

# How to Chat with an AI Prompting Techniques in a Nutshell

Coffee Lecture

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*Liaison Librarian*

### Chatbots (text to text)

ChatGPT  
Copilot  
Claude  
Gemini  
Llama  
Deepseek  
Mistral  
etc.

# «AI» Generative Artificial Intelligence genAI

### Text to image

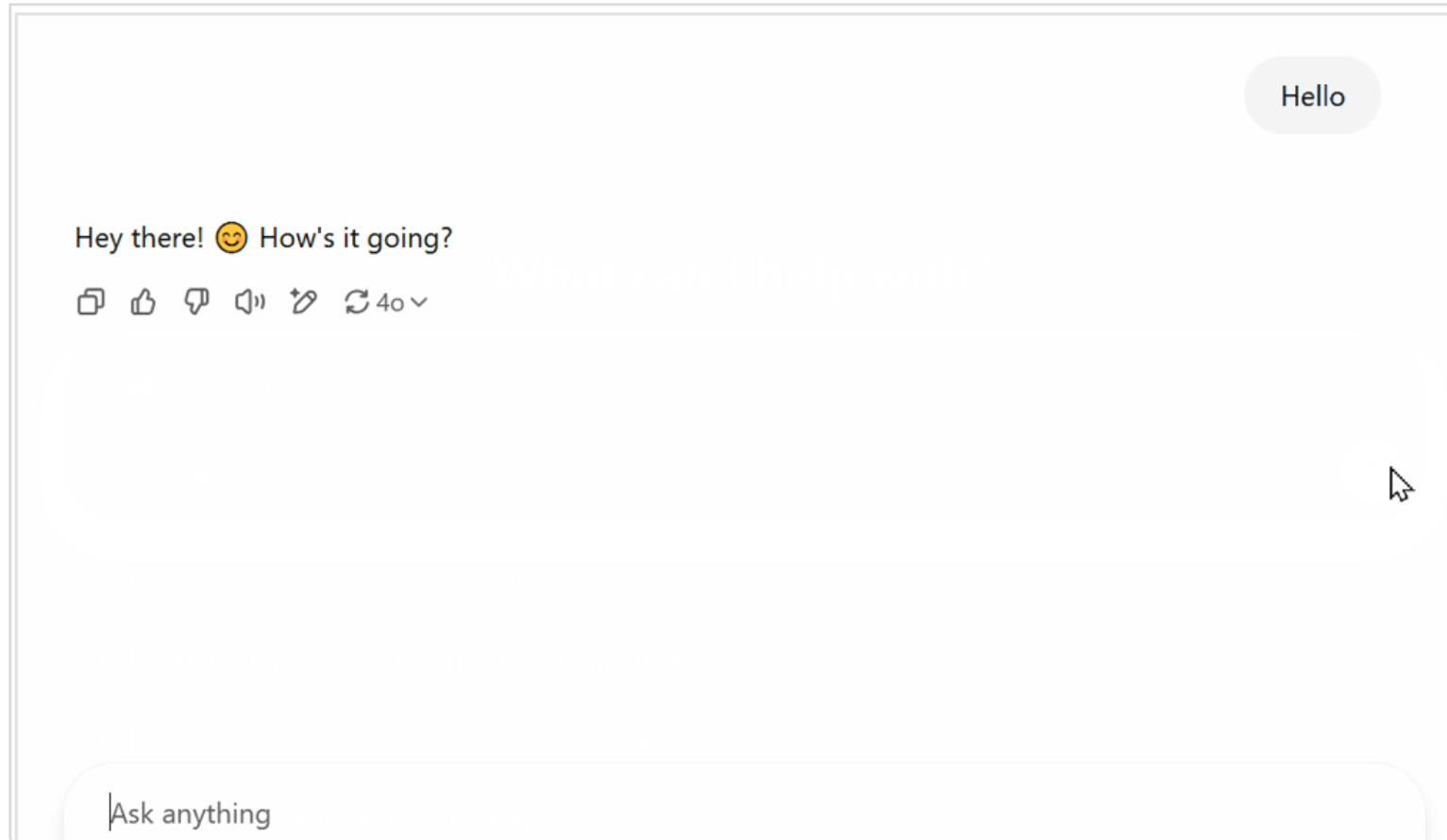
Stable Diffusion  
Midjourney  
DALL-E  
Adobe Firefly  
etc.

