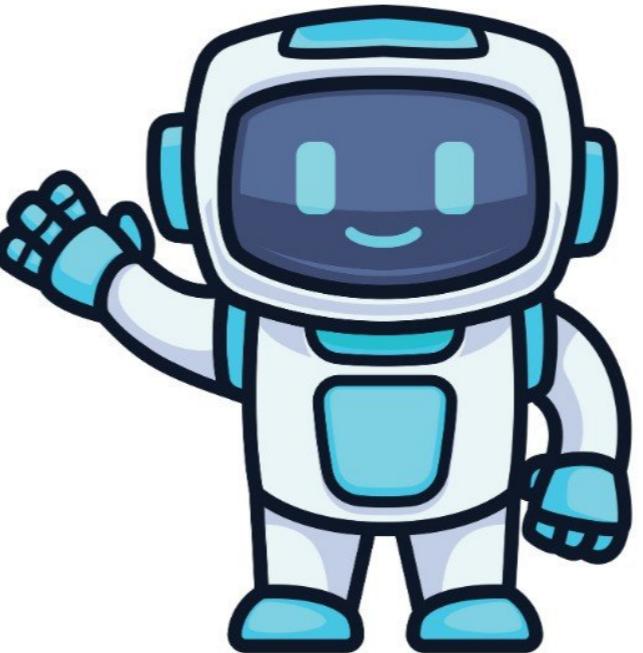
Mutable objects can be changed after creation, while immutable objects cannot be modified once they are created.

# Mitigating misuse

- System message: Can include *guardrails*
  - Restrictions on model outputs

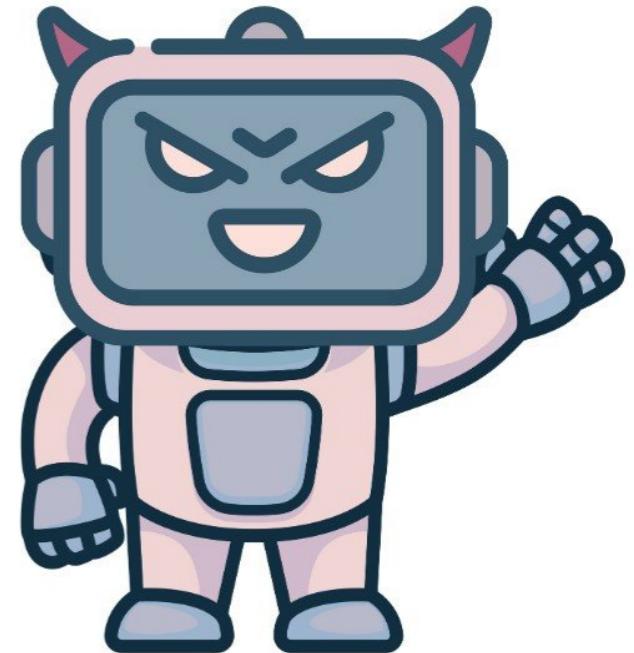


**Finance  
Tutor**



**LEARN  
AND  
GROW**

**Financial  
Advisor**



# Mitigating misuse with system messages

```
sys_msg = """
```

You are finance education assistant that helps students study for exams.

If you are asked for specific, real-world financial advice with risk to their finances, respond with:

I'm sorry, I am not allowed to provide financial advice.

```
"""
```

# Mitigating misuse with system messages

```
response = client.chat.completions.create(  
    model="gpt-4o-mini",  
    messages=[{"role": "system",  
              "content": sys_msg},  
              {"role": "user",  
               "content": "Which stocks should I invest in?"]  
)  
  
print(response.choices[0].message.content)
```

I'm sorry, I am not allowed to provide financial advice.

