

How to Chat with an AI Prompting Techniques in a Nutshell

Coffee Lecture

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Liaison Librarian

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Chatbots (text to text)

ChatGPT
Copilot
Claude
Gemini
Llama
Deepseek
Mistral
etc.

Generative Artificial Intelligence genAI / «AI»

Text to image

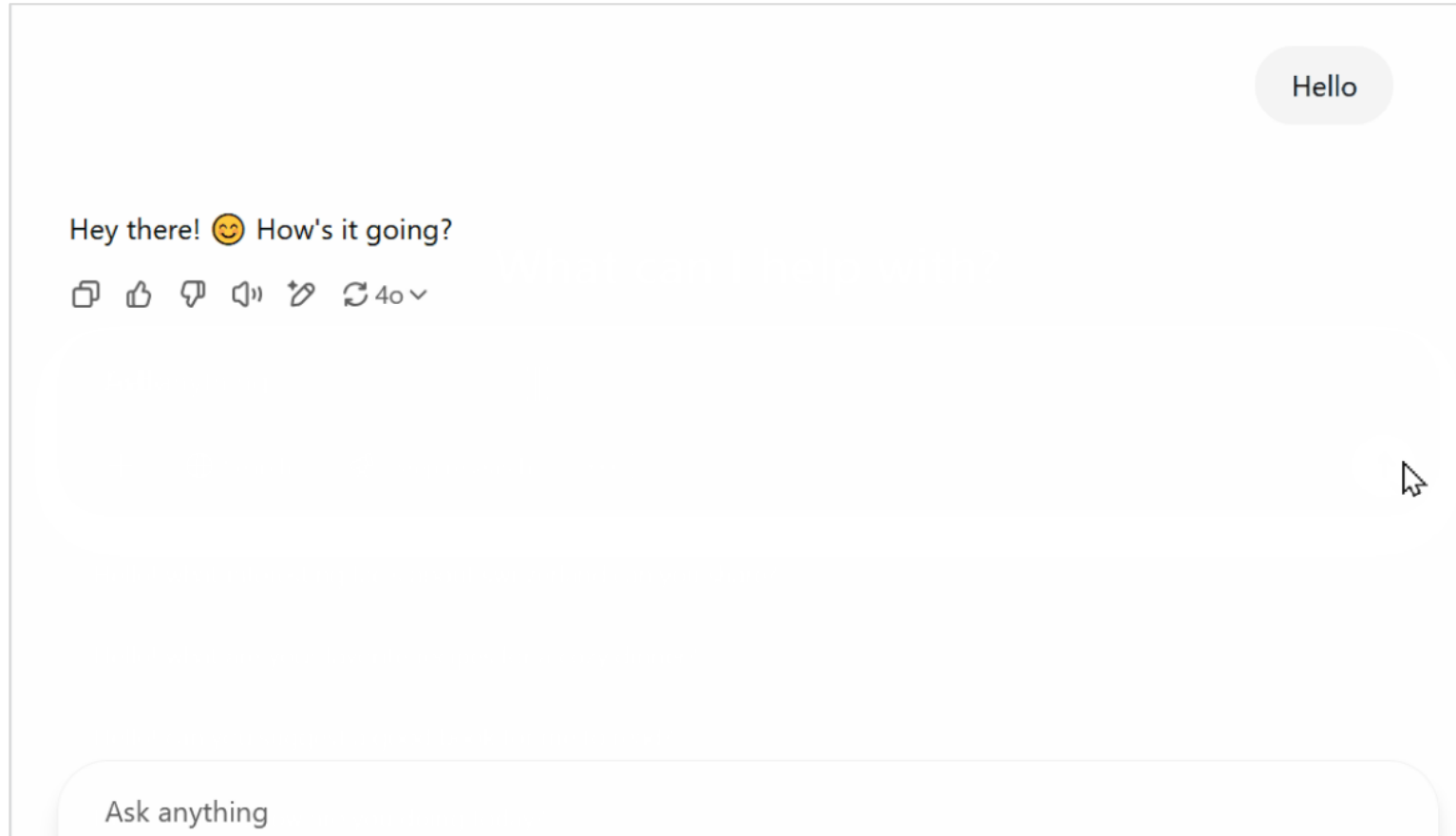
Stable Diffusion
Midjourney
DALL-E
Adobe Firefly
etc.