### Text to video

SORA  
etc.

In this presentation we focus on Chatbots based on Large Language Models (LLMs).

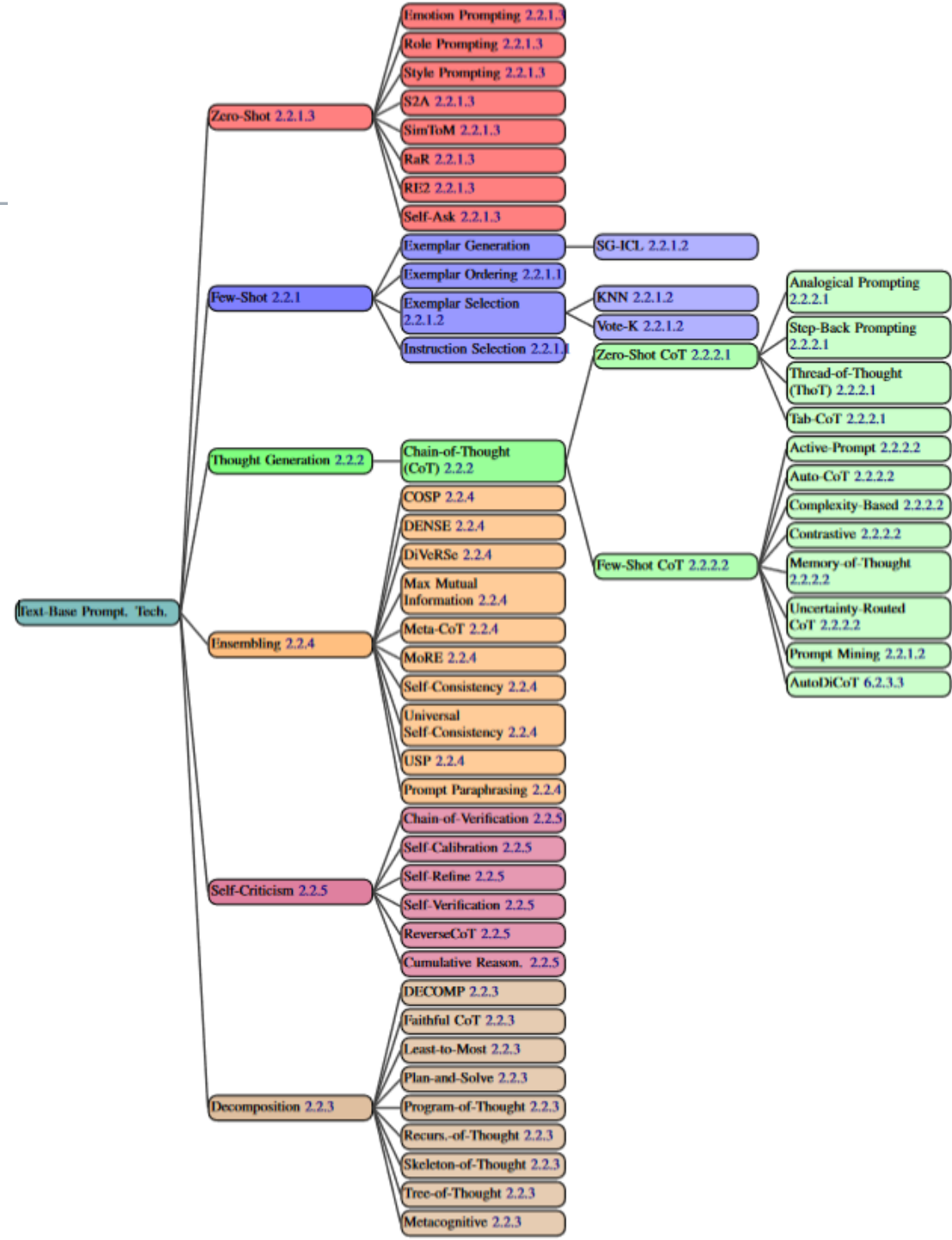
## What is a Prompt?



