

Gemini Prompt Engineering Course

Rjvir Atwal, Alex Ho, Sabhyata Nihalani, Bodee Besser, Amay Jayesh Ghia, Mounica Policharla, Ethan Lin, Akshat Saraogi and Priyansh Bhattacharya

July 11th, 2025



Module 1

Foundations of AI and Prompt Engineering

Module 1 Overview: Learning Objectives

By the end of this module, MSIS staff will be able to:

- Explain what Artificial Intelligence (AI) is and how it's used
- Understand what prompt engineering is and why it matters
- Break down the components of an effective prompt
- Understand how LLMs (Large Language Models) interpret prompts
- Recognize the ethical and legal considerations around AI use
- Apply responsible AI usage practices

Module 1 Overview: Learning Benefits

Benefits:

- Identify opportunities to automate repetitive tasks or enhance decision-making with AI tools
- Save time and frustration by knowing how to "ask" AI the right way
- Create prompts that deliver exactly what you need
- Avoid common prompt mistakes that lead to irrelevant or biased results
- Know when it's appropriate to use AI vs. when human oversight is required
- Use AI safely and ethically in real work scenarios

Module 1 Agenda – AI & Prompt Engineering

What is AI? - Explore Definitions, Benefits, Applications of AI

AI Landscape - Explore the different major subfields of AI

What is Prompt Engineering? – Explore prompting and importance of prompt engineering

How LLMs work? – Learn about Large Language Models and how they interpret prompts

Ethical and Legal Considerations - Explore ethical considerations and guidelines and familiarize with major regulations

Overview

What is AI?

Prompt Engineering

How LLM works

Ethical and Legal

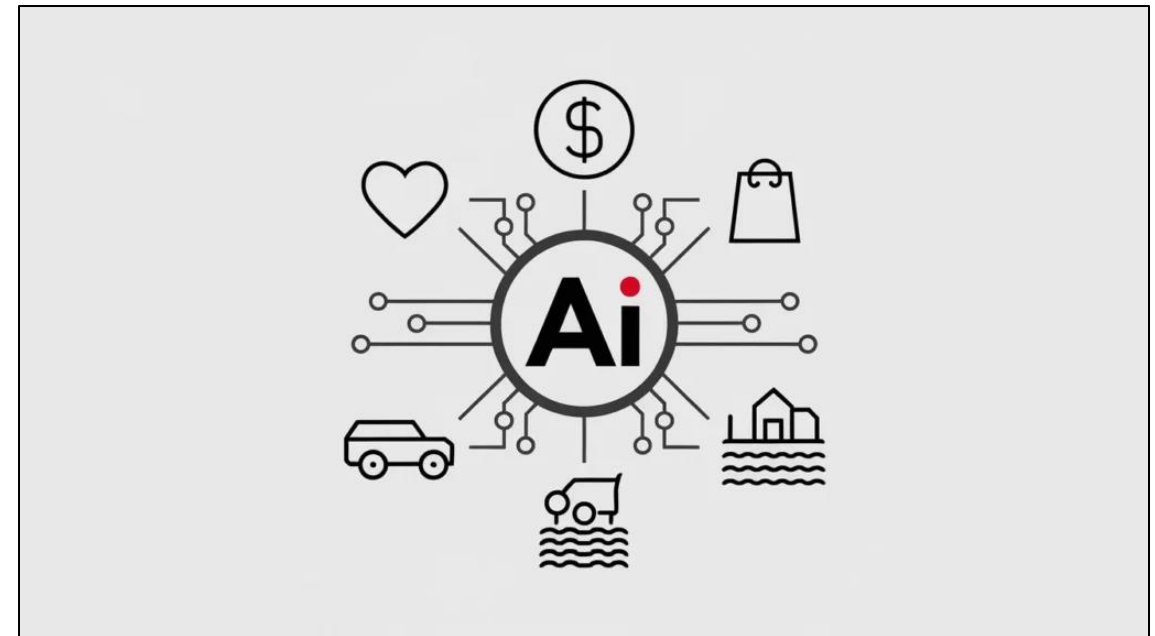
Conclusion

Section 1: What is Artificial Intelligence

Artificial intelligence (AI) is a “field of science concerned with building computers and machines that can reason, learn, and act in such a way that would normally require human intelligence or that involves data whose scale exceeds what humans can analyze”

- **Key Features:**

- **Learning:** improve performance overtime through learning from data
- **Reasoning:** solve problems using logic, rules, algorithms
- **Perception:** interpret input to understand context and environment
- **Natural Language Processing (NLP):** understand, interpret, and respond to human language



Source: [Google Cloud](#)

