

# AI Prompting “Hacks”

# Meet the Team



**Heather Rippetoe**

College of Education  
Whitson-Hester School of  
Nursing  
College of Fine Arts



**Mallory Matthews**

College of Business  
Interdisciplinary Studies  
Agriculture & Human Ecology



**Lacy Means**

College of  
Arts & Sciences



**Carrie Roberson**

College of  
Engineering



# Session Resources:

- Session will be recorded.
- Slide deck will be shared.
- Links to resources throughout presentation.
- Book a consultation with your instructional designer!

# Agenda

- Prompt Engineering
- Elements of Good Prompt
- 5 Prompting Hacks





## Disclaimer

- Due to time restrictions today, we will highlight 5 advanced prompting hacks. There are many more out there!
- If you have specific questions, please feel free to [book a consultation](#) with your identified instructional designer.





"It's vital to remember that AI serves as a powerful tool to be leveraged rather than a plug-and-play solution. In the context of prompts, the old saying, '**garbage in, garbage out**,' holds true. To generate desired outputs, focus on crafting well-structured prompts. Embrace experimentation and keep iterating to improve the results."

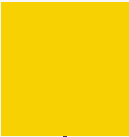
— Darrell Lerner



# What is prompt engineering?

It is the practice of developing and optimizing prompts to efficiently use language models (LMs) for a variety of applications.



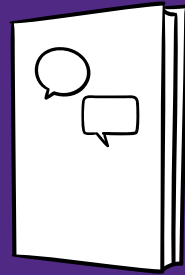


# Elements of a Good Prompt

Instructions



Context



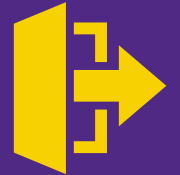
Example



Input Data

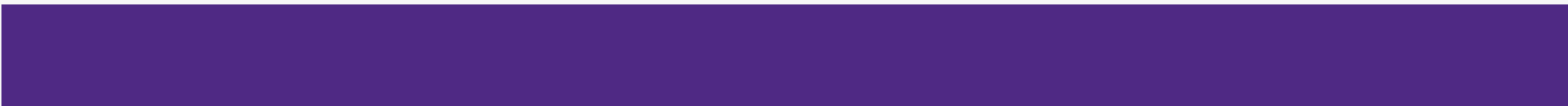


Output





**What tasks  
are you  
using AI for?**





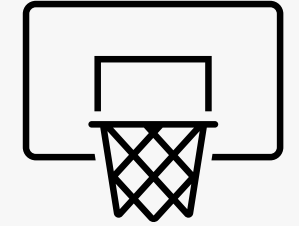
01

# Zero Shot Prompting

No examples



# Zero Shot Prompting



- Technique where AI is asked to perform a task without examples
- Allows the model to generalize and apply it's knowledge to the task.
- This style of prompting gets the conversation going between you and AI.
- Requires iterating and fine-tuning to get the desired output.



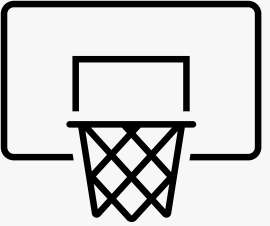
# Zero Shot Prompting

## Benefits

- **Efficiency**- It eliminates the need for time-consuming task-specific examples.
- **Versatility**- Models can generate responses for wide range of tasks without needing specific input.

## Limitations

- **Complex Tasks**- tasks that demand deep contextual understanding might pose challenges for zero shot prompting.
- **Incomplete instructions**- clear instructions are crucial for zero shot prompting. If the prompt is too vague, it may struggle to infer and generate output.



# Example



Here are five key ways instructors at the collegiate level can use AI:

## 1. Personalized Learning

AI tools can adapt learning materials and recommend resources tailored to individual student progress, helping instructors offer personalized guidance to students who need extra support or advanced challenges.

## 2. Automated Grading and Feedback

AI can assist with grading multiple-choice tests, essays, and even provide feedback on written assignments, saving time and offering students quicker, more consistent feedback.

## 3. Content Generation

Instructors can use AI to generate quizzes, summaries, or practice exercises based on course materials, helping to create additional learning opportunities without needing to manually develop everything.

## 4. Predictive Analytics for Student Performance

AI can analyze student data to predict potential academic challenges, enabling instructors to intervene early and provide the necessary support to improve student outcomes.

## 5. Virtual Teaching Assistants

AI-powered chatbots or virtual assistants can handle routine student questions, freeing up instructors' time while still offering students round-the-clock support for common course-related inquiries.