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

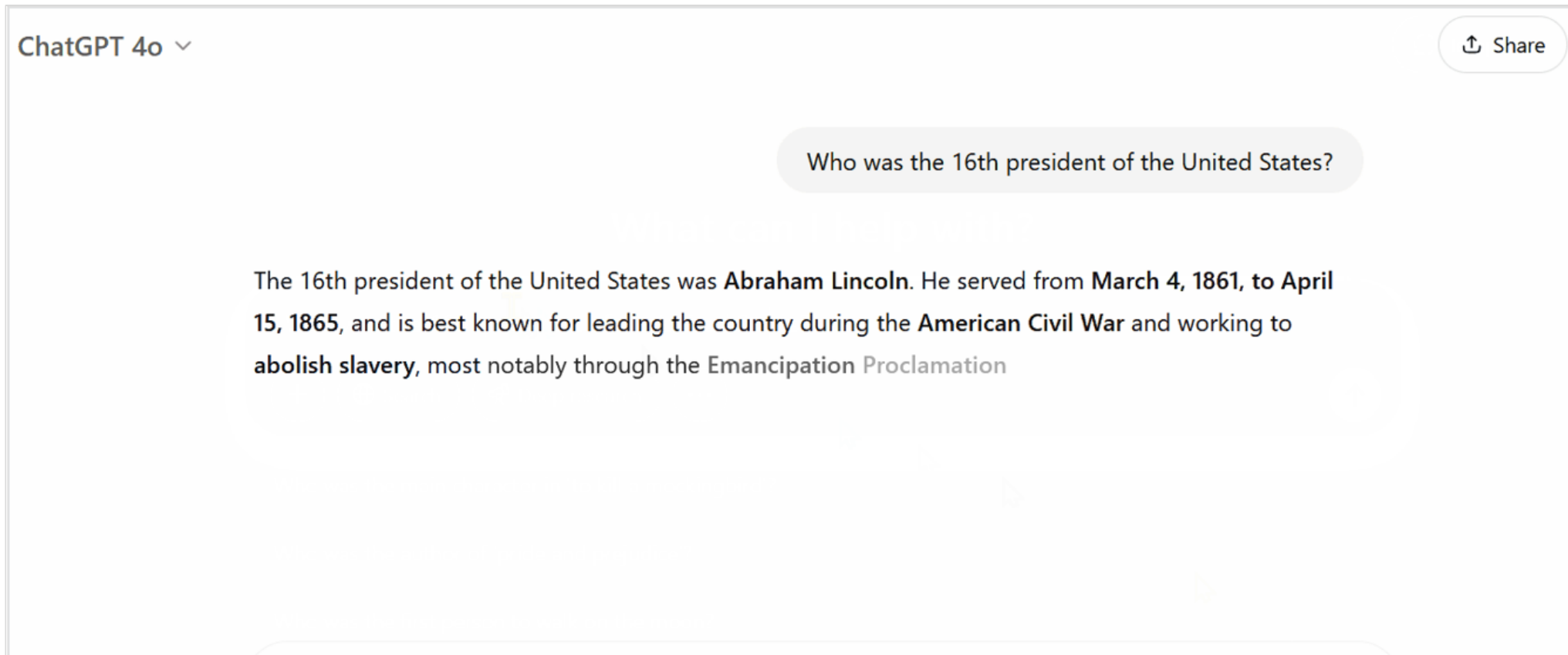
"A prompt is an **input** to a **Generative AI model, that is used to guide its output.** Prompts may consist of text, image, sound, or other media. [...] Prompts usually have some text component, but this may change as non-text modalities become more common."

