PROMPT ENGINEERING 101:

ASKING GOOD QUESTIONS

WHAT'S THE PLAN?

- Master the fundamentals of effective prompt design.

- Learn to apply prompts in diverse scenarios, from academic research to creative content generation.

- Gain hands-on experience with prompt refinement and iteration.

WHAT IS PROMPT ENGINEERING?

- The process of crafting precise, effective questions or instructions to achieve specific, high-quality responses from AI systems.

- Precision in prompts:
  - Saves time
  - Reduces misunderstandings
  - Improves efficiency.

- The quality of AI output directly relies on the clarity and relevance of the prompts it receives.

WHY THE "RIGHT" QUESTIONS MATTER

- **Ensuring Clarity**
  - AI tools interpret inputs literally.
  - Ambiguous or unclear prompts lead to generalized, less effective responses.
  - Clear questions foster direct, helpful answers and make follow-up prompts easier to construct.
- **Promoting Relevance and Specificity**
  - Targeted prompts narrow down the focus, helping AI skip irrelevant information and hone in on what matters.
  - "Summarize three major economic impacts of climate change" is more effective than "Tell me about climate change."
- **Enhancing Efficiency**
  - Thoughtful prompts maximize the efficiency of AI tools, saving time and resources.
  - Effective prompting is an **iterative** process that involves refining questions to be as direct as possible.
    - A repeated process of making gradual improvements

KNOWING ITS LIMITS AND ITS STRENGTHS

- **Strengths**

- Pattern Recognition
  - AI is adept at processing vast data sets and identifying patterns, such as spotting trends in literature, summarizing large texts, or generating visual ideas from text.

- Content Generation
  - Can produce new content in various formats—text, images, and code—based on learned data.

- **Limitations**

- Context Understanding
  - AI can lack human nuance and understanding of complex contexts.

- Creativity Constraints
  - AI follows given instructions and rarely "thinks outside the box" unless explicitly instructed.

- **Implications for Prompt Engineering**
  - To maximize AI's potential, prompts should be designed to guide the AI in ways that account for its strengths while navigating around its limitations.

TYPES OF PROMPTS

- **Open Prompts**
  - Encourage broad exploration (e.g., "Explain how AI is changing education").
  - Suitable for brainstorming or idea generation.
- **Closed Prompts**
  - Aim for specific answers
  - Useful for focused, concise responses.
  - "List three ways AI impacts education."
- **Descriptive Prompts**
  - Require the AI to describe or explain
  - "Describe the theme of identity in *To Kill a Mockingbird*."
- **Directive Prompts**
  - Ask AI to perform an action, like summarizing, comparing, or generating a list.
  - "List three ways AI impacts education."
- **Exploratory**
  - Broaden the conversation, seeking multiple perspectives
  - "What are various theories on human intelligence?"
- **Conclusive**
  - Aim for specific, clear conclusions or answers
  - "Summarize the main argument of the article."

COMPONENTS OF AN EFFECTIVE PROMPT

- **Context**
  - Provide necessary background (e.g., "Based on recent developments in machine learning…").
  - The context helps guide the AI to provide responses that are accurate and relevant.
- **Task Clarity**
  - Specify what the AI should do. Is it summarizing, analyzing, listing, or comparing?
  - Instead of "Explain Shakespeare," specify "Summarize the themes in *Hamlet* with examples."
- **Constraints**
  - Set clear parameters, such as word limits, tone, or style.
  - "Summarize in 50 words or less" or "Provide a response in an academic tone."
- "Describe the historical impact of the Renaissance on art and literature in no more than 100 words, focusing on key artists and writers."

PROMPTING GUIDELINES

- **Use Clear Language**
  - Avoid jargon, acronyms, and ambiguous terms. Use simple, direct language.
  - Replace "Discuss the ontology of AI" with "Explain what AI is and how it works."
- **Be Specific**
  - Vague prompts lead to general answers.
  - Define exactly what you need.
  - Instead of "Tell me about AI," try "Explain three key benefits of using AI in healthcare."
- **Define the Outcome**
  - Specify what you want: a summary, list, comparison, argument, etc.
  - "List three reasons why AI is beneficial for small businesses and briefly explain each."

COMMON PITFALLS

- **Overly Broad Prompts**
  - Effective prompts communicate SPECIFICALLY what task the AI is to perform
  - Rather than asking an AI agent to "Explain history," you might request that it "Summarize the impact of WWII on the American economy."
- **Avoiding Assumptions**
  - Don't assume AI knows specific contexts;
  - Provide clear context about what you are attempting to answer or create
  - Rather than asking, "Describe this author's impact," specify the author's name and field.

KEY CRITERIA FOR EVALUATING PROMPT EFFECTIVENESS

- **Clarity**
  - Is the prompt easily understandable?
- **Relevance**
  - Does it directly address the desired outcome?
- **Specificity**
  - Is it detailed enough for a targeted answer?
- **Alignment**
  - Does it align with the intended goal?

EFFECTIVE OR INEFFECTIVE?

- In a 100-word summary, explain why chickens should be considered valuable employees in a startup focused on organic pest control.

- Tell me about pineapple pizza.

- List three scientific reasons why a sandwich with extra pickles could potentially improve someone's mood. Explain each reason briefly.

- Write about a robot dog.

- Create a 200-word lesson on the physics of spaghetti noodles in space, explaining how astronauts could cook pasta without gravity.

- What's the deal with noodles?

