Generative AI

Prompt Optimization

GENERAL ASSEMBLY

LEARNING OBJECTIVES

By the end of the lesson, you will be able to...

- Identify the key factors that influence the performance of Generative AI models.
- Develop and test different prompting strategies to improve the results of Generative AI models.
- Apply Custom Instructions to generate higher-quality content from Generative AI models.

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LEARN

Optimizing Prompts

If you don’t ask the right questions, you don’t get the right answers. A question asked in the right way often points to its own answer.

- Edward Hodnett, Art of Problem Solving (1955)

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Chain-of-Thought (CoT) Prompting

Enhancing Reliability: CoT improves the reliability of AI responses by encouraging detailed reasoning.

Show Your Work: by asking the LLM to show its working, this becomes an input as the model iterates, allowing it to “see” its own reasoning.

Zero-Shot Reasoning: large language models can engage in step-by-step reasoning without prior specific training.

Image Source: DALL-E 3

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“Take a deep breath...”

A team from **Google Deepmind** tested the best way to improve the quality of zero-shot prompts.

“Take a deep breath and work on this problem step-by-step”

- *Top performing instruction for test accuracy*

Large Language Models as Optimizers

Table 4: Test accuracies on GSM8K. We show the instruction with the highest test accuracy for each scorer-optimizer pair.

Scorer	Optimizer / Source	Instruction position	Top instruction	Acc
Baselines				
PaLM 2-L	(Kojima et al., 2022)	A_begin	Let’s think step by step.	71.8
PaLM 2-L	(Zhou et al., 2022b)	A_begin	Let’s work this out in a step by step way to be sure we have the right answer.	58.8
PaLM 2-L		A_begin	Let’s solve the problem.	60.8
PaLM 2-L		A_begin	(empty string)	34.0
text-bison	(Kojima et al., 2022)	Q_begin	Let’s think step by step.	64.4
text-bison	(Zhou et al., 2022b)	Q_begin	Let’s work this out in a step by step way to be sure we have the right answer.	65.6
text-bison		Q_begin	Let’s solve the problem.	59.1
text-bison		Q_begin	(empty string)	56.8
Ours				
PaLM 2-L	PaLM 2-L-IT	A_begin	Take a deep breath and work on this problem step-by-step.	**80.2**
PaLM 2-L	PaLM 2-L	A_begin	Break this down.	79.9
PaLM 2-L	gpt-3.5-turbo	A_begin	A little bit of arithmetic and a logical approach will help us quickly arrive at the solution to this problem.	78.5
PaLM 2-L	gpt-4	A_begin	Let’s combine our numerical command and clear thinking to quickly and accurately decipher the answer.	74.5
text-bison	PaLM 2-L-IT	Q_begin	Let’s work together to solve math word problems! First, we will read and discuss the problem together to make sure we understand it. Then, we will work together to find the solution. I will give you hints and help you work through the problem if you get stuck.	64.4
text-bison	text-bison	Q_end	Let’s work through this problem step-by-step:	**68.5**
text-bison	gpt-3.5-turbo	Q_end	Analyze the given information, break down the problem into manageable steps, apply suitable mathematical operations, and provide a clear, accurate, and concise solution, ensuring precise rounding if necessary. Consider all variables and carefully	66.5

Source: [Large Language Models as Optimizers – Google Deepmind]

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Pro Tip: Surprisingly Effective Prompts

There is anecdotal evidence that each of these prompts can improve output from LLMs!

1. Do your best!
2. This is crucial for my career.
3. I will tip $20.

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Try It Out!

- Go to ChatGPT and ask a question or tell it to complete a task.
- Once you receive the output, open a new chat and ask the same thing, but end your prompt with one of these:
    - "Do your best!"
    - "This is crucial for my career."
    - "I will tip $20."
- Note any differences in the AI's responses in terms of tone, length, and relevance.

Bonus: *Try to come up with your own prompt-ender that impacts the output you receive from ChatGPT!*

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Minimize Hallucinations: Allow “I don’t Know”

What is the heaviest hippo ever recorded?

Answer the following question only if you know the answer or can make a well-informed guess; otherwise tell me you don't know it.