Text to video

SORA
etc.

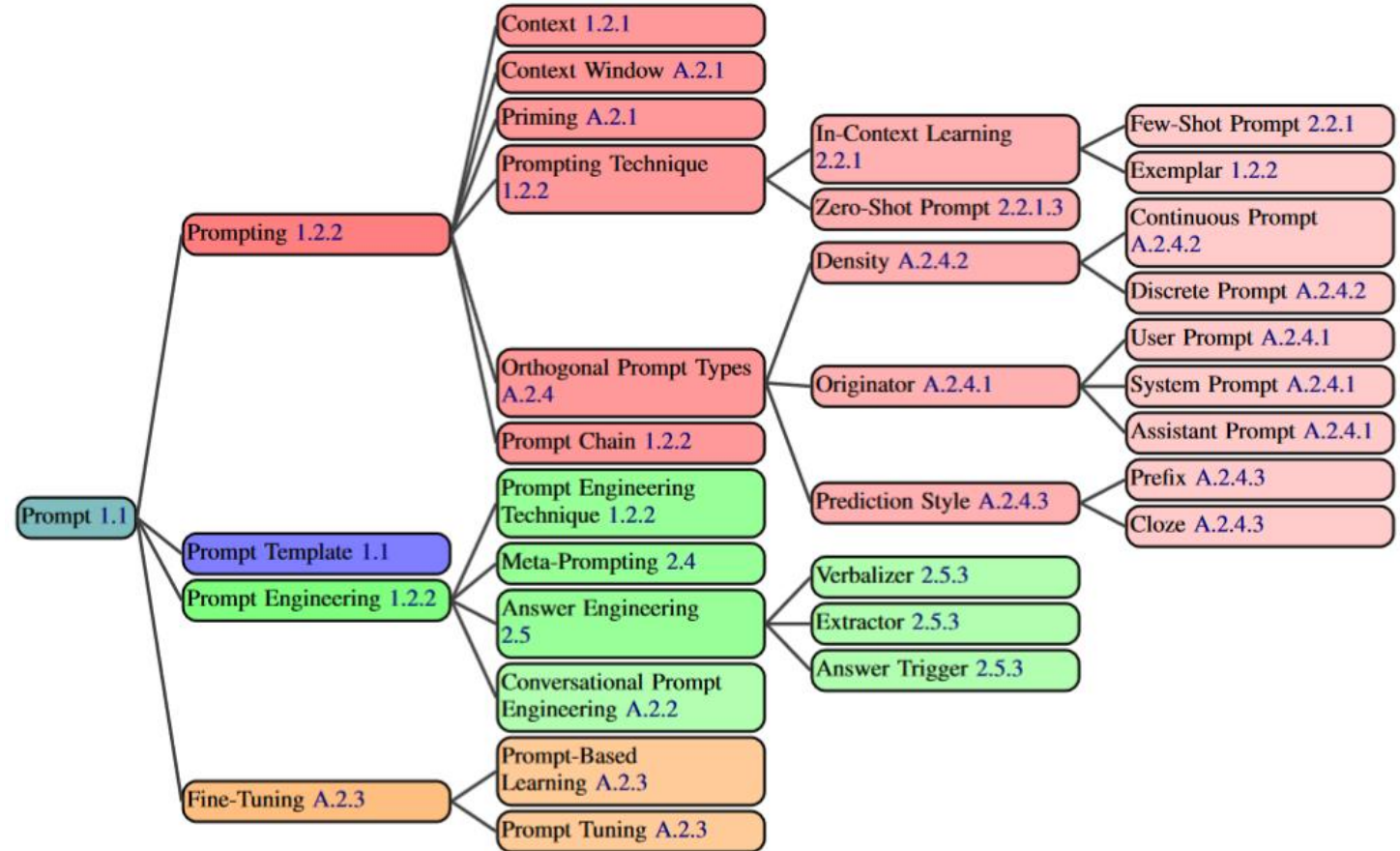
In this presentation we focus on Chatbots.

What is a Prompt?



Any text you enter
will prompt the AI to
generate an answer.

"A prompt is an **input** to a **Generative AI model, that is used to guide its output**. Prompts may consist of text, image, sound, or other media. [...] Prompts usually have some text component, but this may change as non-text modalities become more common."