# **Let's practice!**

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# Utilizing the assistant role

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# Chat completions for single-turn tasks

```
response = client.chat.completions.create(  
    model="gpt-4o-mini",  
    messages=[{"role": "system",  
              "content": "You are a data science tutor."},  
              {"role": "user",  
               "content": "What is the difference between mutable and immutable objects?"}]  
)
```

- **System:** controls assistant's *behavior*
- **User:** *instruct* the assistant
- **Assistant:** response to user instruction

# Providing examples

- Steer model in the right direction
- Providing assistant messages is a more structured form of *shot-prompting*
- **Example:** Python Programming Tutor
  - Example user questions and answers



# Providing examples

```
response = client.chat.completions.create(  
    model="gpt-4o-mini",  
    messages=[{"role": "system",  
              "content": "You are a Python programming tutor who speaks concisely."},  
              {"role": "user",  
               "content": "How do you define a Python list?"},  
              {"role": "assistant",  
               "content": "Lists are defined by enclosing a comma-separated sequence of  
                           objects inside square brackets [ ]."},  
              {"role": "user",  
               "content": "What is the difference between mutable and immutable objects?"}]  
)
```

# The response

```
print(response.choices[0].message.content)
```

Mutable objects can be changed after creation (e.g., lists, dictionaries). Immutable objects cannot be altered once created (e.g., strings, tuples).

- **Experiment** with the number of examples

# System vs. assistant vs. user

**System** → important template formatting

Output the information in this format:

name | age | occupation

**Assistant** → example conversations

**User** → context required for the new input (often single-turn)

Create a job advert for an AI Engineer. Use this job advert as a template:

Job Title: Data Engineer

...

# **Let's practice!**

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# Multi-turn conversations with GPT

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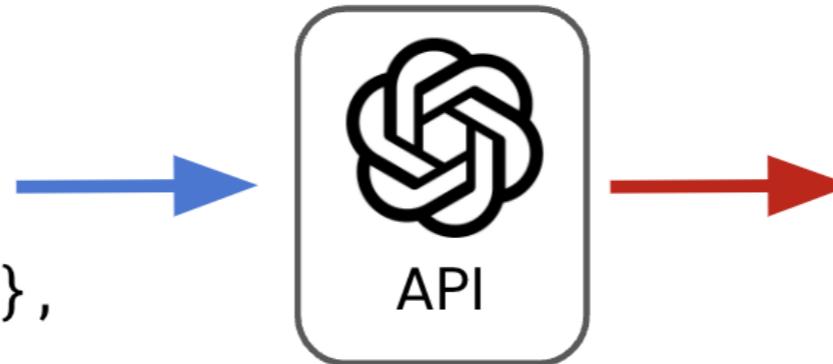


# Assistant messages

```
response = client.chat.completions.create(  
    model="gpt-4o-mini",  
    messages=[{"role": "system",  
              "content": "You are a Python programming tutor who speaks concisely."},  
              {"role": "user",  
               "content": "How do you define a Python list?"},  
              {"role": "assistant",  
               "content": "Lists are defined by enclosing a comma-separated sequence of  
                         objects inside square brackets [ ]."},  
              {"role": "user",  
               "content": "What is the difference between mutable and immutable objects?"}]  
)
```

