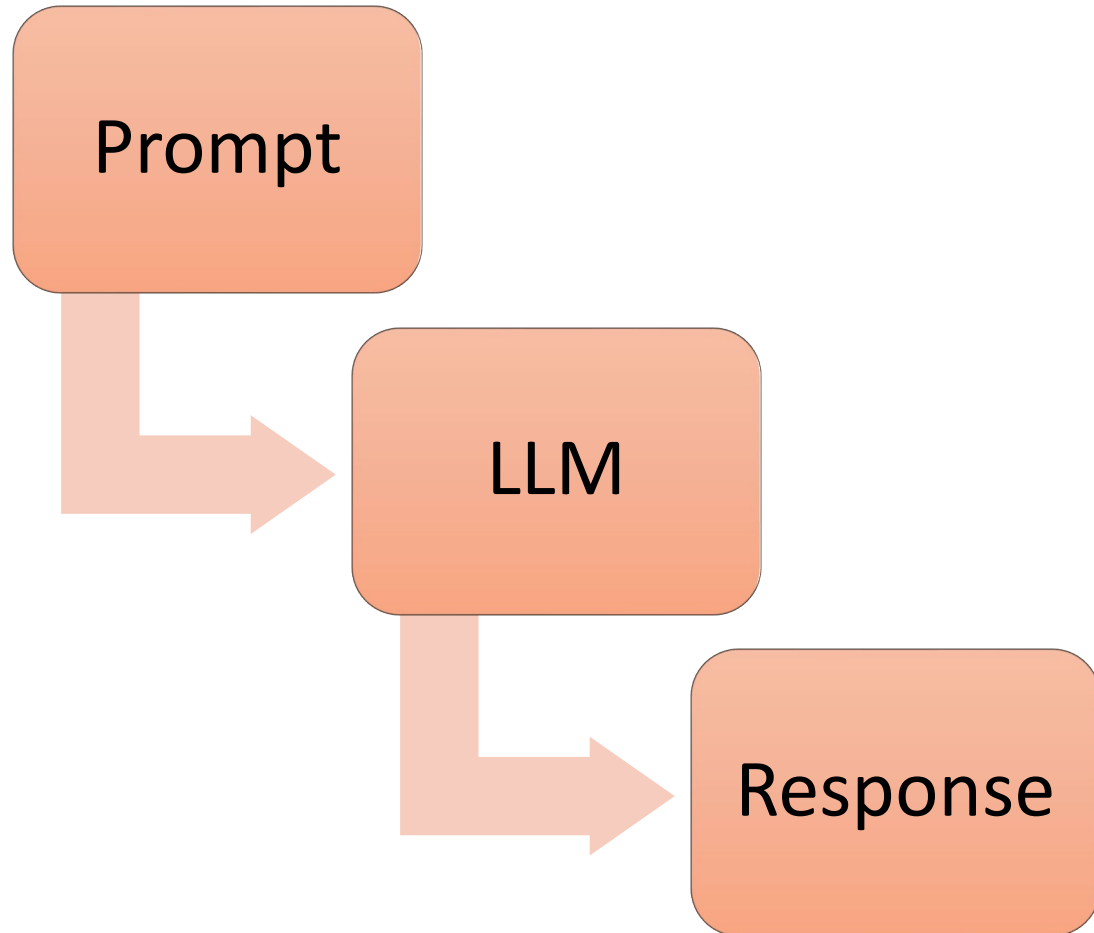




Prompt Engineering and Use Cases

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The Prompt-Response Cycle



You

Name 3 ice cream flavors

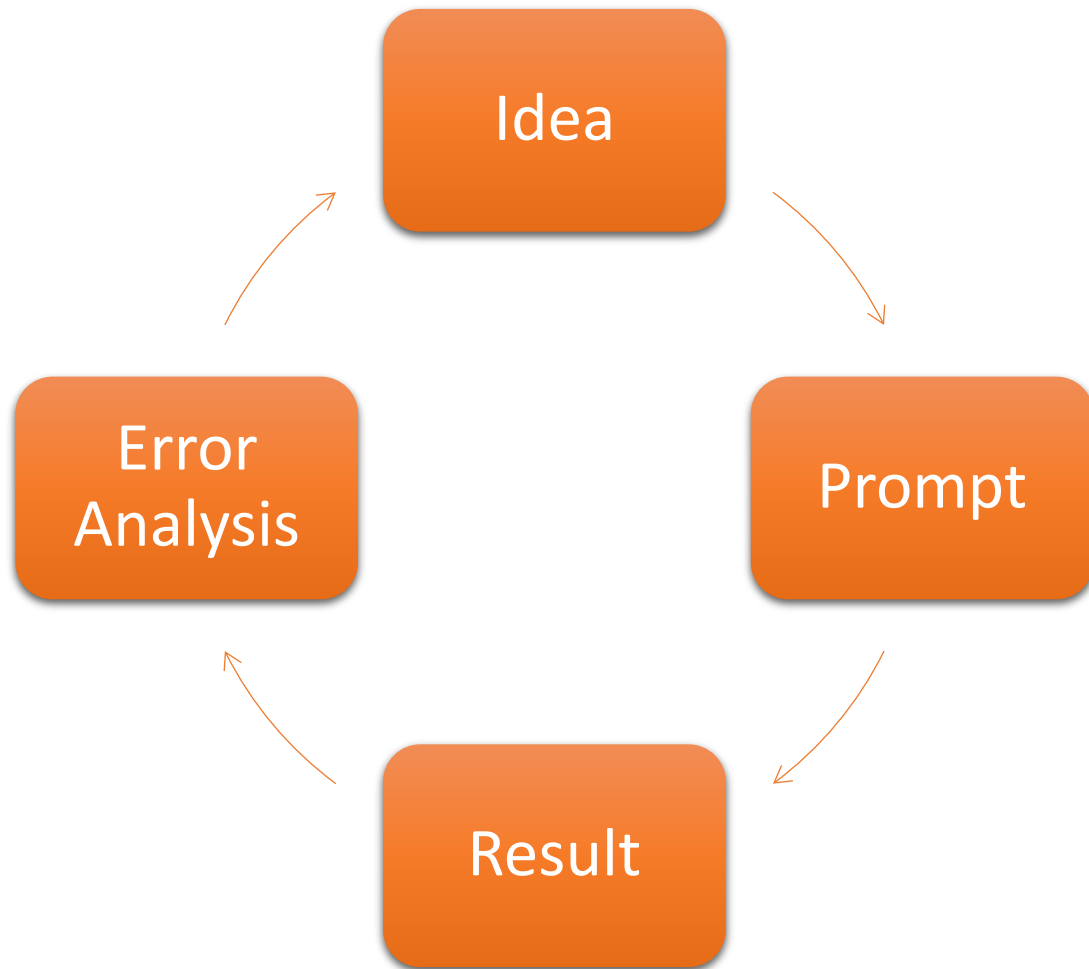


ChatGPT

Certainly! Here are three common ice cream flavors:

1. Vanilla
2. Chocolate
3. Strawberry

Main Prompting Steps



1. Define the problem or goal
2. Use relevant keywords and phrases
3. Write the prompt
4. Test, evaluate, and iterate

General Tips for Designing Prompts

■ Start Simple

- Begin with basic prompts.
- Add details progressively to refine results.

■ Use Clear Instructions

- Verbs like “Write,” “Summarize,” “Translate.”
- Clearly state what you want to achieve.

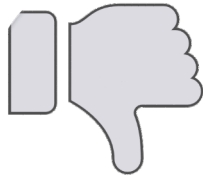
■ Be Specific

- The more detailed the prompt, the better the results.
- Include necessary context: tone, format, key points.

■ Focus on What to Do

- Phrase instructions in the positive.
- Guide the model towards specific actions.

Evolution of an Effective Prompt



Help me write a Western blot methodology.



Write a methods section for Western blot analysis of AKT phosphorylation in HepG2 cells, including protein extraction and quantification.



Write a methods section for Western blot analysis of AKT phosphorylation in HepG2 cells. Include:

Sample prep: 30µg protein/lane, RIPA buffer

Gel conditions: 10% SDS-PAGE, 120V

Antibodies: p-AKT (1:1000), HRP-secondary (1:5000)

Analysis: Densitometry with β -actin normalization

Format: Cell style, ~300 words

Prompting Tactics for Improved Results



Prompts to Reduce Hallucinations

Tactic:

- Ask the model to provide only well-established information
- Include a fallback for uncertainty

Example Prompt:

Answer the following question about cell biology.

Keep the answer to 2-3 sentences.

Respond 'Need to verify' if unsure about the specifics.

What are the main components required for successful mammalian cell culture?

Few-Shot Prompting

Tactic:

- Provide examples to improve accuracy and help it follow a desired pattern

Example Prompt:

Classify the following experimental variables:

- Example 1: Variable: Blood glucose levels; Classification: Dependent variable
- Example 2: Variable: Drug dosage; Classification: Independent variable
- Example 3: Variable: Patient age; Classification: Confounding variable
- Now classify these: Cell viability, Incubation temperature, Patient smoking status, Sample collection time

Give the Model Time to Think

Tactic:

- Instruct the model to work through a solution step-by-step
- Instruct the model to reason through the problem before concluding

Example Prompt:

Step 1: Describe the process of mRNA transcription.

Step 2: Explain how transcription errors can lead to protein misfolding.

Step 3: Summarize the potential impact of protein misfolding on cellular function.

Role Playing (Using Personas)

Tactic:

- Assign the model a specific role
- Provide a clear result, end goal, context, and constraints

Example Prompt:

You are an expert lab technician.

Create a protocol for preparing reagents for an ELISA assay.

The goal is to ensure consistency across multiple labs.

The content is for a standard operating procedure (SOP) document.

Your instructions should be precise and include exact measurements.

Wrap Up

- **Prompt engineering is a powerful tool** for guiding AI toward precise, actionable outputs.
- **Iterative testing and refinement** ensure better results and reduce errors.
- **Effective prompts save time** and enhance productivity across diverse use cases.
- **Keep experimenting!** Practice and creativity are key to mastering prompt design.

Upcoming Training from the NIH Library

- [AI Literacy: Navigating the World of Artificial Intelligence](#)
 - January 15 1:00 – 2:00 pm
- [Best Practices and Patterns for Prompt Generation in ChatGPT](#)
 - January 28 1:30 - 3:00 pm
- [Crafting Your Generative AI Usage Strategy](#)
 - February 5 12:00 - 12:45 pm

Thank you



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