Benefits of AI

Automation

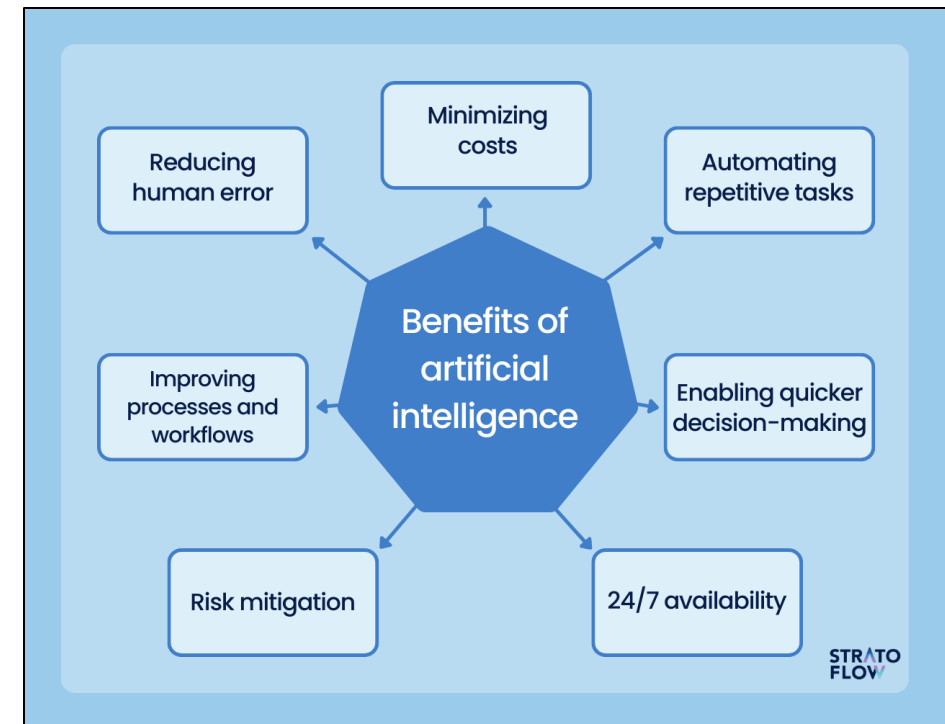
Reduce human error

Eliminate repetitive tasks

Fast with great accuracy

Enhanced decision making

Availability and Consistency



Source: [Google Cloud](#)

Applications and Use Cases of AI



Business Intelligence: Data collection, analysis, visualization, decision-making



Healthcare: Disease diagnosis, personalized care



Education: Automated administrative tasks, personalized learning



Finance: Risk and fraud detection, document processing



Manufacturing: Automating tasks, optimize production processes



Additional applications: retail, transportation, energy, ...

Source: [Google Cloud](#)

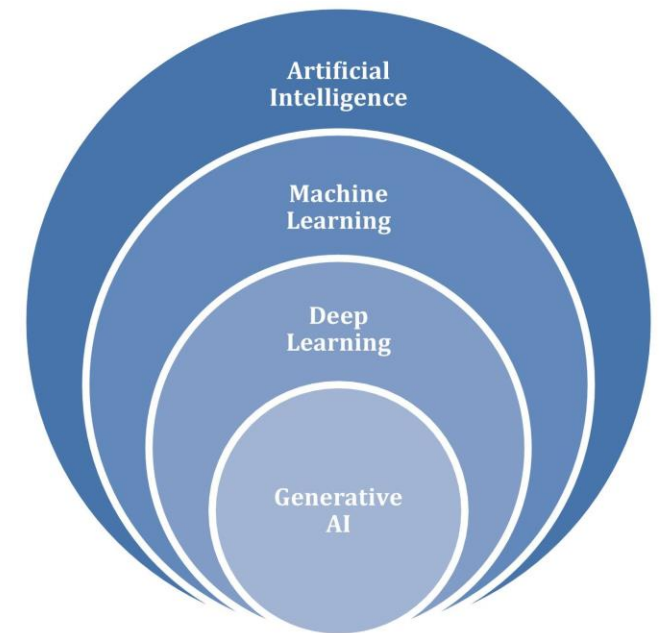
AI Landscape

Artificial Intelligence (AI): the broad field of simulating human intelligence in machines

Machine Learning (ML): a subfield of AI where systems learn from data

Deep Learning (DL): a type of Machine Learning using neural networks for complex tasks

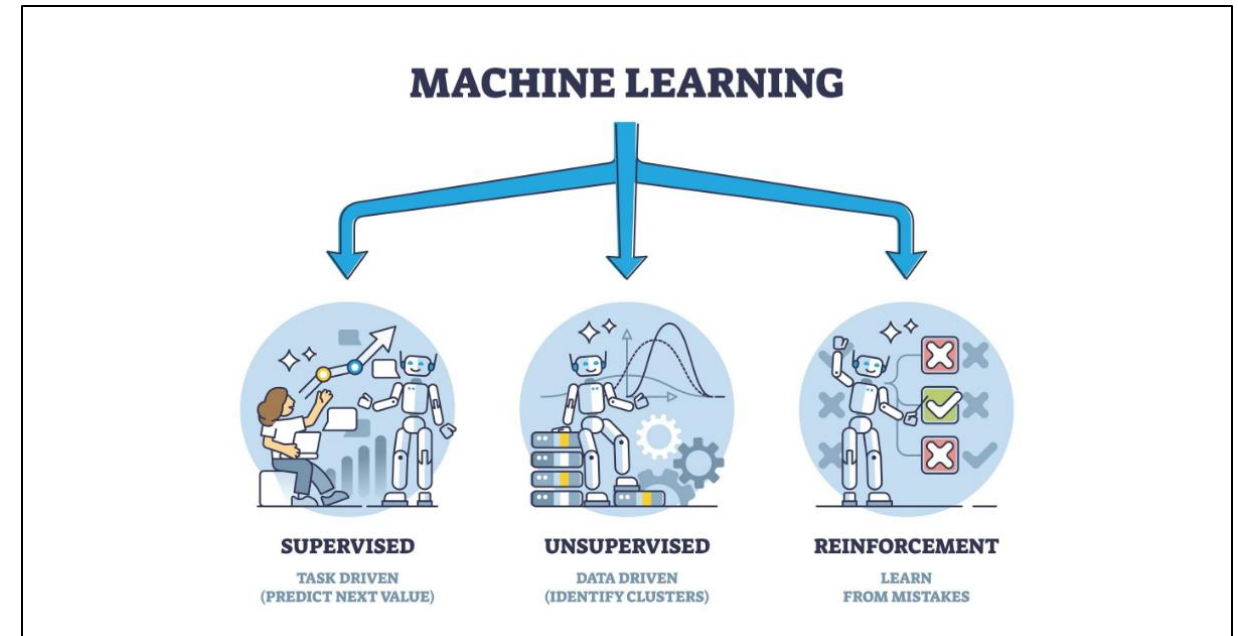
Generative AI: A type of Deep Learning that creates new content like text and images