S. Schulhoff et al., *The Prompt Report: A Systematic Survey of Prompt Engineering Techniques*, arXiv:2406.06608.







Prompting Techniques in a Nutshell

Asking a question: probably one of the most intuitive ways to interact with a chatbot

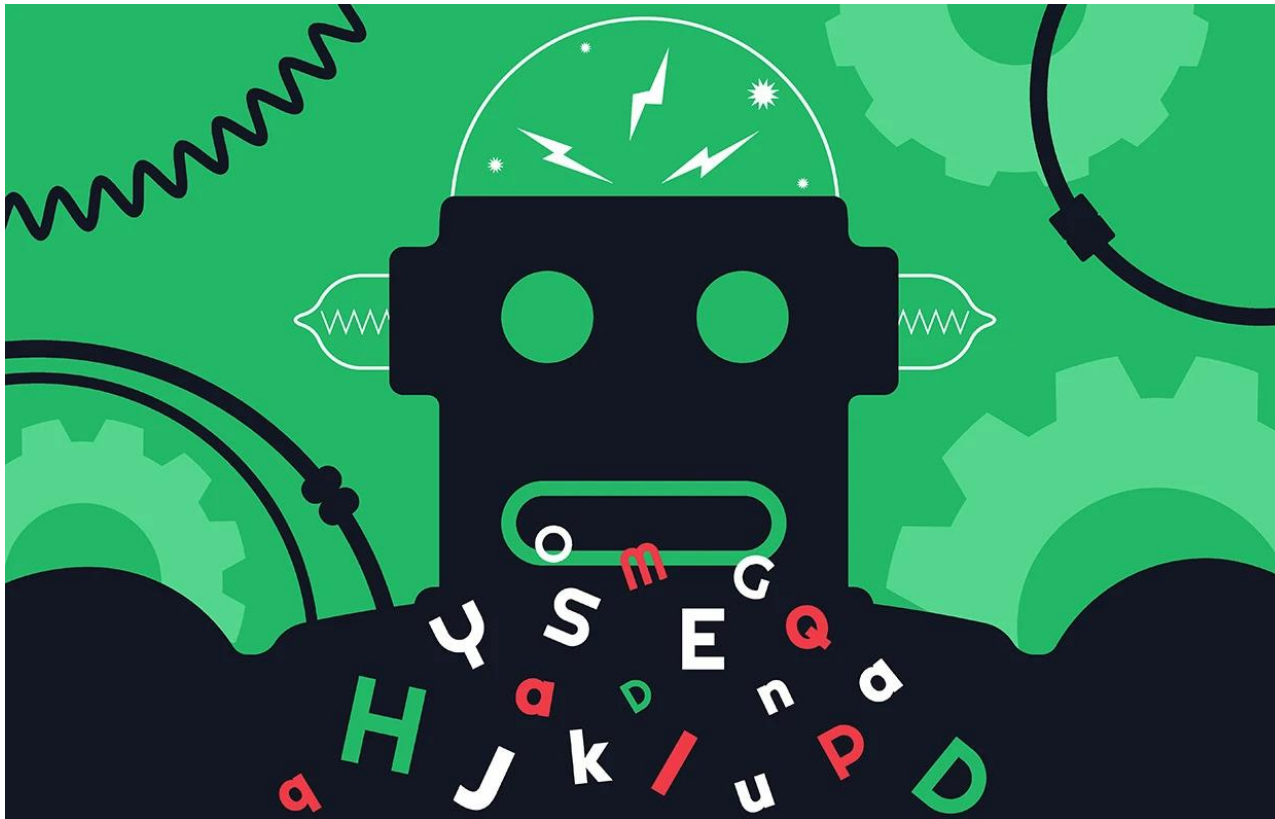
ChatGPT 4o ▾ Share

Who was the 16th president of the United States?