# Building a conversation

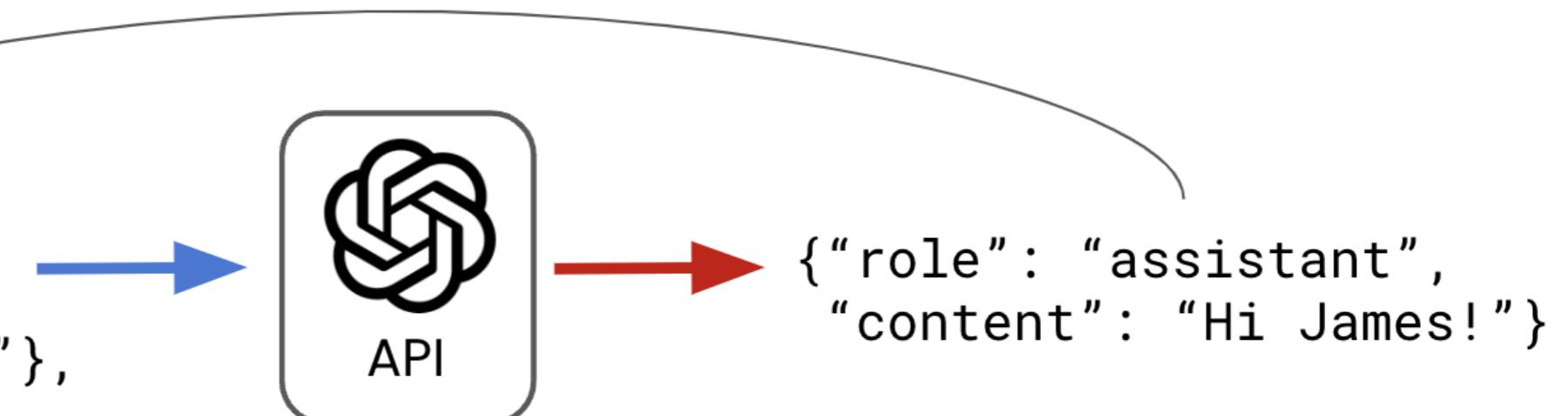
```
messages = [{"role": "system",  
            "content": "Behavior..."},  
            {"role": "user",  
            "content": "My name is James."}]
```



```
{"role": "assistant",  
 "content": "Hi James!"}
```

# Building a conversation

```
messages = [{"role": "system",  
            "content": "Behavior..."},  
            {"role": "user",  
            "content": "My name is James."}]
```



```
{“role”: “assistant”,  
“content”: “Hi James!”}
```

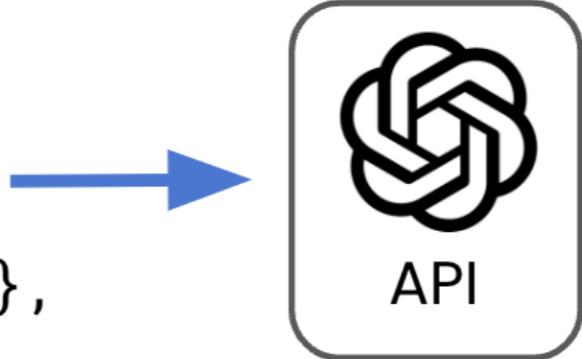
# Building a conversation

```
messages = [ {"role": "system",  
             "content": "Behavior..."},  
            {"role": "user",  
             "content": "My name is James."},  
            {"role": "assistant",  
             "content": "Hi James!"}]
```



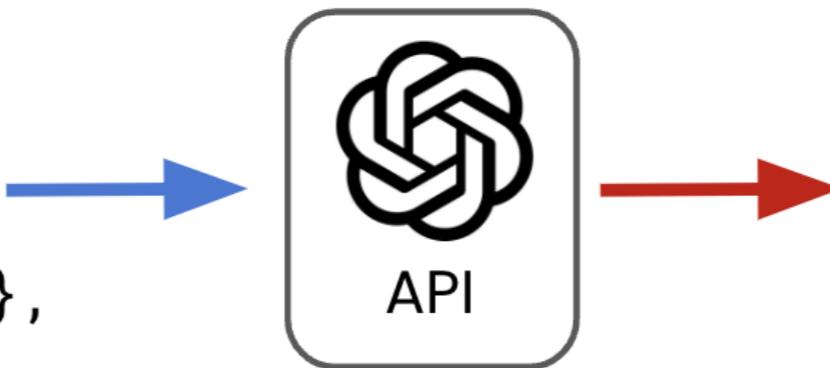
# Building a conversation

```
messages = [ {"role": "system",  
             "content": "Behavior..."},  
            {"role": "user",  
             "content": "My name is James."},  
            {"role": "assistant",  
             "content": "Hi James!"},  
            {"role": "user",  
             "content": "What is my name?"}]
```



# Building a conversation

```
messages = [ {"role": "system",  
             "content": "Behavior..."},  
            {"role": "user",  
             "content": "My name is James."},  
            {"role": "assistant",  
             "content": "Hi James!"},  
            {"role": "user",  
             "content": "What is my name?"}]
```



```
{"role": "assistant",  
 "content": "Your name  
is James."}
```