Source: [Fundamentals of AI](#)

Machine Learning

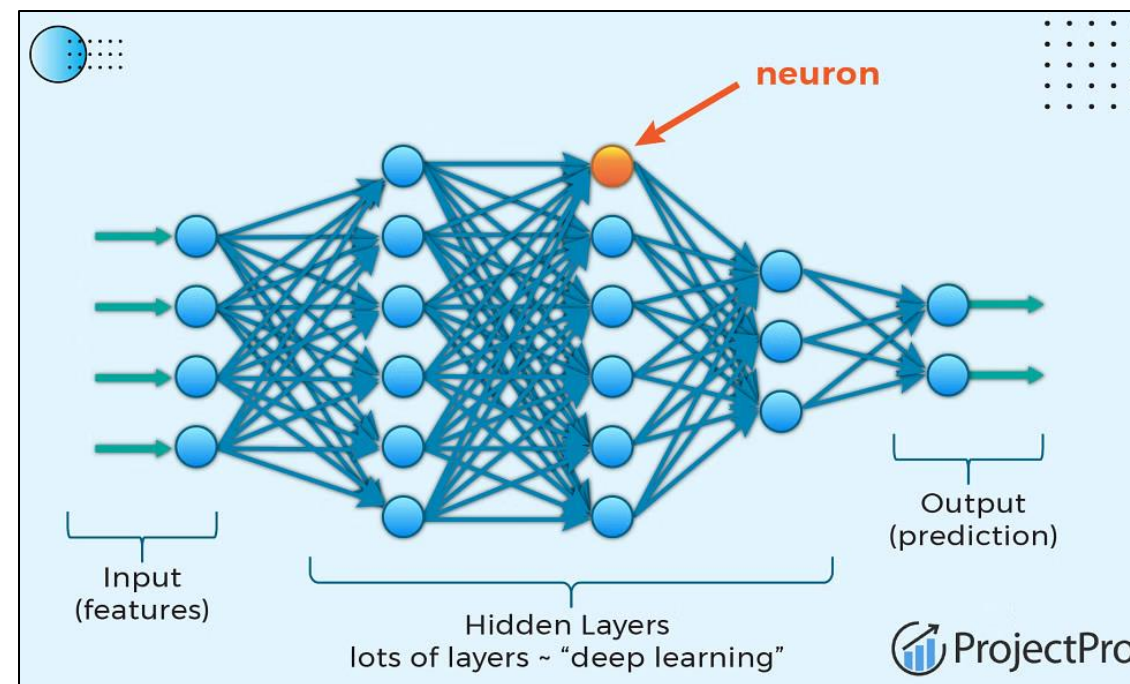
- Machine Learning (ML) is a branch of AI focused on enabling computers and machines to imitate the way that humans learn, to perform tasks autonomously, and to improve their performance and accuracy through experience and exposure to more data
- ML allows computers to learn from data and improve performance over time



Source: [IBM](#)