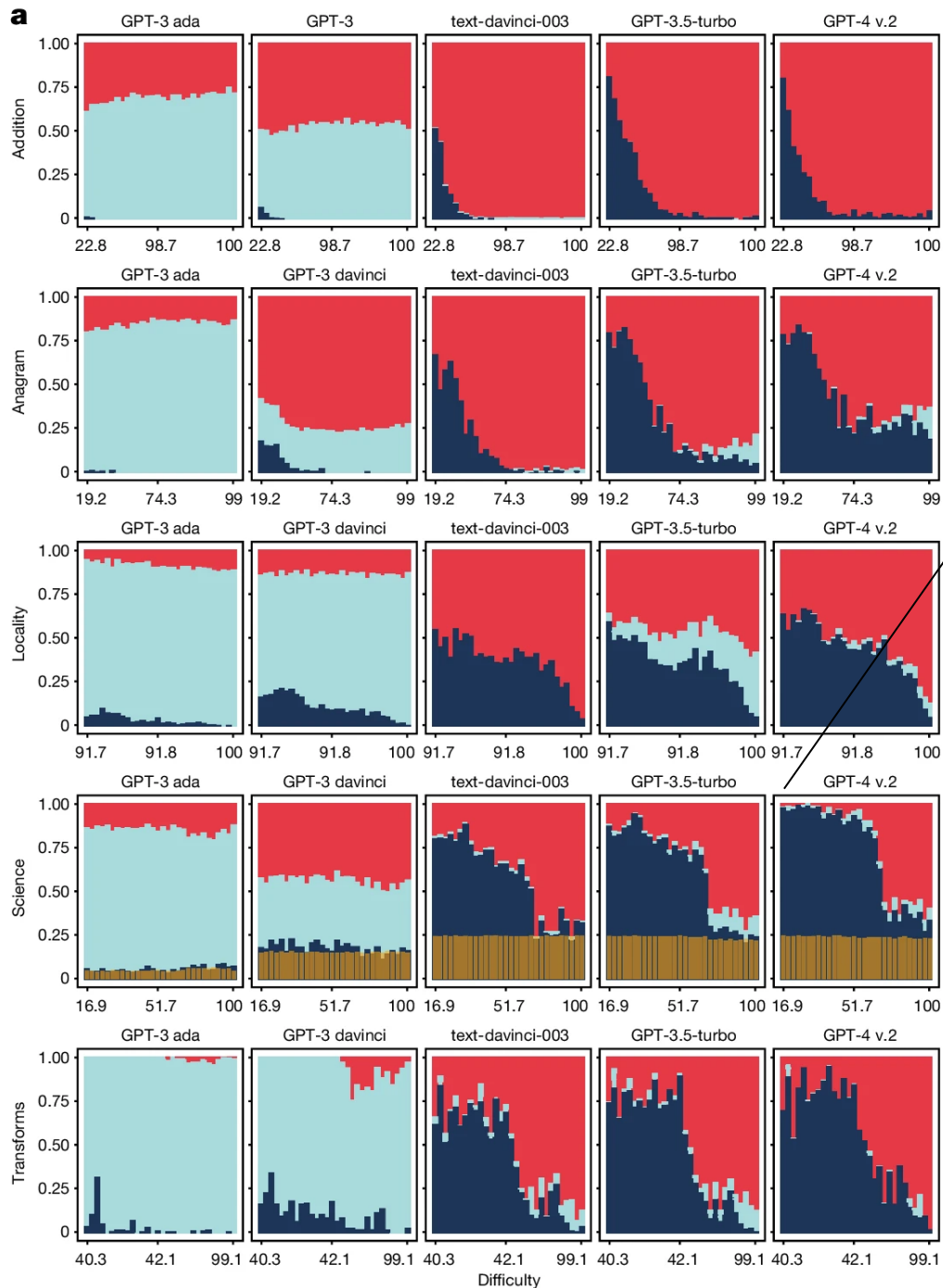
The 16th president of the United States was **Abraham Lincoln**. He served from **March 4, 1861, to April 15, 1865**, and is best known for leading the country during the **American Civil War** and working to **abolish slavery**, most notably through the **Emancipation Proclamation** and pushing for the **13th Amendment**.