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

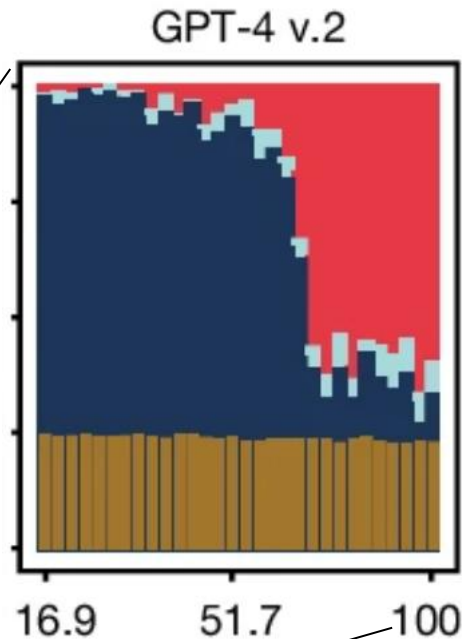
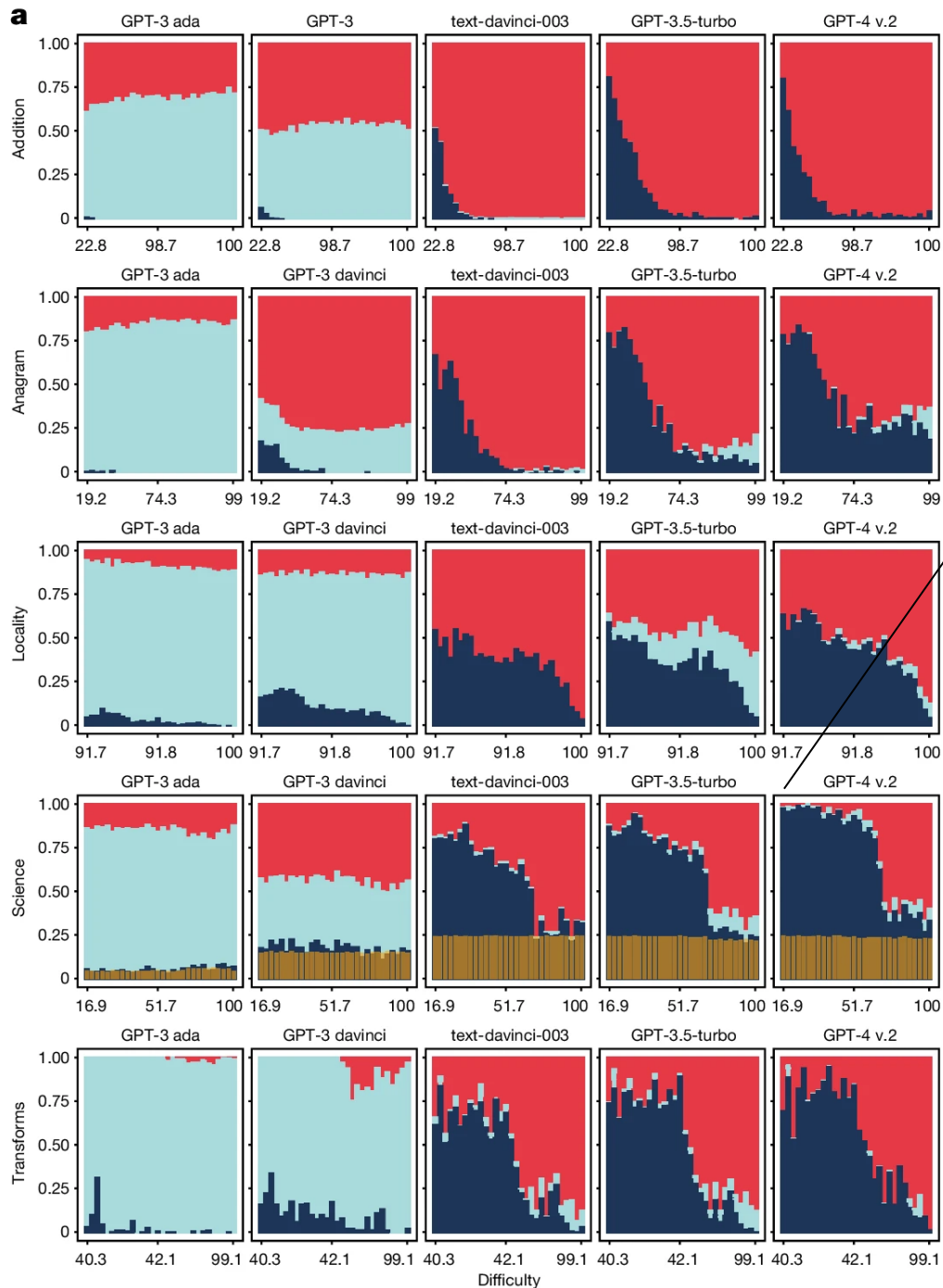
Who was the 16th president of the United States?