# 02

## One or Few Shot Prompting

"Show, Don't Tell"





# One or Few Shot Prompting

- You give examples of the desired output
- Only ask for AI to do a task which is closely related to your example
- Helps the model understand what the desired output needs to be
- Cuts down on the iterating process, but you still have to verify the information is correct and be the human in the loop.



# One or Few Shot Prompting



## Benefits

- **Simplicity**- Constructing a prompt with examples is much more accessible than fine-tuning models.
- **Speed**- Generating results via a prompt is nearly instantaneous, whereas fine-tuning a model can take significant time.

## Limitations

- **Unpredictable Outputs**- this style prompting has more leeway to go in unexpected directions compared to a fine-tune technique.
- **Biased or Inconsistent Results**- few shot prompting allows for more bias or inconsistent results along with hallucinations.



# Example



**CR** I need help solving this mathematical equation.  $2x+3=11$ . Show me the steps, but don't tell me the answer

Sure, I'd be happy to walk you through the steps to solve the equation  $2x + 3 = 11$  without giving away the final answer. Here's how you can approach it:

1. Start with the original equation:  $2x + 3 = 11$
2. To isolate  $x$ , we first need to subtract 3 from both sides of the equation:  $2x + 3 - 3 = 11 - 3$  This simplifies to:  $2x = 8$
3. Now that we have  $2x$  on one side, we need to divide both sides by 2 to isolate  $x$ :  $2x \div 2 = 8 \div 2$  This gives us the final step:  $x = 4$

And there you have it! These are the steps to solve the equation. Would you like me to explain any of these steps in more detail?

**CR** I do not want the final answer given.



I apologize for the oversight. You're absolutely right, and I should have been more careful. Let me provide the steps again without revealing the final answer:

1. Start with the original equation:  $2x + 3 = 11$
2. Subtract 3 from both sides of the equation:  $2x + 3 - 3 = 11 - 3$  This simplifies to:  $2x = 8$
3. Divide both sides by 2:  $2x \div 2 = 8 \div 2$  This gives us the final form:  $x = [\text{result}]$

These steps will lead you to the solution without explicitly stating the final value of  $x$ . You can now solve for  $x$  yourself by performing the last division. Is there any part of this process you'd like me to clarify further?

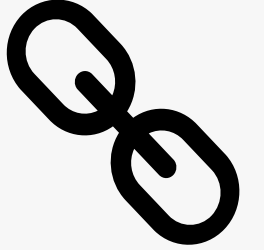
# 03

## Chain of Thought

"Let's think step by step.."



# Chain of Thought (CoT)



- Allows model to break down a complex problem into more manageable parts.
- Looks at the different parts before it answers the prompt.
- Ideal for complex problem solving examples such as math calculations
- Use the words, "Let's think step by step" within your prompt





# Chain of Thought

## Identify the Problem

- Clearly define the multi-step problem you want the LLM to solve.

## Break it Down

- Decompose the problem into smaller tasks or questions that leads to the solution.

## Create Prompts

- For a smaller task, create a prompt that guides the language model.

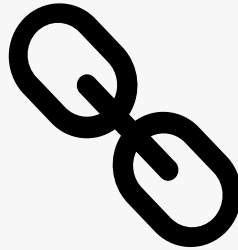
## Execute

- Feed these prompts to the LLM in a sequence, collecting outputs at each step.

## Analyze & Refine

- Evaluate the outputs and refine the prompts if necessary.

# Chain of Thought Prompting



## Benefits

- **Accuracy-** by breaking down a problem into smaller tasks, the model can focus on each step, leading to more accurate results.
- **Complex Tasks-** whether it's solving math problems or making sense of intricate scenarios, CoT allows the models to handle them efficiently.

## Limitations

- **Model size requirement-** research has shown that CoT prompting only occurs with models in sizes of 100 billion parameter range.
- **Reliability-** sometimes CoT doesn't accurately represent how the model arrived at the answer. Particularly with math problems.

# Example

**CR** I want to create a group project for the university level seniors majoring in education. This project should include ways they can use what they have learned in their own classroom. Help me think step by step what all the requirements should be

Let's think through this step-by-step to create a comprehensive group project for senior education majors that will help them apply their learning to real classroom situations.

## 1. Project Overview:

- Title: "Classroom Implementation Strategies"
- Goal: To develop a practical, comprehensive plan for implementing educational theories and methods in a real classroom setting.