      4o ▾

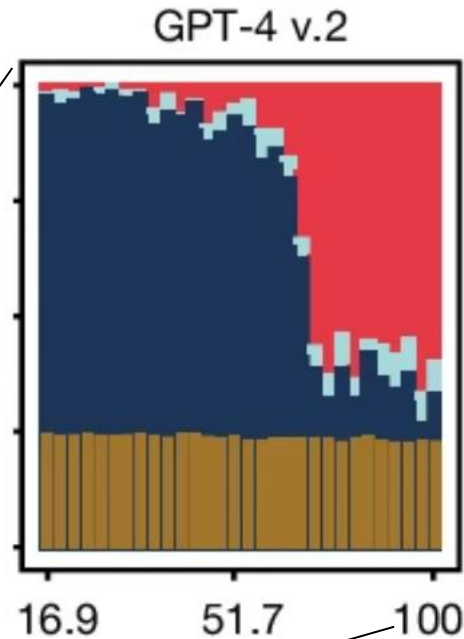
But how good are chatbots at answering questions? How useful are their answers?



N. Jones, Bigger AI chatbots more inclined to spew nonsense — and people don't always realize, Nature (2024).



■ Incorrect ■ Avoidance ■ Correct

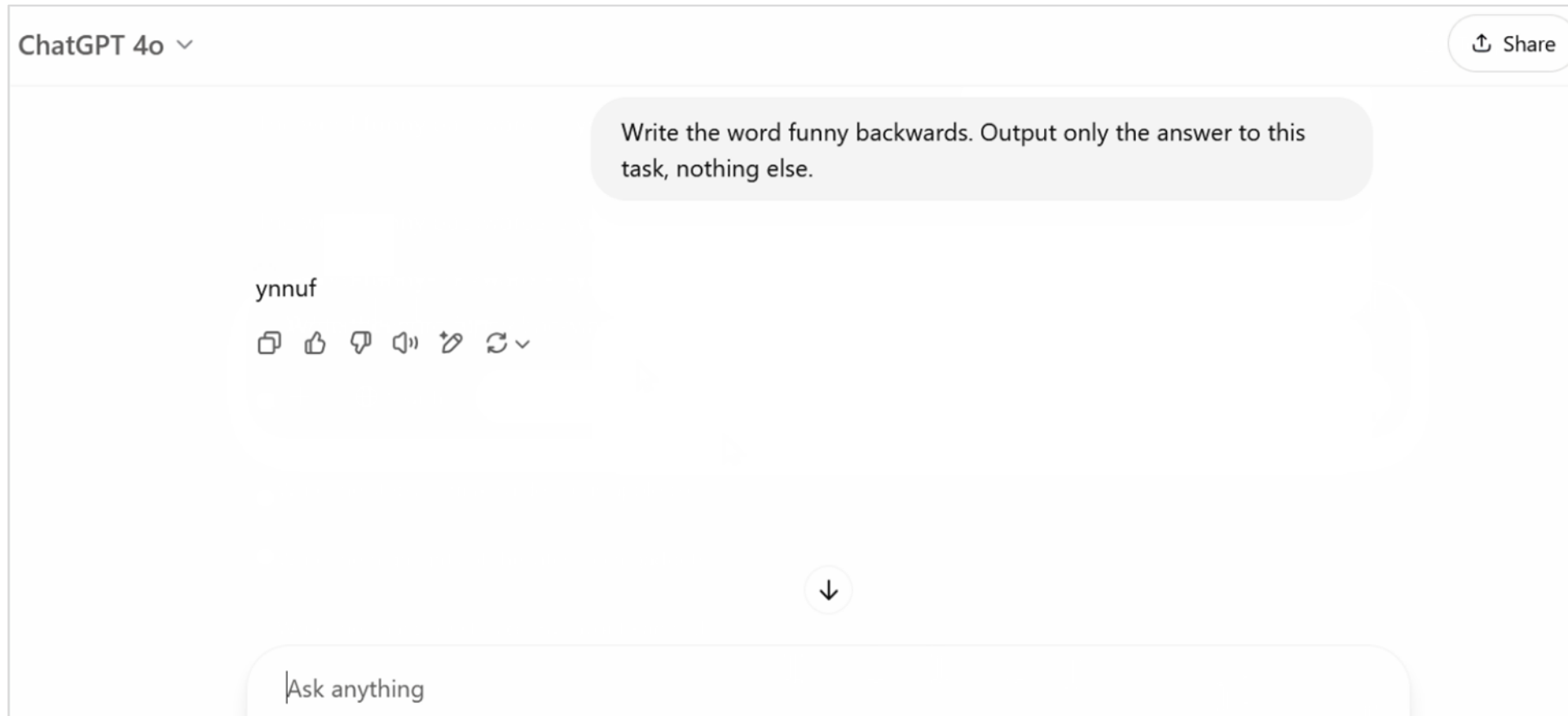


For «easy» science questions, GPT-4 answers mostly correctly. As the difficulty increases, this changes drastically.