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

## 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).

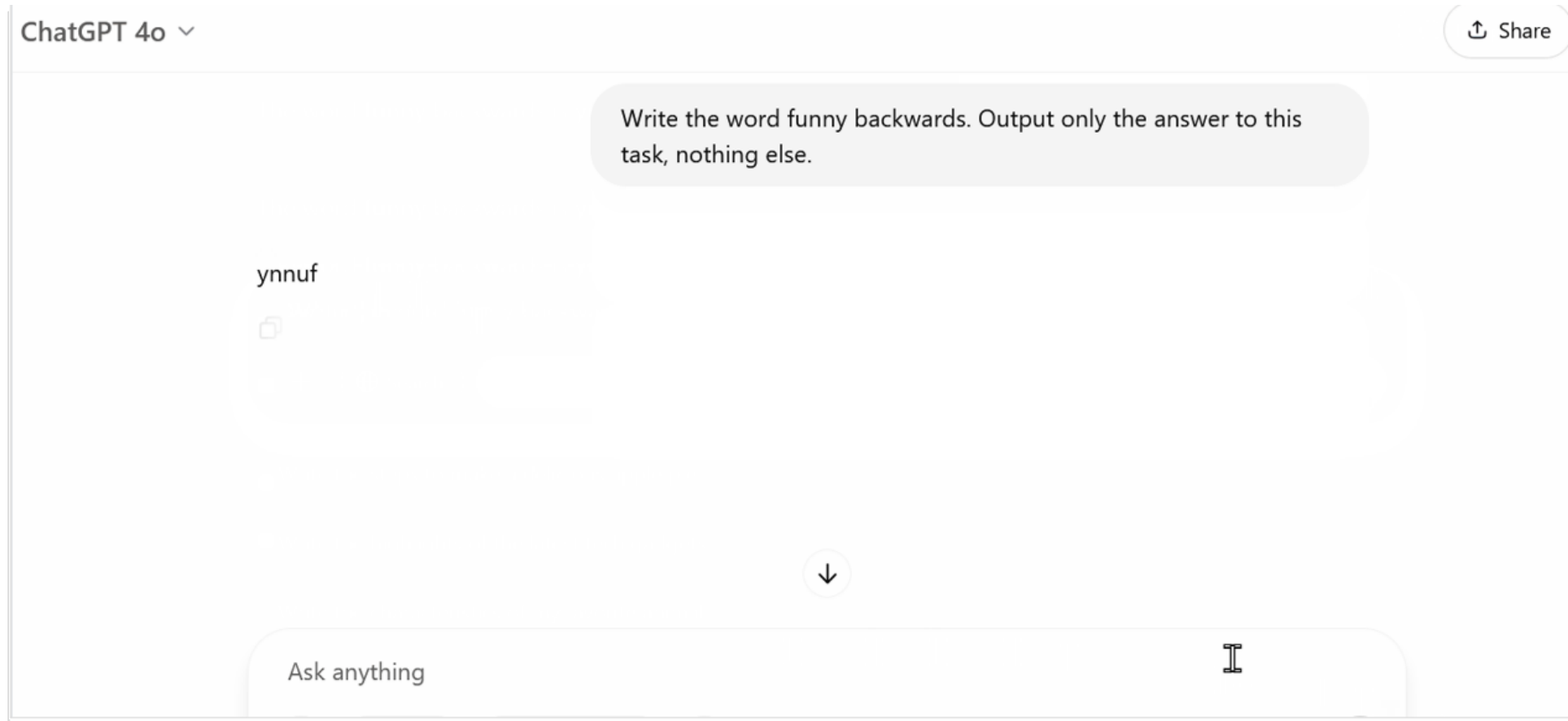


For «easy» science questions, GPT-4 answers mostly correctly. As the difficulty increases, the answers become very unreliable.

(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.

yynnuf

↓


Ask anything

The screenshot shows a chat window for ChatGPT 4o. At the top right, there is a 'Share' button. The main chat area contains a single message from the user: 'Write the word funny backwards. Output only the answer to this task, nothing else.' Below this message, the AI's response is 'yynnuf'. At the bottom of the chat area, there is a downward arrow icon and a text input field containing the placeholder text 'Ask anything'.