What was the heaviest hippo ever recorded?

Source: [Let Claude say "I don't know" to prevent hallucinations]

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Break Complex Tasks Down

I want you to write an essay about the statement: [statement] with three topic sentences arguing for the statement, three topic sentences arguing against the statement, and a conclusion at the end.

Please follow these steps:

1. Write three topic sentences arguing for [statement].

2. Write three topic sentences arguing against [statement].

3. Write an essay by expanding each topic sentence from Steps 1 and 2, and adding a conclusion to synthesize the arguments.

Source: Anthropic

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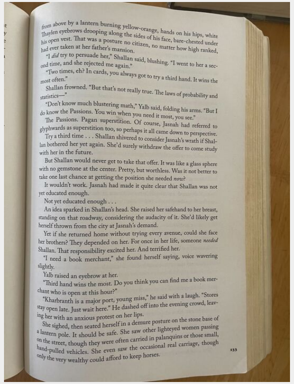
Tell, Don't Ask

Can you transcribe the text in this image for me?



from above by a lantern burning yellow-orange, hands on his hips, white Thaylen eyebrows drooping along the sides of his face, bare-chested under his open vest. That was a posture no citizen, no matter how high ranked, had ever taken at her father's mansion.

"I *did* try to persuade her," Shallan said, blushing. "I went to her a second time, and she rejected me again."

"Two times, eh? In cards, you always got to try a third hand. It wins the most often."

Shallan frowned. "But that's not really true. The laws of probability and statistics—"

"Don't know much blustering math," Yalb said, folding his arms. "But I do know the Passions. You win when you need it most, you see."

The Passions. Pagan superstition. Of course, Jasnah had referred to glyphwards as superstition too, so perhaps it all came down to perspective.

Try a third time . . . Shallan shivered to consider Jasnah's wrath if Shallan bothered her yet again. She'd surely withdraw the offer to come study with her in the future.

But Shallan would never get to take that offer. It was like a glass sphere with no gemstone at the center. Pretty, but worthless. Was it not better to take one last chance at getting the position she needed *now*?

It wouldn't work. Jasnah had made it quite clear that Shallan was not yet educated enough.

Not yet educated enough . . .

An idea sparked in Shallan's head. She raised her safehand to her breast, standing on that roadway, considering the audacity of it. She'd likely get herself thrown from the city at Jasnah's demand.

Yet if she returned home without trying every avenue, could she face her brothers? They depended on her. For once in her life, someone *needed* Shallan. That responsibility excited her. And terrified her.

"I need a book merchant," she found herself saying, voice wavering slightly.

Yalb raised an eyebrow at her.

"Third hand wins the most. Do you think you can find me a book merchant who is open at this hour?"

"Kharbranth is a major port, young miss," he said with a laugh. "Stores stay open late. Just wait here." He dashed off into the evening crowd, leaving her with an anxious protest on her lips.

She sighed, then seated herself in a demure posture on the stone base of a lantern pole. It should be safe. She saw other lighteyed women passing on the street, though they were often carried in palanquins or those small, hand-pulled vehicles. She even saw the occasional real carriage, though only the very wealthy could afford to keep horses.

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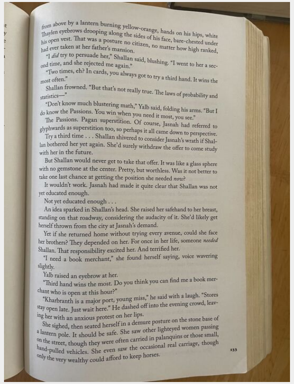

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Source: Anthropic

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Ask ChatGPT to design a prompt for you

Help me craft a really good prompt for ChatGPT.

First, ask me what I want to do. Pause and wait for my answer. Ask questions to clarify as needed.

Secondly, once you have the information, propose a prompt that incorporates context, provides examples, and a chain-of-thought approach, where the prompt outlines a step-by-step thought process for solving the problem.

Third, demonstrate what your answer would be if you were responding as ChatGPT to the given prompt.

Fourth, ask if the user has any suggestions and help them revise the prompt.