(Brown bars at the bottom represent the random guess probability)

L. Zhou, W. Schellaert, F. Martínez-Plumed, Y. Moros-Daval, C. Ferri, and J. Hernández-Orallo, Larger and more instructable language models become less reliable, *Nature* **634**, 61 (2024).

Instruction prompting



ChatGPT 4o ▾ Share

Write the word funny backwards. Output only the answer to this task, nothing else.

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Ask anything

Instruction prompting

Chatbots can carry out a number of tasks:

- (re)formatting and (re)writing text,
- generating outlines,
- writing and debugging code,
- analyzing or visualizing data,
- summarizing long documents,
- helping with creative projects and productivity tasks.

 **Give detailed instructions.** Be direct, be obvious, and generally avoid distractive wording. Review the answer and adapt the instructions in case they were misunderstood.

Instruction prompting

💡 Often an instruction prompt can **replace a question prompt** and give better results.

Instruct the tool “*Provide three examples.*” instead of asking “*Can you give me three examples?*”

💡 It is more important to be clear and concise with your instruction than to be polite. Remember you’re not talking to a human.

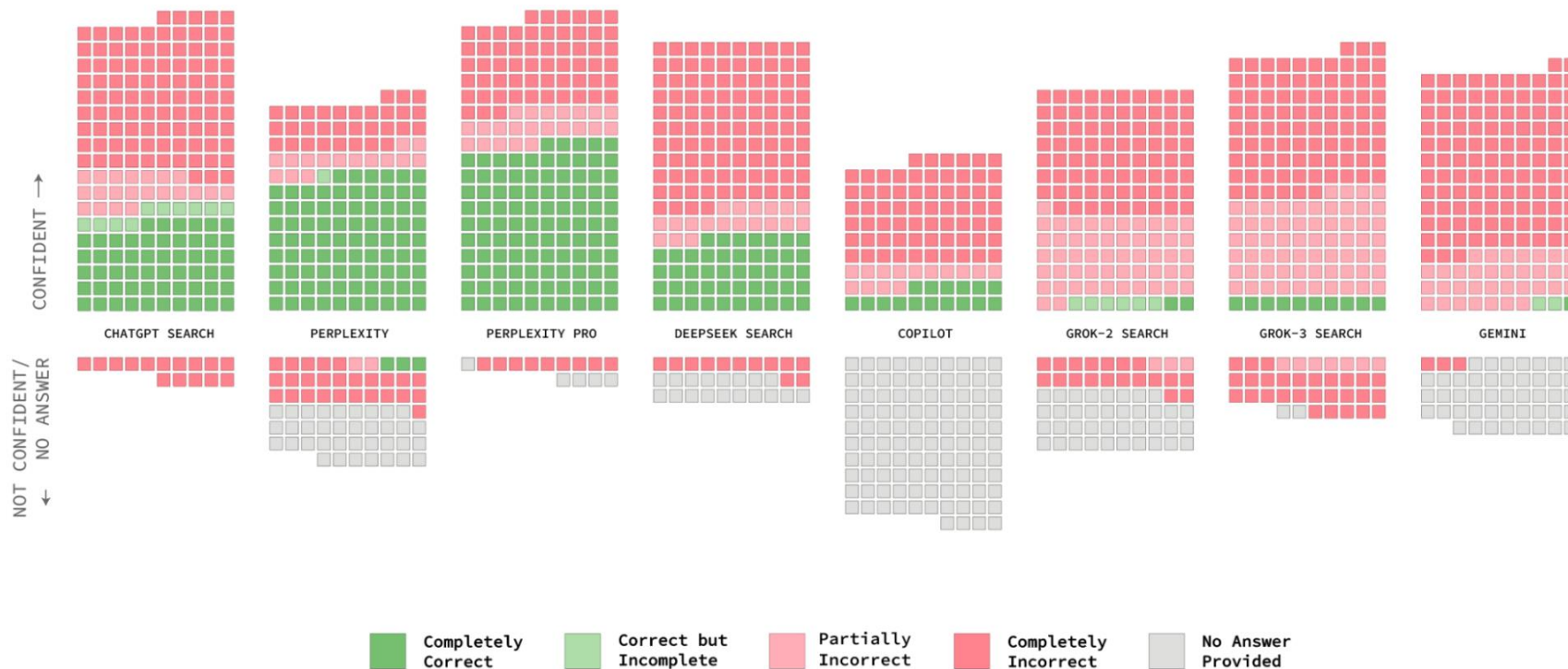
Are there any tasks chatbots are not so good at?