Deep Learning

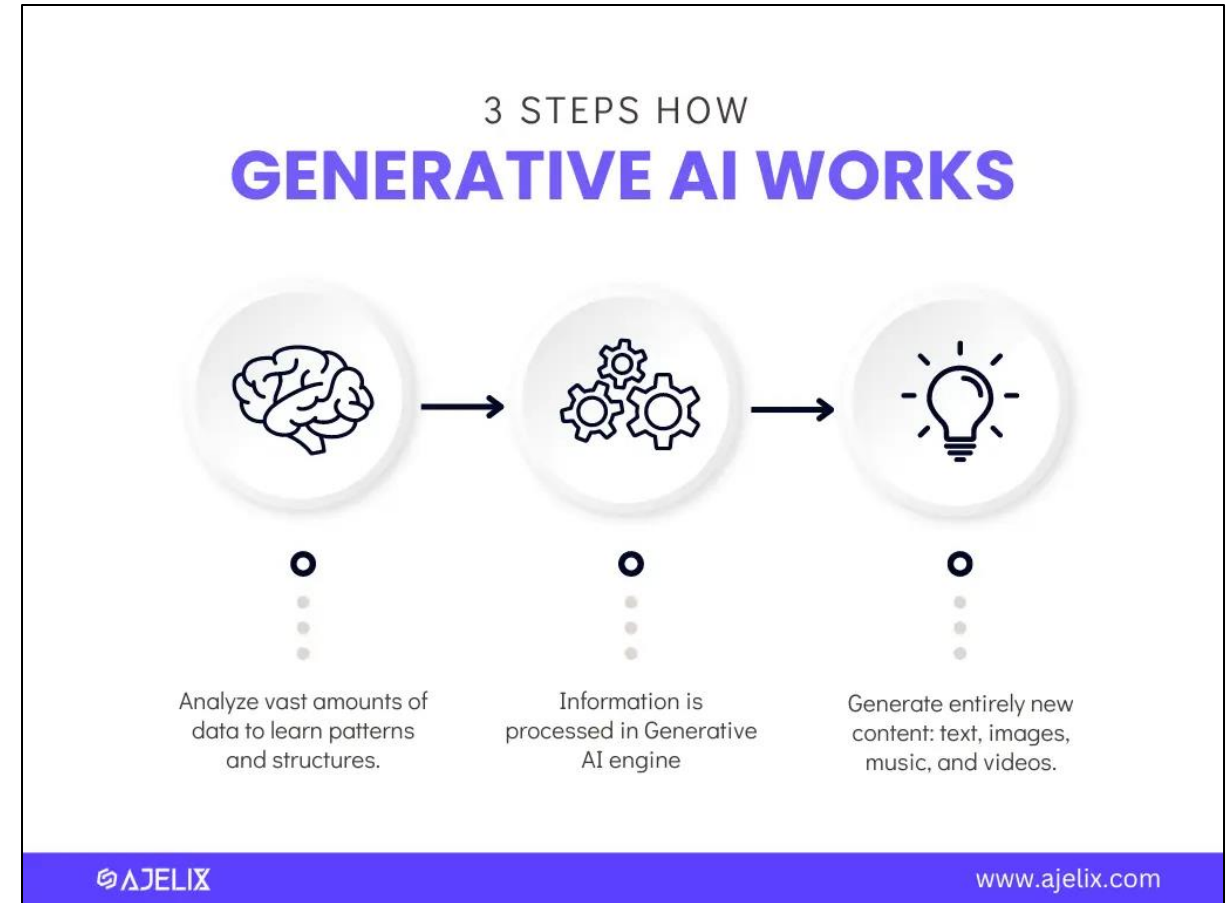
- Deep learning is a subset of machine learning that uses multilayered neural networks, called deep neural networks, to simulate the complex decision-making power of the human brain
- Inspired by the human brain



Source: [Google Cloud](#)

Generative AI

- A category within AI, often utilizing deep learning, that focuses on generating new content or data that is similar to the input data it has been trained on
 - This can include creating images, videos, text, or sound that resemble the training data but are new and original outputs
- A generative model can take what it has learned from the examples it's been shown and create something entirely new based on that information. Hence the word “generative!”
 - Large Language models (Gemini)



Source: [Google](#)

Section 2: What is Prompt Engineering

- **Prompting:** Giving Generative AI specific instructions to receive new information or to achieve a desired goal
- **Prompt Engineering:** the practice of designing inputs for AI tools that will produce optimal outputs
- **Why Prompt Engineering is important:**
 - Without proper prompt engineering, you risk receiving irrelevant, inaccurate, or incomplete responses from AI systems
 - With good prompts, you can maximize the effectiveness of the model, ensuring more useful results

Source: [McKinsey](#)

Example Prompt Comparison

- **Bad Prompt:** “Tell me about meditation”
- **Output:** “Meditation is a practice where an individual uses a technique, such as mindfulness, or focusing the mind on a particular object, thought, or activity, to train attention and awareness, and achieve a mentally clear and emotionally calm and stable state.”

Analysis:

- **Prompt too broad**
- **Output is generic and lacks context**
- **Dry, factual response**

Example Prompt Comparison

- **Good Prompt:** “Write a 150-word introduction for a blog post about the benefits of meditation for college students”
- **Output:** “Meditation offers college students a variety of benefits that can significantly enhance their academic performance, mental health, and overall well-being. By practicing mindfulness, students can reduce stress, improve concentration, and increase emotional resilience. In today’s fast-paced academic environment, meditation provides a much-needed escape from the pressures of exams and deadlines. Research shows that even short, daily sessions can promote better sleep, lower anxiety levels, and foster a sense of calm. As college life becomes more challenging, incorporating meditation into a student’s routine can lead to improved focus and productivity, making it a powerful tool for success.”