## 2. Group Formation:

- Divide students into groups of 3-4
- Ensure diverse skill sets within each group

## 3. Target Grade Level and Subject:

- Each group should choose a specific grade level and subject area
- This allows for focused, relevant planning

## 4. Project Components: a. Theoretical Foundation:

- Require groups to identify 3-5 key educational theories or pedagogical approaches they've studied
- Explain how these theories apply to their chosen grade level and subject

## b. Lesson Plan Series:

- Develop a series of 5-7 interconnected lesson plans
- Incorporate the chosen theories into each lesson
- Include differentiation strategies for diverse learners

## c. Assessment Plan:

- Create formative and summative assessments aligned with the lesson plans
- Explain how these assessments reflect learning objectives and theories used

## d. Classroom Management Strategy:

- Develop a comprehensive classroom management plan
- Address potential challenges and solutions

## 5. Presentation Requirements:

- 20-minute group presentation
- Visual aids (e.g., PowerPoint, handouts)
- Q&A session with peers and instructors

## 6. Written Report:

- 15-20 page detailed report covering all project components
- APA format with proper citations of educational research

## 7. Peer Review:

- Groups review and provide feedback on another group's project
- Encourage constructive criticism and collaborative improvement

## 8. Reflection Component:

- Individual reflection paper (3-5 pages)
- Discuss personal growth, challenges, and future application of learning

## 9. Real-world Connection:

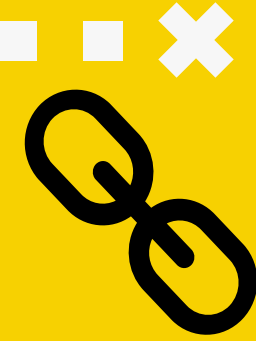
- Require groups to interview a current teacher in their chosen grade/subject
- Incorporate insights from the interview into their project

## 10. Timeline and Milestones:

- Set clear deadlines for each project component
- Include check-in points for groups to receive feedback from instructors

## 11. Evaluation Criteria:

- Develop a rubric that assesses theoretical understanding, practical application, creativity, and presentation skills
- Include peer evaluation as part of the final grade



# 04

## **Skeleton of Thought**

"Outline, then expand"



# Skelton of Thought (SoT)



- Provides a framework of thoughts for the model to expand upon
- Ensures structure and coherent responses
- Ideal for reports or essays or summaries of these tasks.





# Skeleton of Thought Prompting

## Benefits

- **Response Generation-** enhances output by first creating a basic structure like a skeleton and then expanding on those thoughts.
- **Time-** seeing the "skeleton" beforehand will save you time in the refining process will allow you to see if the model is on the right track to produce the desired result you want.

## Limitations

- **Mathematical Reasoning-** currently SoT is not ideally used with reasoning tasks such as mathematical equations.
- **Not Widespread-** unlike other techniques of prompting, SoT is not sufficient for basic prompting of answering questions, wanting an explanation, etc.



# Example



Outline the main points in adding in gamification to enhance a course's engagement. Then expand on each point



## Main Points for Adding Gamification to Enhance Course Engagement:

1. Clear Objectives and Progress Tracking
2. Incorporating Challenges and Quests
3. Reward Systems and Feedback
4. Competition and Collaboration
5. Storytelling and Thematic Elements
6. Levels of Difficulty
7. Personalization and Player Agency
8. Social Interaction and Community Building
9. Use of Game-like Tools and Platforms
10. Regular Updates and New Content

# SoT prompt example

## 1. Clear Objectives and Progress Tracking

- **Explanation:** Clear objectives act as guideposts, helping students understand their goals and the steps required to achieve them. Gamification can make these objectives visible and tangible, using progress bars, experience points (XP), or skill trees to indicate student advancement.
- **Expansion:** For example, breaking a course into smaller milestones, each with its own objectives, helps keep students motivated. Progress tracking in the form of XP systems can provide instant feedback. Students could unlock new levels or badges when they reach certain benchmarks, giving them a sense of accomplishment and purpose.

## 2. Incorporating Challenges and Quests

- **Explanation:** Challenges, quests, or problem-solving missions encourage students to engage with course material in a dynamic way.
- **Expansion:** These challenges can be problem sets, projects, or critical thinking activities that are framed as missions or adventures. For example, in a math course, students could be tasked with solving puzzles that increase in difficulty, earning rewards for solving them. Quests can also be collaborative or individual, giving students a chance to choose their preferred mode of participation.