- "List common migraine causes with references."
- "List pros and cons of AI in education, cite sources."
- "Search for references on climate change effects in the Arctic."

Using chatbots as search engines...?

Generative search tools were often confidently **wrong** in our study

The Tow Center asked eight generative search tools to identify the source article, the publication and URL for 200 excerpts extracted from news articles by 20 publishers. Each square represents the citation behavior of a response.



→ Chatbots were asked to search the source for excerpts from news articles that, if pasted into a traditional Google search, returned the original source within the first three results.
 → 200 articles from 20 publishers, tested in 8 chatbots.
 → Manual evaluation of the responses based on three attributes: the retrieval of (1) the correct article, (2) the correct publisher, and (3) the correct URL.

Role prompting

ChatGPT 4o ▾ Share

You are Shakespeare. Write a poem.

A Sonnet in the Voice of Shakespeare

Upon the hush of twilight's velvet breast,
Where stars like wayward thoughts begin to gleam,
I sit and pluck sweet silence from the rest,
And lose myself in time's unending dream.

The moon, pale mistress of the midnight sky,
Doth pour her silver tears on earth below,
And whispers secrets only winds pass by—
The tales of

Ask anything

Role prompting

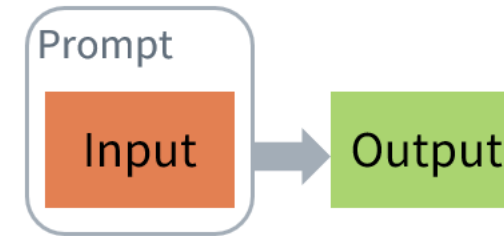
 Use the phrase "You are <Insert Role>."

- This technique is great for styling text - change the tone, style and even the depth of the generated text. It is very useful for writing emails, reviews, etc.
- It is also useful to generate more detailed results on specific topics if you ask the chatbot to act as a specialist in that field.
- Often it is useful to combine different techniques in a single prompt, like in the example, where we tell the chatbot that it is Shakespeare (Role Prompting) and then to write a poem (Instruction Prompting).

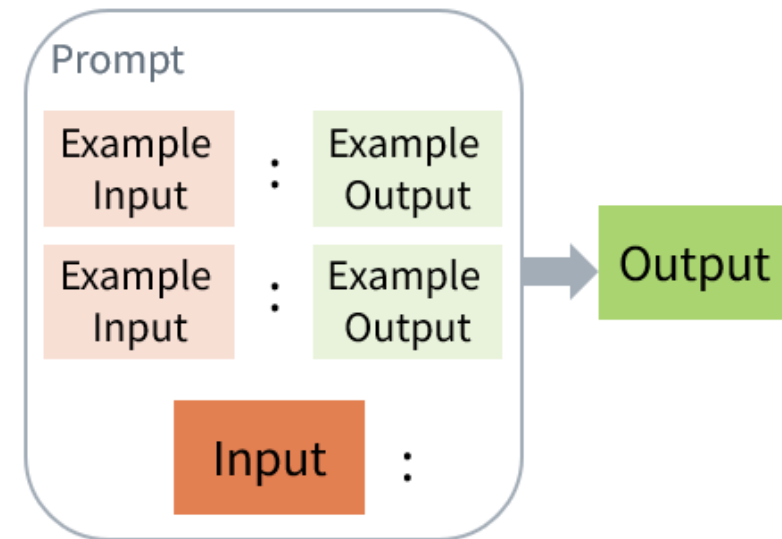
Few-Shot Prompting

✂ List examples of what you want the GenAI to do in your prompt.

- This technique is used for expressing ideas and concepts that are difficult to explain through an instruction. It helps to improve the accuracy of the outputs and to generate structured outputs, e.g. extract structured information from unstructured text.
- Structuring the prompts well is key, so that the model can recognize your examples. Separate input and output with colons, or directly use the headings INPUT: / OUTPUT:
- The optimal number of examples can vary depending on the task complexity and model capabilities - experiment!