Analysis:

- Prompt is more specific with greater request clarity (150-word, for college students,...)
- Output is more relevant, focused and actionable
- Specified target audience and context (blog post)

Anatomy of a Prompt

Example Prompt: “Summarize the following article about work trends in 2024. Format your answer as a list of bullet-points containing main themes from the article”

Three Core Components:

- **Instruction:** What should the AI do?
 - Ex: “Summarize the following article ...”
- **Context:** What does the AI need to know?
 - Ex: “... article about work trends in 2024 ...”
- **Format:** How should the output be structured?
 - Ex: “... Format your answer as a list of bullet-points containing main themes”

Section 3: How LLMs Interpret Prompts

Large Language Model (LLM) are models trained on immense amounts of data, making them capable of understanding and generating natural language and other types of content to perform a wide range of tasks

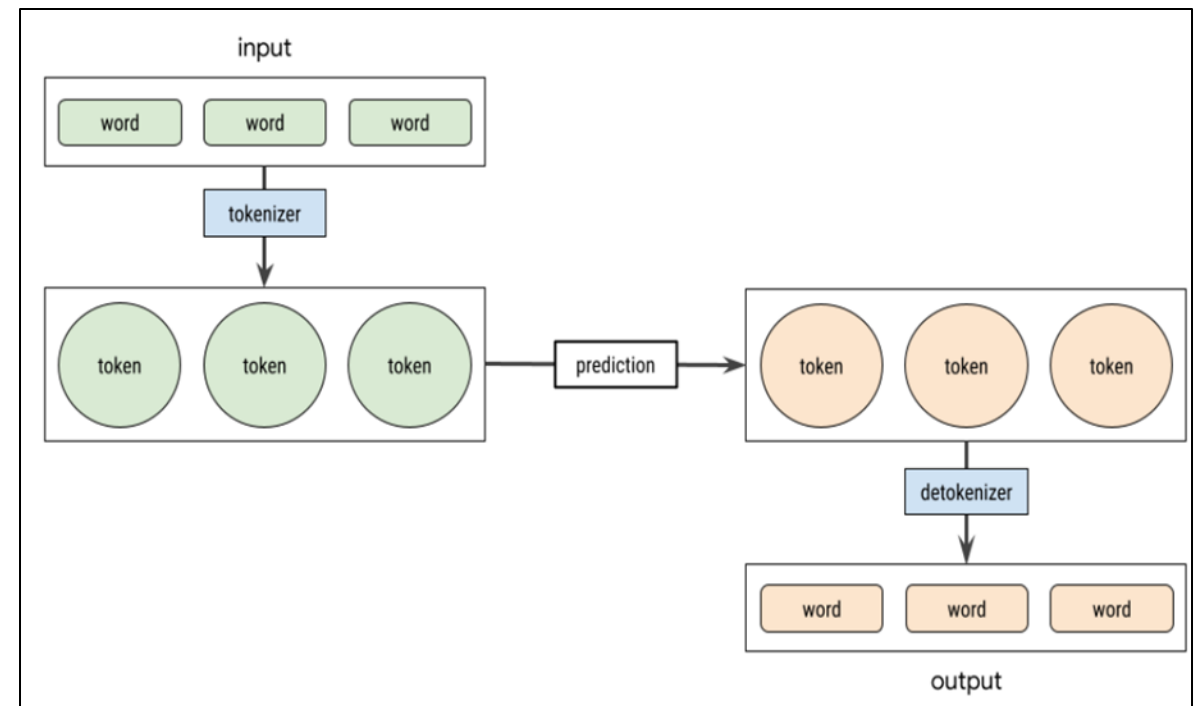
- Model performance can be increased through prompt engineering
- Applications: text generation, content summarization, AI assistants, language translation,...



Source: [Cloudflare](#)

How LLMs Work

- **Tokenization:** convert input text (prompt) into tokens, which can be words or individual characters. This process help LLMs process text efficiently
- **Context Windows:** the amount of text a model can consider at once when processing
- LLM interpret prompts by breaking down the input into tokens, identify patterns, and use them to predict the next most likely sequence of tokens



Source: [Hugging Face](#), [IBM](#)

Section 4: Ethical and Legal Considerations

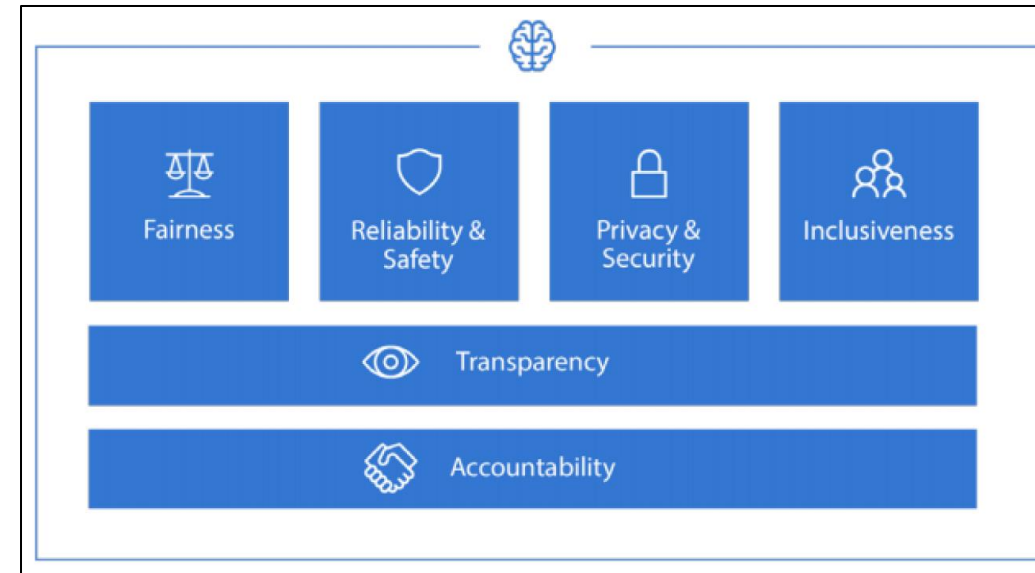
- Ethical challenges in Prompt Engineering
 - **Bias Reinforcement:** if prompt contains stereotypes or bias, AI might repeat or strengthen these ideas
 - **Misinformation:** poorly designed prompts can lead to misleading information
 - **Harmful Content:** AI could accidentally produce harmful or dangerous content if prompts are poorly crafted
 - **Exploitation of System Flaws:** writing prompts to trick or exploit AI flaws could encourage unethical use of AI