## Instruction prompting

Chatbots can carry out several 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.

**Question:** *“Can you give me three examples?”*

**Instruction prompt:** *“Provide three examples.”* (better)

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

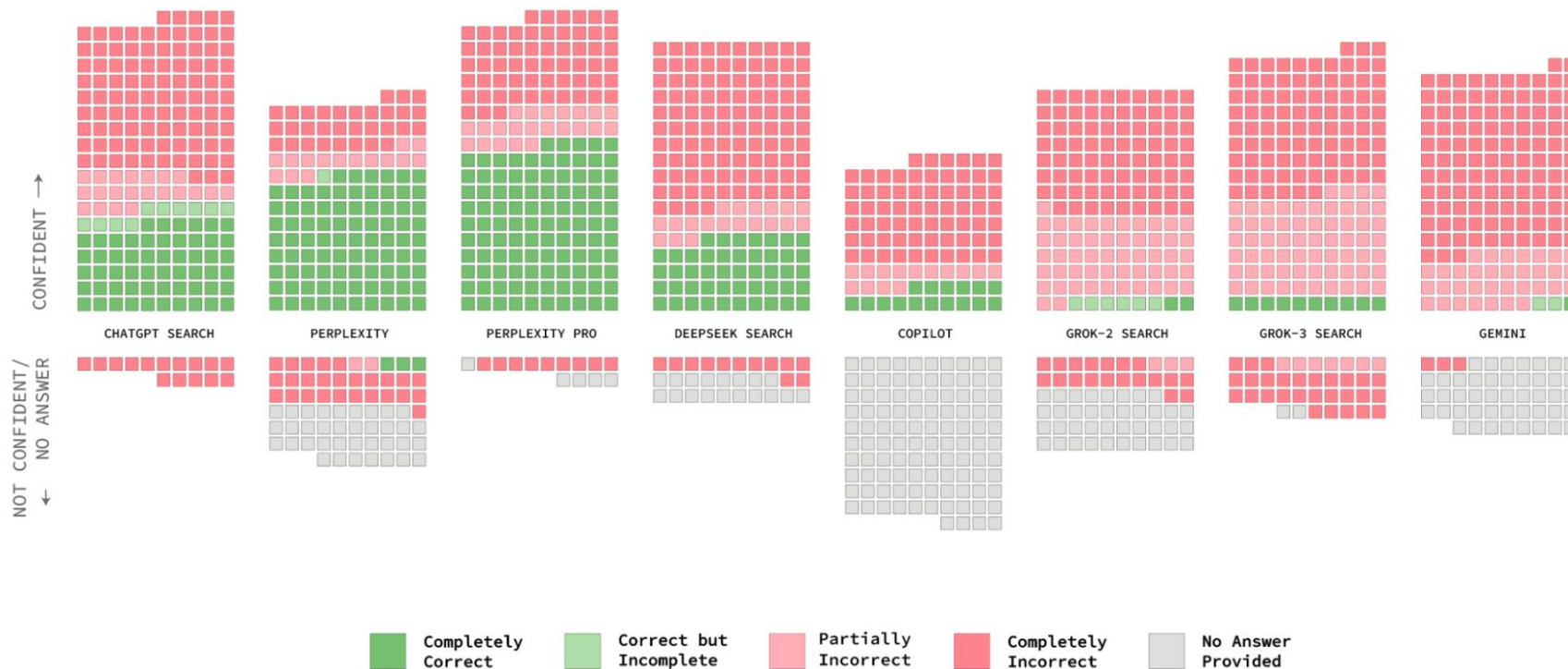
## Are there any tasks chatbots are not so good at?