- List three reasons a squirrel might be the best choice as a forest tour guide. Make each reason humorous but believable.

PROMPT MAKEOVER

- You have been given a simple and flawed prompt

- Using the skills that we have learned today, improve the prompt

- Give it a makeover!

- Give it a glowup!

GLOW UP EXAMPLES

- Original Prompt: "Tell me about exercise."

- How might we improve this prompt?

- "Describe the benefits of running as a form of exercise, focusing on cardiovascular health and mood improvement, in 75 words or less."

- Original Prompt: "Explain what animals do."

- "List three unique survival strategies animals use in the wild, with examples, in 100 words."

ADVANCED TECHNIQUES

- Chain of Density Prompting

- Step-by-step approach where AI follows a logical chain of reasoning.

- Example: "Describe the pros and cons of social media, then evaluate its impact on mental health."

- Essay Compression Prompting

- This technique is useful for condensing longer, more detailed information into a shorter, easy-to-read summary.

- Role-Playing Prompts

- Using persona-based prompts like "As an economist, analyze…" to improve contextual relevance.

CHAIN OF DENSITY PROMPTING

- Guide the AI to produce responses that are:
  - Dense with relevant information
  - Structured, and in-depth, making it easier to achieve high-quality outputs in complex topics.
- **Why COD Prompting Works:**
- Each layer (or "density step") helps the AI focus on specific aspects, preventing overly broad responses and encouraging well-rounded answers.
- The final prompt includes multiple layers that guide the AI to provide a detailed, organized response, using examples, comparisons, and structured content.

HOW-TO COD PROMPT

- Start with a Basic Question
  - Begin with a simple question or task, keeping it broad and easy to understand.
  - "How does a penguin becoming mayor help the town?"
- Add Detail in Small Steps
  - Take the fundamental question and add more information to make it specific.
  - This is like "zooming in" on one part of the topic.
  - Explain how a penguin mayor helps reduce littering and keeps the streets icy (in a good way).
- Break the Question into Parts
  - Add another step to focus on specific areas or comparisons, so the AI knows to give a complete answer.
  - Compare how a penguin mayor's approach to town cleanup is different from a human mayor's approach.
- Ask for Examples to Make It Real
  - Including examples helps the AI give a more concrete answer that feels real and relatable.
  - Give one funny example of a penguin mayor cleaning up the town or getting penguins to recycle fish wrappers.
- Organize the Answer by Sections
  - Request the answer in parts or sections to keep it well-organized and easy to read.
  - "Summarize in two sections: one about how a penguin mayor improves the town, and one comparing their methods to a human mayor's.

FINISHED COD PROMPT

- Explain how a penguin mayor helps reduce littering and keeps the streets icy (in a good way). Compare these benefits to what a human mayor would do, and give a funny example of a penguin mayor helping penguins recycle fish wrappers. Summarize in two sections: one about the penguin mayor's improvements and one comparing them to a human mayor.

CHAIN OF DENSITY RACE

- The next slide contains simple prompts that need to be expanded using the Chain of Density prompting method

- A prompt will be revealed then we will take two minutes to add ONE DETAIL OR ONE CONSTRAINT to make the prompt more effective

- We will repeat this process three times.

- After each round, we will share the prompts that we created.

- The prompt that the group selects will be the new prompt that is to be expanded or constrained

C.O.D. RACING

1. "Explain how a library works."

2. "Describe the importance of sleep."

3. "Talk about the benefits of cooking at home."

4. "Explain what makes a story interesting."

5. "Describe what a good friend is."

ESSAY-COMPRESSION PROMPTING

- Useful for condensing longer, complex information into clear, focused summaries, ideal for generating concise responses.
  - Rather than asking,"Summarize this text," this technique preserves more of the original language of the provided text, ensuring great clarity, preciseness, and specificity
- Setting a word limit, key points, and a clear structure makes it simpler for the AI to produce a focused summary without overwhelming information.

HOW TO ESSAY-COMPRESS

- Start with the Big Question or Topic
  - Begin by stating the main idea or question you want summarized.
  - Think of it as the "big picture" that you want to compress.
  - "Summarize the benefits of hiring a llama as an office manager."
- Set a Clear Word or Sentence Limit
  - Specify a length for the response to keep it concise and focused.
  - "Summarize in 30 words or less."
- Identify Key Areas or Points to Cover
  - Pick 2-3 main points or ideas that you want included.
  - This helps the AI focus on the most important aspects of the topic.
  - "Include benefits like boosting team morale, handling paperwork with ease, and being eco-friendly."
- Add Structure to Guide the Summary
  - Ask for an organized answer, like a bullet-point list or short paragraphs, to make the summary easy to read.
  - "Summarize in 2-3 bullet points."
- Ask for Clear Language
  - Specify that you want a simple or beginner-friendly answer, especially for complex topics.
  - "Explain in a fun and simple way that anyone could understand."

SUCCESSFUL ESSAY-COMPRESSION PROMPT

- Summarize the benefits of hiring a llama as an office manager in 30 words or less. Include benefits like boosting team morale, handling paperwork, and being eco-friendly. Use 2-3 bullet points, in simple, fun language.

WRAP UP

- **Key Takeaways**

- Emphasize the importance of clarity, specificity, and purposeful prompting in generating effective AI responses.

- Prompt engineering is a skill that grows with practice and iterative refinement.

- **Final Thought**

- Encourage attendees to experiment with prompts, using the principles learned today to maximize the usefulness of AI tools in their personal and professional lives.