Source: [Slash](#)

Ethical Considerations in Prompt Design

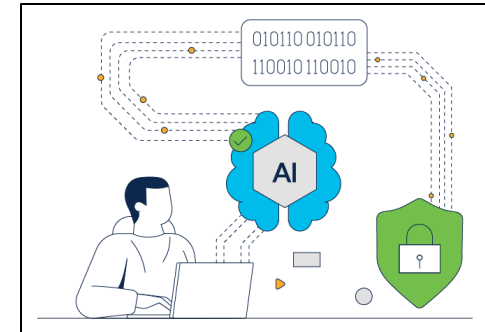
- **Avoid Harmful Content:** prompts must not solicit violent, discriminatory, hateful, or illegal material
- **Consider Impact on Different User Group:** prompts and outputs should avoid stereotyping and misrepresenting user groups
- **Encourage Accuracy, Inclusivity, Fairness:** prompt designs and outputs should ensure balanced representation among diverse demographic groups



Source: [Slash](#)

Safety and Security Best Practice

- **Avoid Inputting Sensitive Data:** Do not use prompts containing personal, financial, or confidential information
 - Anonymize content
 - Preprocess inputs to extract safe data beforehand
 - Use secure systems
 - Set review policies for prompt risk
- **Verify Critical information:** Do not assume outputs are always factual and cross-check with trusted data sources
- **What Could Go Wrong?**
 - **Scenario:** Copying and pasting a student's private information into a prompt to summarize for documentation
 - **Risk:** violating FERPA and institutional data privacy rules or potential storage or misuse of sensitive data
 - **Best Practice:** Replace identifiable information with placeholders (example: [Student A] instead of name,...) or summarize the input manually before inputting into AI products (ex: "Student A is struggling with ...")
 - Ask AI to summarize or reword a template copy without real student data



Source: [Slash](#)

Responsible AI Usage Guidelines and Best Practices

- **Avoid pasting anything that contains:**
 - Student private information
 - Confidential materials
- **Use Templates** where possible when asking AI to draft materials and documentation
- **Verify Outputs** by cross checking against reliable sources
- **Transparency:** make it clear when and where AI is involved in the creation of content or decision making; especially in interactions with customers
- **Avoid Over-Reliance on AI:** AI should assist and not replace expert and human judgements
 - Important to have human supervision and policies



AI for Education

How to Use AI Responsibly **EVERY** Time

E **VALUATE** the initial output to see if it meets the intended purpose and your needs.

V **ERIFY** facts, figures, quotes, and data using reliable sources to ensure there are no hallucinations or bias.

E **NGAGE** in every conversation with the GenAI chatbot, providing critical feedback and oversight to improve the AI's output.

R **EVISE** the results to reflect your unique needs, style, and/or tone. AI output is a great starting point, but shouldn't be a final product.

Y **OU** are responsible for everything you create with AI. Always be transparent about how you've used these tools.

© 2023 AI for Education & Vera Cubero - V2 aiforeducation.io

Source: [Slash](#)

Plagiarism and Originality

- **Understand risk of Plagiarism:** AI can generate outputs that closely resemble training content, raising plagiarism and copyright risks
 - Use AI for brainstorm, outline, or draft content
 - Add insights or structure during revision to ensure human inputs
 - Run generated content through plagiarism detectors and style checker
- **Ownership of AI-Generated Content:** AI outputs alone may not be eligible for IP protection without significant human input



Source: [U.S. Copyright Office](#)

US Legal Considerations

Intellectual Property (IP) and Copyright Law

US Copyright Office Guidance on AI

- AI-generated content without human authorship is not eligible for copyright
- Human input must be “creative and controlling” to qualify
- Requires disclosure of AI involvement in copyright applications

Relevant for

- Using AI to create course materials, academic content, or publications
- Faculty and student ownership of AI-assisted work

Best Practice

- Use AI for initial structure or brainstorming
- Revise content carefully after generation and run through plagiarism or style checkers

Data Privacy and Transparency Requirements

FERPA (Family Education Rights and Privacy Act)

- Protects student education records and personally identifiable information (PII)
- Requires notification of how student records are used including uses for AI tools

Relevant for

- AI tools used in advising, admissions, grading, or learning analytics
- Entering student data into AI systems

Best Practice

- Never enter actual student data into public AI tools (ChatGPT, non-internal tools)

Source: [NMU](#), [U.S. Copyright Office](#), [Deloitte](#)