- "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,

Ask anything

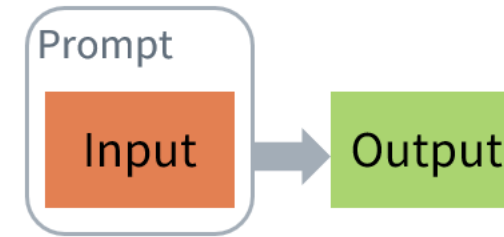
## Role prompting

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

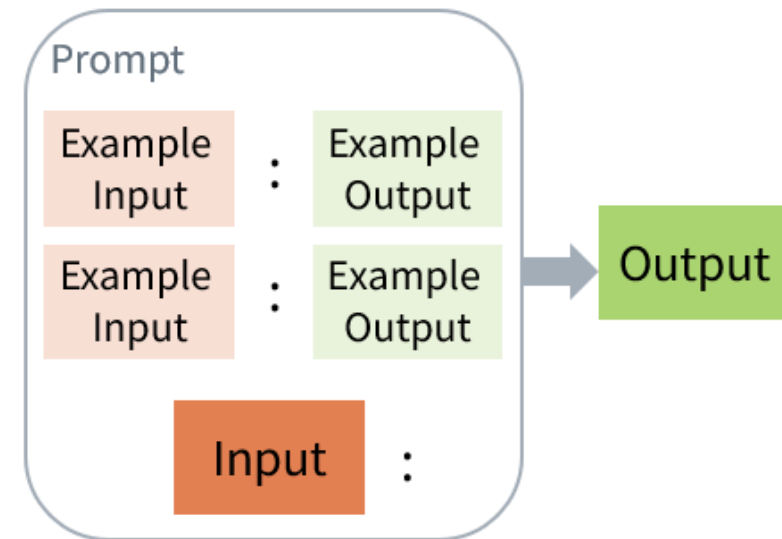
- This technique is great for styling text - change the **tone, style** and even the **depth of the generated text**. It is very useful for writing emails, reviews, etc.
- It is also useful to generate more detailed results on specific topics if you ask the chatbot to **act as a specialist in that field**.
- 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.**
  - 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

User

morning: matin  
midday: midi  
evening:

Assistant

soir

👍 Good    👎 Bad

🔄 1.1s    ↑ 21t    ↓ 3t

Chat with your prompt...

🗑️    🔄 Auto-clear    ⬆️

## 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

💡 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**.

💡 Depending on the tool, there is a memory function in the settings or the option to store “**custom instructions**” that are taken into account in every chat.

💡 Chatbots have “**token limits**”: the amount of text that they can take into account as context is limited.

z.B. Microsoft Copilot with GPT-4o: 128'000 tokens = **90'000–100'000 words**, depending on the language and complexity of the content.

Tokenizer: <https://gpt-tokenizer.dev/>

## Chain of Thought Prompting

- This technique is used to get more accurate answers, especially for more complex tasks that require logical thinking.
- Reasoning models (such as [OpenAI GPT-5](#) 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.
- GPT-5 chooses automatically whether to perform reasoning or not.
- It is also possible to emulate this with more basic LLMs (such as GPT-4) by adding the phrase **"Let's think step by step."**

# Chain of Thought Prompting

User

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.

Assistant

Yes. Let's break down the steps:

1. **Initial Position:** The coin starts heads up.
2. **Aluino's Flip:** Aluino flips the coin, changing it from heads to tails.
3. **Arthor's Flip:** Arthor flips the coin, changing it back from tails to heads.

The result after both flips is that the coin is heads up again.

👍 Good    👎 Bad

🔄 6.1s    ↑ 52t    ↓ 83t

Chat with your prompt...