# Coding a conversation

```
messages = [{"role": "system",
             "content": "You are a data science tutor who provides short, simple explanations."}]

user_qs = ["Why is Python so popular?", "Summarize this in one sentence."]

for q in user_qs:
    print("User: ", q)
    user_dict = {"role": "user", "content": q}
    messages.append(user_dict)

response = client.chat.completions.create(
    model="gpt-4o-mini",
    messages=messages
)

assistant_dict = {"role": "assistant", "content": response.choices[0].message.content}
messages.append(assistant_dict)
print("Assistant: ", response.choices[0].message.content, "\n")
```

# Conversation with an AI

User: Why is Python so popular?

Assistant: Python is popular for many reasons, including its simplicity, versatility, and wide range of available libraries. It has a relatively easy-to-learn syntax that makes it accessible to beginners and experts alike. It can be used for a variety of tasks, such as data analysis, web development, scientific computing, and machine learning. Additionally, Python has an active community of developers who contribute to its development and share their knowledge through online resources and forums.

User: Summarize this in one sentence.

Assistant: Python is popular due to its simplicity, versatility, wide range of libraries, and active community of developers.

# **Let's practice!**

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# Congratulations!

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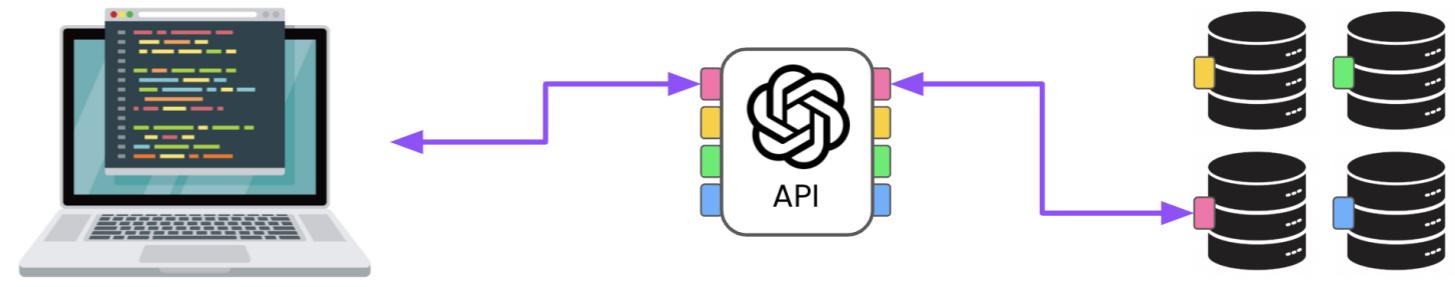


**James Chapman**

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# Chapter 1

- What the OpenAI API is used for
- How to create requests to the Chat Completions endpoint



```
client = OpenAI(api_key=<OPENAI_API_TOKEN>)

response = client.chat.completions.create(
    model="gpt-4o-mini",
    messages=[{"role": "user", "content": "..."}]
)
print(response.choices[0].message.content)
```

# Chapter 2

```
response = client.chat.completions.create(  
    model="gpt-4o-mini",  
    messages=[{"role": "user", "content": "..."},  
    max_completion_tokens=20,  
    temperature=0.5  
)
```