US Legal Considerations

Content Responsibility

State Deepfake and Synthetic Media Laws

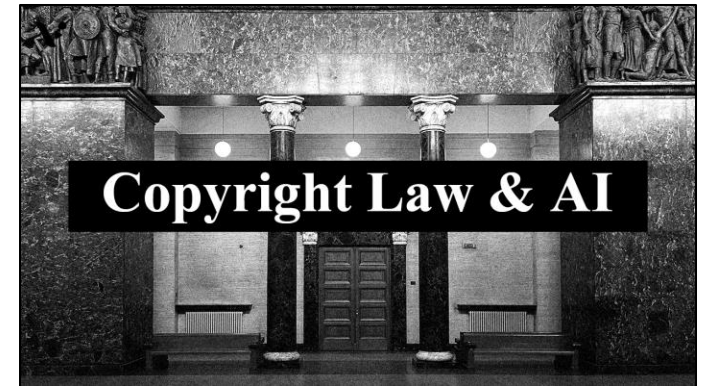
- Require labeling of AI-generated media, especially in communications or political messaging

Relevant for

- Marketing, recruitment, or student-facing video/images that use generative AI

Best Practice

- Label content clearly if AI generated
- Get institutional approval (university, department, administrative office) for public-facing AI media



Source: [halock](#)

EU Legal Considerations

EU AI Act

- Classifies AI into 4 risk levels (unacceptable, high, limited, minimal)
- Generative AI is subject to transparency, risk mitigation, and labeling requirements

Relevant for

- Colleges using foundation models in public services or decision making
- Developing or deploying AI tools in education, admissions, or student support within the EU or with EU students

Source: [whitecase](#)

Module 1 Conclusion

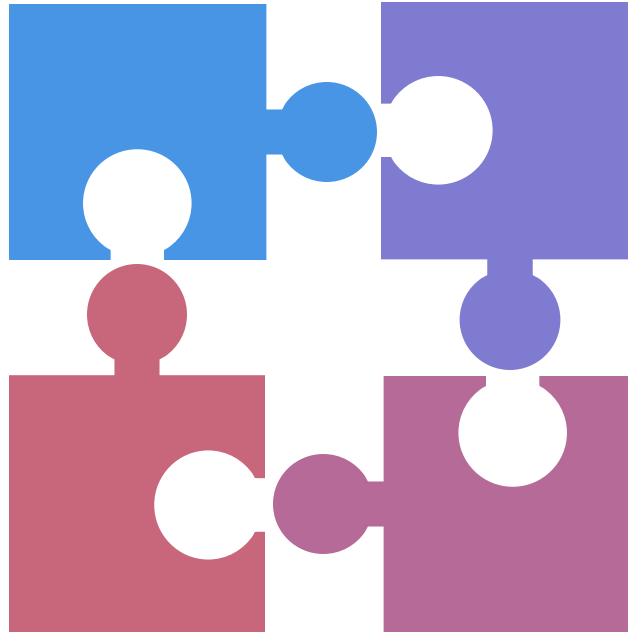
To effectively leverage Gemini-powered tools, learners must cultivate a foundational grasp of AI functionality, prompt engineering strategies, and the ethical frameworks required for safe deployment across use cases

Foundation of AI and Its Impact

- Defines AI as systems that mimic human intelligence to learn, reason, and act
- Explains key AI subfields including machine learning, deep learning, generative AI
- Highlights key applications

Prompt Engineering Breakdown

- Introduce prompting, prompt engineering with examples
- Break down structure of an effective prompt: instruction, context, format
- Emphasizes how prompt quality affects AI output



Understanding How LLMs Work

- Explains tokenization and how models interpret prompts
- Explore context windows and impact on prompt design
- How prompt engineering boosts performance and output quality

Ethical AI Use and Legal Aspects

- Discuss risks like bias, misinformation, and harmful content in AI usage
- Provides legal and ethical guidelines for safe, inclusive AI use
- Discuss US and EU laws, frameworks and best practices in AI use

Goal: Participants will be able to define core concepts in artificial intelligence, explain the principles of prompt engineering, understand how large language models process inputs, and apply ethical safeguards, laying a strong conceptual and operational foundation for effective, responsible use of generative AI tools like Gemini

Module 2

Beginner Prompting Techniques

Learning Objectives for this Module

By the end of this module, MSIS staff will be able to:

- Recognize and define key beginner-level prompting techniques, including Zero Shot, Few-Shot, Chain-of-Thought, Meta Prompting, Self-Consistency, and Generate Knowledge Prompting
- Understand when and why to apply each technique based on the complexity, structure, and outcome required for a given task
- Differentiate between prompting styles through analogies and practical comparisons, gaining confidence in how each method affects output quality and reasoning depth
- Apply each technique in relevant MSIS contexts - such as summarizing meeting notes, generating reports, organizing data, or drafting outreach emails - using hands-on examples
- Evaluate and iterate on prompt quality, identifying opportunities to refine inputs for improved clarity, structure, and performance
- Create effective prompts independently, selecting the right technique to align with tone, reasoning, or task complexity - laying the foundation for more advanced prompting strategies in future modules

Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-
Consistency

Generative
Knowledge

Conclusion

Module Agenda – Beginner Techniques

Zero-Shot Prompting: Ask the model to complete a task without providing any examples

Few-Shot Prompting: Give the model a few examples to guide its response for similar tasks

Chain-of-Thought Prompting: Encourage model to explain its reasoning step by step before answering

Meta Prompting: Prompt the model to generate an optimal prompt for a task

Self-Consistency Prompting: Sample multiple reasoning paths and choose the most consistent final answer

Generate Knowledge Prompting: Ask the model to generate broad knowledge before completing related tasks

Overview

Zero Shot

Few-Shot

C-O-T

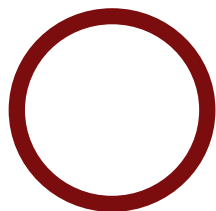
Meta

Self-Consistency

Generative Knowledge

Conclusion

What is Zero-Shot Prompting



Definition:

Asking the AI to complete a task without giving any examples. The AI relies entirely on the phrasing of the prompt to determine the task and generate a response.



