Generative AI: Prompt Engineering Basics

🧠 What Is Prompt Engineering?

- **Prompt Engineering** is the process of crafting clear and effective prompts to interact with generative AI models.

- Prompts guide the AI to produce relevant, accurate, and desirable outputs.

- The quality of your prompt directly influences the model's response.

🔑 Key Concepts

📑 What Is a Prompt?

- A **prompt** is an input or instruction given to a generative model.

- Prompts can include:

    - **Instruction** – What task the model should perform.

    - **Context** – Background information to guide the model.

    - **Input Data** – Specific content or examples for the model to work on.

    - **Output Indicators** – Hints about the expected format or structure.

✍️ Best Practices for Writing Effective Prompts

1. **Clarity** – Be clear and specific in your instructions.

2. **Context** – Provide necessary background or scenario.

3. **Precision** – Define constraints or desired style/output.

4. **Role Play** – Ask the model to act as a specific expert or persona (e.g., "Act as a product manager...").

🖊 Also:

- Use **zero-shot**, **one-shot**, and **few-shot** techniques depending on how many examples you give the model.

- Apply **Chain-of-Thought (CoT)** or **Tree-of-Thought (ToT)** prompting for complex reasoning tasks.

- Use **iterative refinement** – test, revise, and optimize your prompts.

⚙️ Common Prompt Engineering Tools

Tool	Key Features
IBM watsonx Prompt Lab	Experiment with prompts across foundation models; includes templates for summarization, classification, etc.
Spellbook (by Scale AI)	IDE for prompt testing; includes a prompt editor and template library.
Dust	Chain prompts, version control, custom prompt flows, and API integration.
PromptPerfect	Optimizes prompts for different models (GPT, Claude, LLaMA, DALL-E, etc.) with step-by-step refinements.
OpenAI Playground	Interactive platform for testing prompts with OpenAI models.
PromptBase	Marketplace for buying/selling custom prompts for ChatGPT, Midjourney, etc.

🧩 Benefits of Prompt Engineering

- Enhances model efficiency and reliability.

- Improves output quality, relevance, and tone.

- Reduces unwanted bias or hallucinations in results.

- Helps align AI outputs with specific business, technical, or creative goals.

🧪 Labs and Expert Viewpoints

- Hands-on labs included naive prompting, persona patterns, and prompt optimization exercises.

- Expert videos provided insights on:

    - Real-world prompt use cases.

    - Prompt iteration techniques.

    - Role-specific prompting strategies.

🎓 Learning Outcomes

- Learned how to **craft effective prompts** to guide generative AI models.

- Mastered various **prompt engineering approaches** to optimize AI responses.

- Experienced hands-on labs and heard insights from field experts.

🧩 Key Techniques & Concepts

1️⃣ Zero-shot Prompting

- The model generates a response **without any examples**.

- Best for simple tasks or quick testing.

2️⃣ Few-shot Prompting

- Includes **a few examples** within the prompt to teach the model the expected format or logic.

- Leverages **in-context learning** for improved performance.

3 Interview Pattern

- Emulates a back-and-forth **conversational style**.

- Allows for **dynamic, iterative** question-and-response interaction.

4 Chain-of-Thought (CoT)

- Guides the model to perform **step-by-step reasoning**.

- Enhances logical and cognitive response capabilities.

- Ideal for math, logic, and reasoning tasks.

5 Tree-of-Thought (ToT)

- An advanced version of CoT.

- Structures reasoning in a **hierarchical, tree-like format**.

- Useful for **complex decision-making, planning, and creativity**.