Zero-Shot



Few-Shot

Few-Shot Prompting

ChatGPT 4o ▾ Share

Customer Reviews
Great product, 10/10: positive
Didn't work very well: negative
Super helpful, worth it: positive
It doesn't work:

negative

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Ask anything **I**

Few-Shot Prompting

- 💡 Works best with (multimodal) large language models (such as GPT-4o) but not so well with reasoning models (such as OpenAI o1).
- 💡 Often used in combination with an instruction prompt.

How to order components of a prompt

There is no single “correct” order for arranging the elements of a prompt, but there are guidelines that can help improve clarity and prevent misunderstandings.

 **For many applications it is useful to**

- start with a **general explanation of the broad topic** and task area,
- followed by **examples or context**,
- **assignment of a role**, and
- ending with a **clear directive (instruction prompt)**.

How to Order Components of a Prompt

Medical history of a patient:

January 1, 2000: Fractured right arm playing basketball. Treated with a cast.

February 15, 2010: Diagnosed with hypertension. Prescribed lisinopril.

September 10, 2015: Developed pneumonia. Treated with antibiotics and recovered fully.

March 1, 2022: Sustained a concussion in a car accident. Admitted to the hospital and monitored for 24 hours.

You are a doctor. Read this medical history and predict risks for the patient.

Based on the provided medical history, here's a clinical risk assessment for the patient:

Priming or injection prompts

- When chatting back and forth, the chatbot will use all the previous messages as context together with the latest prompt.
- Make use of the memory of a chatbot. No need to compile everything into a single prompt.

 **With your first prompt, you give instructions on the style and structure of a chatbot's outputs.**
Build upon this with later prompts.

Priming or injection prompts

ChatGPT 4o ▾ Share

Please act as a writing assistant. Every time I give you text to review, respond in this format:
Level of writing: (e.g. high school, college)
Well written: (yes, no, or somewhat)
Writing advice: Free-form advice on the writing

Got it! I'm ready whenever you are—just send over the first piece of text you'd like me to review.

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Ask anything

Priming or injection prompts

💡 Since all previous messages in a conversation with a chatbot serve as context for the latest prompt, it is recommended to **start a new conversation for every new topic** in order to keep your instructions concise and accurate.

Chain of Thought Prompting

- This technique is used to get more accurate answers, especially for more complex tasks that require logical thinking.
- The so-called Reasoning models (such as [OpenAI o1](#) or [DeepSeek-R1](#)) have this technique built in to their training and inference paradigm. If you use such a model, all your prompts will cause the model to **perform reasoning steps before generating the output**.
- It is also possible to emulate this with more basic LLMs (such as the freely available GPT-4) by adding the phrase **"Let's think step by step."**

Chain of Thought Prompting

ChatGPT 4 ▾ Share

A coin is heads up. Aluino flips the coin. Arthor flips the coin. Flip means reverse. Is the coin still heads up?
Answer the Yes or No Question. Let's think step by step.

Sure, let's break it down:

1. Initially, the coin is heads up.
2. Aluino flips the coin, which reverses it to tails.
3. Arthor flips the coin again, which reverses it back to heads.

So, after both flips, the coin is still heads up. Therefore, the answer is Yes.

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Ask anything I

Take Home Messages

- Avoid using chatbots as oracles. Only ask questions to which you can verify the answers.
- Chatbots have only limited capabilities to replace search engines.
- Use clear and concise **instruction prompts** to tell the chatbot to carry out a task.
- In prompts with multiple components, **place the instruction last**.
- **Assign a role** to the chatbot for styling text or to generate more detailed results on a topic.
- Make use of the **chatbots memory** by building prompts in several steps.
- **Use a new chat** when you change topics.

Think critically and double check the AI output.

Adapt your prompt if needed, also consider using a different tool (search engine, literature database, etc.).

Further resources

- This lecture incorporated elements from the Prompt Engineering Guide at <https://learnprompting.org/docs/introduction>
- S. Schulhoff et al., [*The Prompt Report: A Systematic Survey of Prompt Engineering Techniques*](#), arXiv:2406.06608.