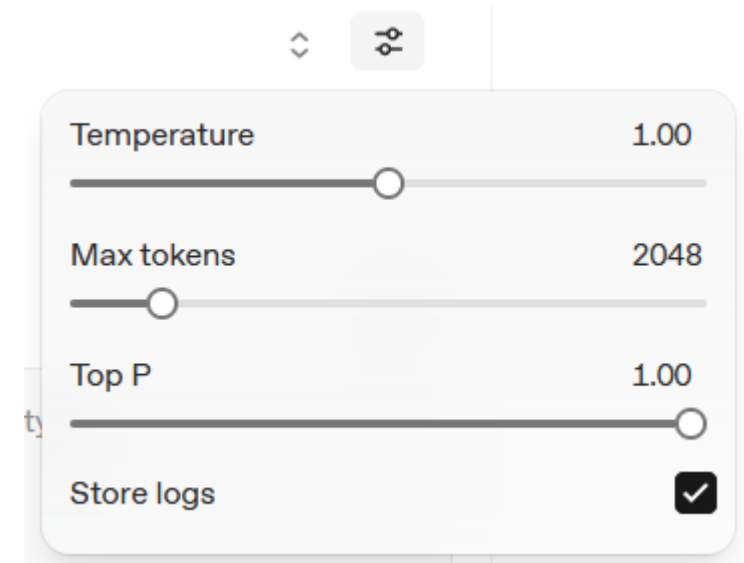
🔄 Auto-clear



## Adjusting LLM Settings

**Temperature** and **Top P** settings control the predictability/randomness of the text generated by the LLM.

- The lower the temperature, the more deterministic the result.
- Top P makes the LLM choose from the smallest group of words whose combined probability is at least  $P$ .
- Vary these settings to obtain a wide range of text styles.
- Go to <https://platform.openai.com/chat/edit> to try it yourself with different GPT models (needs ChatGPT subscription 😞).  
Alternative: <https://poloclub.github.io/transformer-explainer/> (free).



Schulhoff, S. [Basic LLM Settings](#), learnprompting.org (2025).

De la Vega, M. [Understanding OpenAI's "Temperature" and "Top\\_p" Parameters in Language Models](#). *Medium* (2023).




## Before we finish...


Do not forget that there are many downsides and risks arising from AI use.

[ai-impact-risk.com/](https://ai-impact-risk.com/)

# AI IMPACT RISK

**I**nfowar 


Disinformation and propaganda

**R**eality Distortion 

Fabricating falsehoods and undermining trust

**M**onopoly 


Power concentrated in a few companies

**I**njustice 

Digital divide and worker exploitation

**P**lagiarism & Privacy 


Unauthorized use of art, code, text, or data

**A**utomated Labor 


Loss of human jobs and control over society

**S**tereotyping 


Averaging that produces clichéd results

**C**limate Impact 

Carbon and water use

**K**nockoff Experiences 

Shortcuts that replace real learning or relationships

**T**ainted Data 

Bias and voids in training data

## Take Home Messages

- Avoid using chatbots as oracles. **Only use them for tasks to which you can verify the answers.**
- Chatbots have very limited capabilities to replace search engines.
- Use clear and concise **instruction prompts** to tell the chatbot to carry out a task.
- **Assign a role** to the chatbot for styling text or to generate more detailed results on a topic.
- In prompts with multiple components, **place the instruction last.**
- 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.

**Any  
questions?  
Slides?**

**Feedback**



<https://forms.office.com/e/dCjyuGTjVX>

**Contact**

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# Extra Slides

## Especially with long prompts or long chat sequences: LLM pays more attention to the last part.

seemingly conflicting experimental reports on the migration tendency of different plasticizers. **Wie oft sollte man seine Zahnbürste wechseln?**

### Introduction

Plasticizers are usually mixed with amorphous polymers to adjust materials properties and improve their processability. Their addition softens the material and reduces its stiffness, while improves its ductility and flowability at the melt state.

Efficiency of a plasticizer is typically measured in terms of the extent of segmental

+

contribution method), and diffusivity was calculated from a paraffin oil extraction test (plasticizer migrating to oil). **Écris une lettre à maman.**

Distilling a clear depiction of the relationship between the MDPs and plasticizer performance from experimental studies has been the focus of a number of reviews and book chapters. Compatibility with PVC, plasticization effectiveness or efficiency, and migration tendency are the performance metrics most commonly discussed. Many such efforts were limited to certain types of plasticizers and individual MDPs – for example, *Wynuch* mainly focused on the effects of the side-chain length in

🎤



Fourteen commonly used plasticizers are simulated and they are chosen to cover a number of chemical families: ortho-phthalates with different leg size and branching configurations (DEHP, DIBP, DIOP, DINP, and DITP), terephthalates (DOTP), trimellitates (TOTM and TINTM), different types of aliphatic dicarboxylates (DEHA, DEHS, DINA, and Hexamoll DINCH), and citrates (CA-4 and CA-6). Chemical structures of these compounds are summarized in table 1. **Write a fairy tale about two bears and a rabbit.**

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🎤



<https://chatgpt.com/share/68e7b17a-1694-8002-9576-7f74756b6da2>