🛠️ 6 Techniques to Improve Prompt Quality

Technique	Description
🎯 Task Specification	Clearly define the goal or task for the AI
📘 Contextual Guidance	Provide background info or context
🧠 Domain Expertise	Use domain-specific knowledge or language
⚖️ Bias Mitigation	Avoid leading or biased phrasing
🧱 Prompt Structuring	Define response format or reasoning logic
🔁 User Feedback Loop	Continuously refine based on outputs

🌟 Benefits of Effective Prompting

- Improves **explainability** of LLM responses

- Addresses **ethical concerns** and bias mitigation

- Builds **user trust**

- Enables **flexible, innovative task applications**

Below is the English version of the glossary for "Generative AI: Prompt Engineering":

Generative AI: Prompt Engineering Glossary

Term	Definition
API integration	Application programming interface integration refers to the process of connecting different software systems or applications through their APIs to enable them to work together and share data or functionality.
Bias mitigation	A technique in which text prompts provide explicit instructions to generate neutral responses.
Chain-of-Thought	An approach to prompt engineering that involves breaking down a complex task into smaller and more manageable steps through a sequence of simpler prompts.
ChatGPT	A language model designed to provide detailed responses to natural language input.
Claude	A powerful and flexible AI chatbot built to assist you with various tasks.
Contextual guidance	A technique in which text prompts include specific instructions to help LLMs generate more relevant outputs by providing necessary background or situational context.
DALL-E	A text-to-image model that generates digital images from natural language descriptions.

Domain expertise	A technique wherein text prompts utilize domain-specific terminology to generate content in specialized fields—such as medicine, law, or engineering—where accuracy and precision are critical.
Dust	A prompt engineering tool that provides a web interface for writing prompts and chaining them together.
Explainability	Refers to the degree to which a user can understand and interpret the model's decision-making process and the reasons behind its generated outputs.
Few-shot prompting	A method that facilitates context learning by providing demonstrations within the prompt to steer the model toward improved performance.
Framing	A technique where text prompts are structured to guide LLMs in generating responses that fall within specified boundaries or contexts.
Generative AI	A type of artificial intelligence that can create new content, such as text, images, audio, or video.
Generative AI models	Models capable of understanding the context of input content to generate new content. Generally used for automated content creation and interactive communication.
GPT	Generative Pre-trained Transformers; a family of neural networks that use the transformer architecture to produce human-like text or content as output.
IBM watsonx.ai	A platform consisting of integrated tools designed for training, fine-tuning, deploying, and managing foundation models with ease.
Integrated Development Environment (IDE)	A software tool designed for writing, testing, and executing prompts as they interact with language models.
Input data	Any piece of information provided as part of the prompt.

Interview pattern approach	A prompt engineering strategy that simulates a conversational or interview-like interaction with the model to obtain more dynamic and iterative responses.
LangChain	A Python library that provides functionalities for building and chaining prompts together in a structured workflow.
Large language models (LLMs)	Deep learning models that are trained on massive amounts of text to understand language patterns and structures. They can perform various language-related tasks, including text generation, translation, summarization, and sentiment analysis.
Midjourney	A text-to-image model that generates images based on natural language descriptions provided by the user.
Naive prompting	Asking queries from the model in the simplest possible manner without any additional guidance or context.
Natural language processing (NLP)	A branch of artificial intelligence that enables computers to understand, interpret, and generate human language.
OpenAI Playground	A web-based tool that allows users to experiment with and test prompts on various OpenAI models, such as GPT.
Output indicator	Benchmarks or metrics used to assess the attributes of the output generated by the model.
Prompt	The instructions or questions given to a generative AI model to generate new content.
Prompt engineering	The process of designing effective prompts to achieve desired and improved responses from generative AI models.
PromptBase	A marketplace for buying and selling prompts.
Prompt lab	A tool that allows users to experiment with prompts across different foundation models, building custom prompts based on their needs.

PromptPerfect	A tool used to optimize prompts for various LLMs or text-to-image models, refining them to improve the quality of generated outputs.
Role-play/Persona pattern	A specific format or structure for constructing prompts that involves assuming a particular character or perspective to guide the output.
Scale AI	A technology company that specializes in data labeling and annotation services.
Stable Diffusion	A text-to-image model that generates detailed images based on textual descriptions.
StableLM	An open-source language model trained on a dataset containing trillions of tokens.
Tree-of-Thought	An advanced prompt engineering approach that structures a prompt hierarchically, like a tree, to direct the model's reasoning and specify the desired line of thinking.
User feedback loop	A technique where users iteratively refine prompts based on the responses generated by the LLM, using feedback to improve subsequent outputs.
Zero-shot prompting	A method in which generative AI models generate meaningful responses to prompts without prior training or the need for demonstration examples within the prompt.