## 3. Reward Systems and Feedback

- **Explanation:** Reward systems such as badges, XP, or virtual currency can motivate students by making learning achievements more tangible.
- **Expansion:** Rewards should be given for completing tasks, participating in discussions, or achieving high grades on tests. Immediate and positive feedback through leaderboards, badges, or public recognition increases a sense of progression. These rewards provide both intrinsic and extrinsic motivation to keep students engaged and committed to their learning.

## 4. Competition and Collaboration

- **Explanation:** Incorporating both competitive and collaborative elements ensures diverse engagement styles.
- **Expansion:** Students can compete in friendly competitions, such as solving problems fastest or performing best in group projects. Collaboration can be encouraged through team-based challenges where success relies on cooperation and sharing knowledge. Balance between competition and collaboration helps cater to different personalities, encouraging both individual excellence and teamwork.

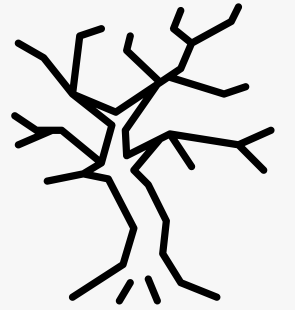
# 05

## Tree of Thought

"Creating branches of responses"



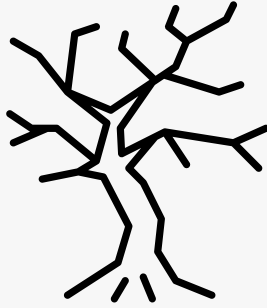
# Tree of Thought (ToT)



- Develops a branching structure of ideas or thoughts for the model to explore
- Enhances creativity
- Ideal for brainstorming and ideation sessions
- Multiple possibilities and pathways



# Tree of Thought Prompting



## Benefits

- **Multiple Paths-** this model enables AI to explore and evaluate multiple reasoning paths ensuring solution accuracy.
- **Mimics Human Thinking-** this style prompting using a tree structure, and branches allows for multiple solutions and human like thinking when making decisions or designing solutions.

## Limitations

- **Inefficiency for simpler tasks-** simple tasks that don't require reasoning will not work with ToT.
- **Prompts-** One challenge is crafting the prompts. It requires a clear understanding of the topic and strategic thinking to ensure the prompts guide the model's learning.

# Example



Use the Tree of thought prompting style to answer this question:  
"Design an efficient system to distribute renewable energy across a large city, minimizing waste while ensuring reliability."

## Branch 1: Generation of Renewable Energy

First, we focus on the types and locations of renewable energy sources.

### Path 1: Diverse Energy Sources

- **Thought 1:** Utilize multiple renewable sources such as solar, wind, and hydropower. Solar farms can be located in areas with high sunlight exposure (rooftops, unused land), while wind turbines can be positioned in windy zones (high altitudes or coastal areas). Hydropower may come from nearby rivers or water bodies.
- **Thought 2:** Integrating energy storage systems, such as battery storage, allows surplus energy from sunny or windy days to be stored for use during low-generation periods.
- **Thought 3:** Incorporate community microgrids (localized grids) to handle energy generation in neighborhoods, making energy distribution more decentralized and robust.

### Path 2: Centralized vs. Decentralized Systems

- **Thought 1:** A **centralized grid** with large renewable power plants connected to a city-wide network allows for easier control and maintenance but can have points of failure.
- **Thought 2:** A **decentralized system**, using smaller, community-based renewable systems with local storage, can improve resilience by isolating failures and reducing transmission distances (and therefore energy loss).

# ToT prompt example

## Branch 2: Distribution Network

Next, consider the infrastructure for distributing energy efficiently.

### Path 1: Smart Grids

- **Thought 1:** Implement a **smart grid** that dynamically adjusts energy flow based on demand and supply fluctuations in real time, helping to minimize energy waste.
- **Thought 2:** Smart grids use advanced sensors and AI to detect issues or inefficiencies in the network early, preventing large-scale power loss or outages.
- **Thought 3:** Smart metering at the consumer level can encourage efficient usage by tracking usage patterns and offering variable pricing based on demand.

### Path 2: Energy Storage and Distribution Losses

- **Thought 1:** **Energy storage** systems, like large battery banks, should be positioned near areas of high consumption to avoid long-distance transmission losses.
- **Thought 2:** Use high-efficiency transmission lines (e.g., high-voltage direct current, HVDC) to reduce energy loss during distribution.
- **Thought 3:** Install **local energy storage units** in residential and industrial areas, which can be charged during low-demand hours and used during high-demand periods to avoid peak load strains.