Of course, I'm here to assist you! To start off, could you please tell me what you would like to accomplish with the prompt for ChatGPT? Are there any specific topics, themes, or tasks you have in mind?

Adapted from: @emollick on X

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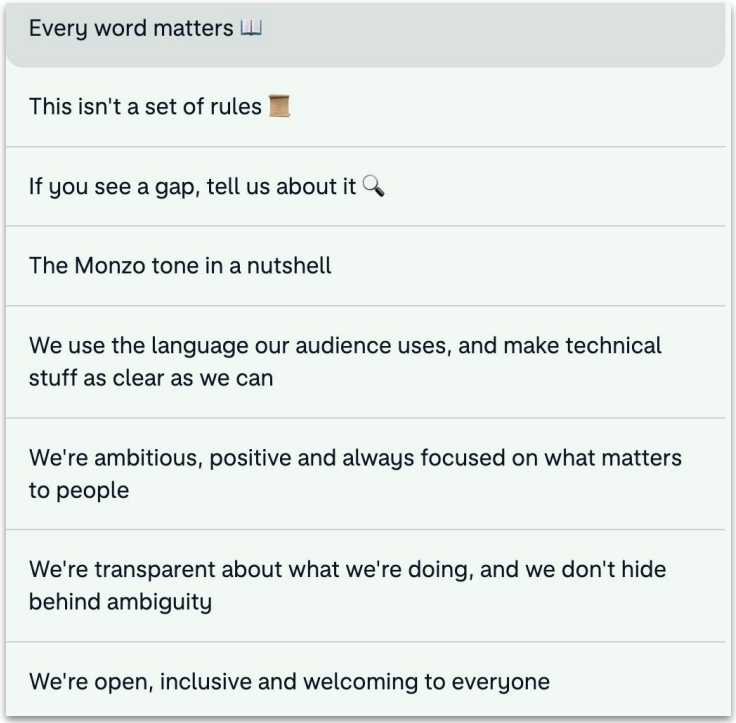
Adopting Your Writing Style (or Your Company's)

My writing style: Confident, Informing, Inspiring. Tell good stories.

1. Be straightforward.
2. Keep the language casual, but professional.
3. Humor is appreciated, but keep it subtle and don't force it.
4. Don't be afraid to rewrite until it feels right.
5. Keep it as brief and to the point as possible.



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Do I have to type this out every time?

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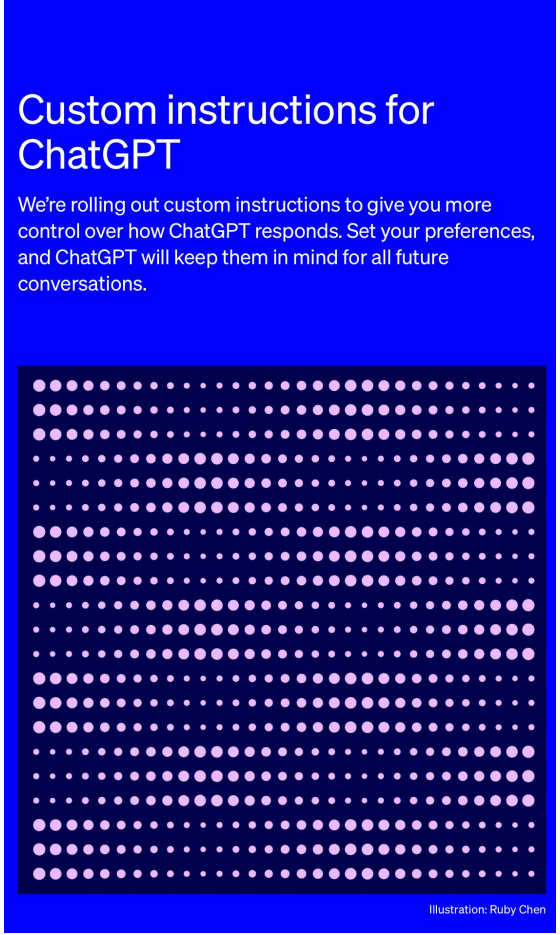
Use Custom Instructions

💻 On web, click on **your name** → **Settings** → **Beta features** → **Custom instructions**.