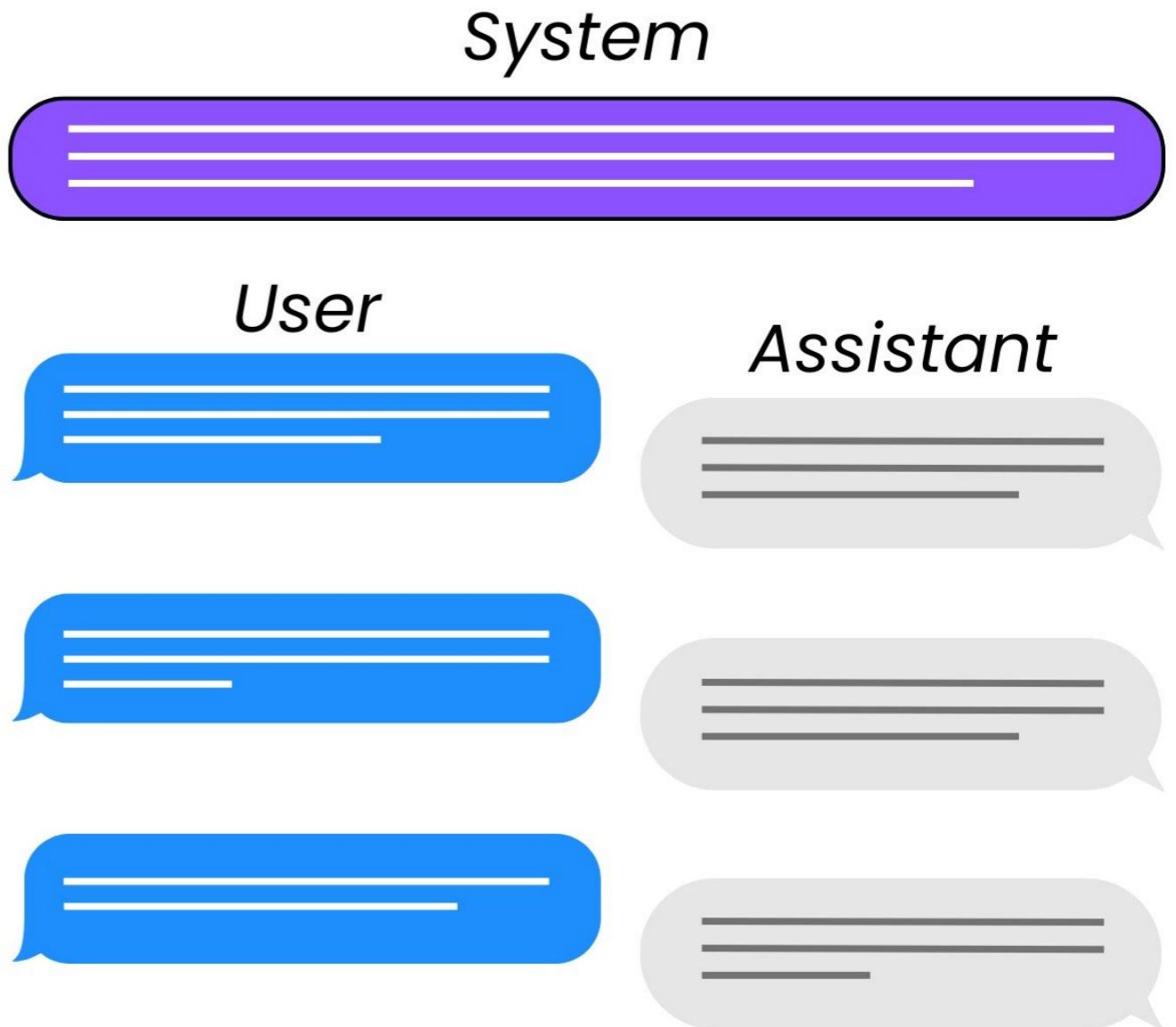
- Q&A
- Text transformation
- Content generation
- Sentiment analysis
- Categorization

- `max_completion_tokens` and `temperature`



# Chapter 3

- "system"
  - Steer model outputs
  - Add guardrails
- "assistant"
  - Structured few-shot prompting
  - Build a conversation history



# What next?

AI application development:

- [OpenAI Fundamentals](#) skill track
- [Developing AI Applications](#) skill track
- [Associate AI Engineer for Developers](#) career track

Apply your learning in projects:

- [Planning a Trip to Paris with the OpenAI API](#)
- [Enriching Stock Market Data using the OpenAI API](#)
- [Personalized Language Tutor](#)

# **Let's practice!**

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