### Path 3: Integration with Existing Infrastructure

- **Thought 1:** Retrofitting existing grid infrastructure with renewable-friendly components, such as transformers capable of handling variable energy inputs from different sources.
- **Thought 2:** Gradually phasing out fossil-fuel-based plants while maintaining some backup systems for reliability during renewable supply falls (e.g., when there's no wind or sun).

## Branch 3: Management and Optimization

Finally, we look at how to optimize energy use across the city while ensuring reliability and minimizing waste.

### Path 1: Demand Response Systems

- **Thought 1:** Implement **demand response systems** that automatically adjust energy usage during peak times. This can be achieved through smart appliances and industrial machinery that reduce power consumption when the grid is under strain.
- **Thought 2:** Use AI and machine learning to predict demand patterns, adjusting energy flow based on forecasted weather (sunny, windy days) and historical consumption data.
- **Thought 3:** Educate consumers on energy-efficient practices, incentivizing reduced usage during high-demand periods through cost-saving measures.

### Path 2: Reliability and Backup Systems

- **Thought 1:** To ensure reliability, integrate a hybrid system that uses **renewable energy** as the primary source but has **backup power sources** (like hydrogen fuel cells or gas turbines) that can be activated during outages or renewable shortfalls.
- **Thought 2:** **Redundancy** in the network is essential. Critical infrastructure (hospitals, public transportation, etc.) should have dedicated backup energy supplies or their own renewable generation systems to ensure continuous operation.

### Path 3: Real-Time Monitoring and Optimization

- **Thought 1:** Continuous **real-time monitoring** of energy generation and consumption across the city allows for immediate identification of inefficiencies, losses, or outages.



# Comparison Chart

Technique	Description	Strength	Weakness	Best Use Cases
Zero-Shot	The model is given no prior examples or context. It relies on its pre-trained knowledge to generate answers based on a prompt.	<ul style="list-style-type: none"> <li>Efficient, no need for examples</li> <li>Quick response</li> </ul>	<ul style="list-style-type: none"> <li>Accuracy may vary</li> <li>Can produce incomplete or irrelevant answers</li> </ul>	Simple tasks or general knowledge queries where the context is well understood by the model
Few-Shot	The model is given a few examples of the task it needs to perform, providing it with context before answering a similar prompt.	<ul style="list-style-type: none"> <li>Increases accuracy compared to zero-shot</li> <li>Can generalize from examples</li> </ul>	<ul style="list-style-type: none"> <li>Might require multiple examples</li> <li>Dependent on example quality</li> </ul>	Tasks where a few patterns or formats can significantly guide the model
Chain of Thought	The model is prompted to explicitly show its reasoning process step by step.	<ul style="list-style-type: none"> <li>Leads to more interpretable responses</li> <li>Helps with complex reasoning problems</li> </ul>	<ul style="list-style-type: none"> <li>Can be verbose</li> <li>May slow down the process</li> </ul>	Complex decision making or reasoning tasks where the process is as important as the outcome
Skeleton of Thought	The model outlines key components of the solution or reasoning first, then fills in the details later.	<ul style="list-style-type: none"> <li>Structured approach to problem solving</li> <li>Helps with organizing complex answers</li> </ul>	<ul style="list-style-type: none"> <li>Can sometimes overlook details</li> <li>Might require post processing</li> </ul>	Tasks requiring hierarchical or structured thinking (essays, coding tasks)
Tree of Thought	The model explores multiple potential solutions or reasoning paths, branching out like a tree, before selecting the optimal solution.	<ul style="list-style-type: none"> <li>Encourages exploration of alternatives</li> <li>Allows for better optimization of answers</li> </ul>	<ul style="list-style-type: none"> <li>Can be computationally expensive</li> <li>Can become complex with multiple branches</li> </ul>	Problems with multiple possible solutions or creative problem-solving tasks (game design, math problems)-



**AI is a new eager assistant capable of finding information, creating visualizations, writing drafts, offering feedback, and analyzing data. It will alter your workflow and allow you to do other things.**

# THANK YOU!

[Feedback Survey](#)

Resources:

- [Bloom's Taxonomy and AI](#)
- [Resource 2](#)
- [Resource 3](#)

Next Week:

[iLearn Tools](#)

[Register](#)