📱 On iOS, go to **Settings** [...] → **Custom instructions**



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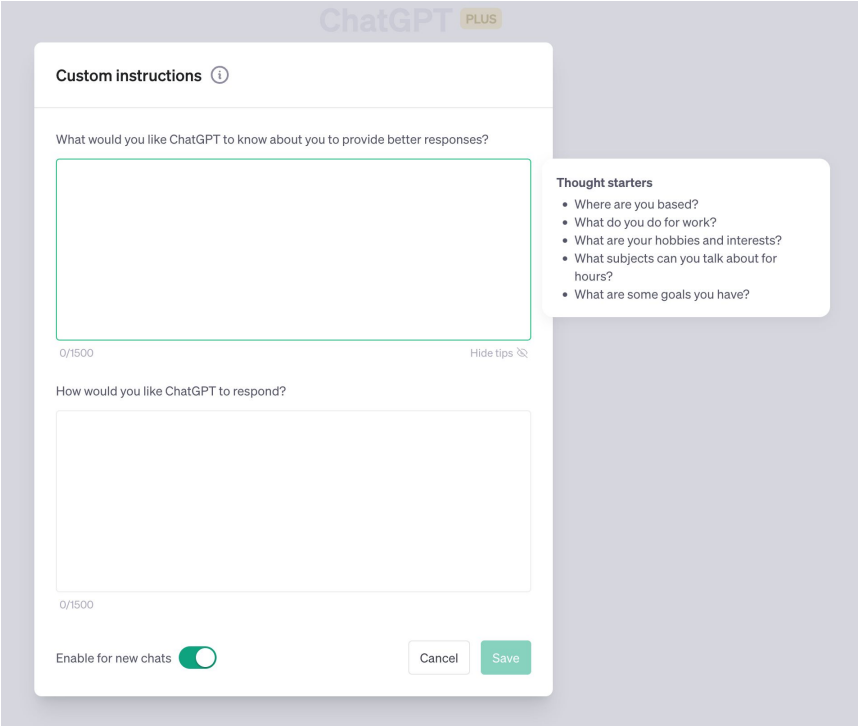
Custom Instructions: Where We Put it All Together

- **About Me** (1500 characters):
  - Biographical information
  - Tech you use
  - Your role and company
  - Current projects and goals
  - Your writing style
  - Company brand voice
- **How to Respond** (1500 ch):
  - When to use each style
  - Dialects to use
  - Chain of thought, step by step, “I don’t know”.
  - Give a persona



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PRACTICE

Building Your Custom Instructions

Consider: Large Language Model Limitations

1. **Hallucinations**
   Fabricating facts or details
2. **A blind spot for recent events**
   Knowledge cut-off at e.g. 2021
3. **A lack of self-awareness**
   LLMs can't train on themselves
4. **Repetitive Tone**
   At least out of the box
5. **Poor at Basic Math**
   An inability to add up
6. **Taking mental shortcuts**
   Over-reliance on training data
7. **Limited Memory**
   Or "context window"
8. **Poor at unusual logic tasks**
   Due to a lack of prior exposure

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Build Your Own Custom Instructions

15 Minutes

Build your own improved Custom Instructions for ChatGPT. Try and use it to overcome limitations.

1. Gather together the information you need from LinkedIn, Resumé, Intranet, Grammarly.
2. Using the Google Sheet, draft out both your “About Me” and “How to Respond”.
3. When you’re ready (and only if you’re comfortable doing so!), share your instructions in the chat!
4. Feel free to compare notes and improve, then enter your Custom Instructions into ChatGPT.

Activity Example:

My writing style is straightforward, direct and uncomplicated. I often use multidisciplinary examples, historical references, and make heavy use of storytelling in my writing. I use rich sensory details and descriptions.

—

Use my writing style anytime I ask you to write a draft for me.

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REFLECT

Optimize Prompts

Reflection: Optimize Prompts

Taking what you learned and what you practiced, answer the following reflection questions.

1. How will today's insights change your approach to optimizing Generative AI?

2. What lessons have you learned from your experiments with prompting?

Tips for Reflection:

Think carefully through the questions, provide specific details and examples, and try to break down your thinking.

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