Analogy:

It's like asking someone to solve a problem with no context, just the question itself. You trust that they understand the task because they've seen similar problems before.

Source: [IBM](#)

Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-
Consistency

Generative
Knowledge

Conclusion

Benefits of Zero-Shot Prompting



Very fast and efficient – no prep needed



Great for straightforward tasks like summarization, translation, or categorization.



Allows staff to get quick results without needing to create structured examples.



Useful in early exploration phases before refining with few-shot or structured prompts.



Saves time when high accuracy or tone isn't critical.

Source: [IBM](#)

Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-
Consistency

Generative
Knowledge

Conclusion

Zero-Shot Use Case

Scenario:

An MSIS staff member is tasked with organizing a "Women in Technology" awareness and networking event for students, alumni, and faculty. They've never done this before and want to quickly generate a foundational outline using Gemini — without giving it any examples of past event structures.

Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-
Consistency

Generative
Knowledge

Conclusion

Zero-Shot Use Case

Zero-Shot Prompting Steps:

- **Scenario Title:** Planning a "Women in Technology" Event
- **Prompt (Zero-Shot Style):**
“I’m organizing a ‘Women in Technology’ event for MSIS students and alumni. Provide a full event planning outline including key activities, potential speakers, timeline, and marketing ideas.”

Expected Gemini Output:

- Event overview with purpose and goals
- Sample agenda: keynote, panel discussion, breakout sessions, networking
- Suggestions for speaker profiles: alumni in leadership, DEI advocates, faculty
- Step-by-step planning timeline over 6–8 weeks
- Promotion ideas: email campaigns, social media, student ambassador content

Why it works:

This is a great use of Zero-Shot Prompting because it allows Gemini to generate a comprehensive response without needing any prior examples, making it perfect for brainstorming, early-stage planning, or when staff want fast, structured output.

Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-
Consistency

Generative
Knowledge

Conclusion

Zero-Shot Use Case

Scenario:

An MSIS staff member has been asked to create a digital onboarding guide for incoming graduate students. They've never built a resource like this before and want to use Gemini to quickly generate a first draft of the guide, including suggested sections, tone, and delivery format, without providing any examples of past onboarding materials.

Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-
Consistency

Generative
Knowledge

Conclusion

Zero-Shot Use Case

Zero-Shot Prompting Steps:

- **Scenario Title:** Creating a Digital Onboarding Guide for New MSIS Students
- **Prompt (Zero-Shot Style):**
“I’ve been asked to create a digital onboarding guide for incoming MSIS students. I’ve never done something like this before. Generate a full outline including suggested sections, delivery format (PDF, website, video, etc.), tone of writing, key content areas (academics, career prep, community), and any visual or interactive features that would enhance the guide.”

Expected Gemini Output:

- Guide purpose and goals
- Key sections: program intro, academics, career resources, student life
- Format ideas: interactive PDF, embedded videos, clickable maps
- Tone: welcoming, helpful, and student-friendly
- Visuals: testimonials, icons, infographics
- Build timeline: 4–6 weeks

Why it works:

This prompt gives Gemini a clear goal with no examples, making it ideal for quick planning when staff need structure but don’t have prior templates to reference.

Overview

Zero Shot

Few-Shot

C-O-T

Meta

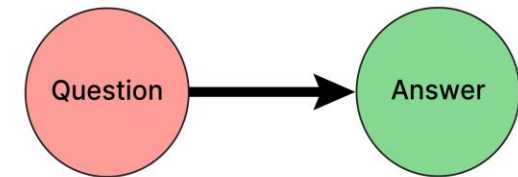
Self-
Consistency

Generative
Knowledge

Conclusion

Creating Your Own Zero-Shot Prompt

- Ask participants to write a zero-shot prompt based on a task they do often (e.g., writing an announcement, drafting a quick response, summarizing data).
- **Things to consider:**
 - Is the task simple enough that examples aren't needed?
 - Does the prompt clearly describe the desired outcome?



Zero-shot

Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-
Consistency

Generative
Knowledge

Conclusion

What is Few-Shot Prompting?



Definition:

Giving the AI a few examples of how a task should be done before asking it to generate a new result.



Analogy:

It's like showing someone a few solved math problems before asking them to solve a similar one on their own.

Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-
Consistency

Generative
Knowledge

Conclusion

Source: [IBM](#)

Benefits of Few-Shot Use Case



Higher quality and more consistent output.



Aligns AI responses to tone, structure, and brand voice.



Useful for tasks with custom formatting or nuanced expectations.



Reduces need for post-editing



Perfect for report writing, policy summaries, and recurring document types.

Source: [IBM](#)

Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-
Consistency

Generative
Knowledge

Conclusion

Few-Shot Use Case

Scenario:

A staff member wants Gemini to summarize changes in enrollment trends.

Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-
Consistency

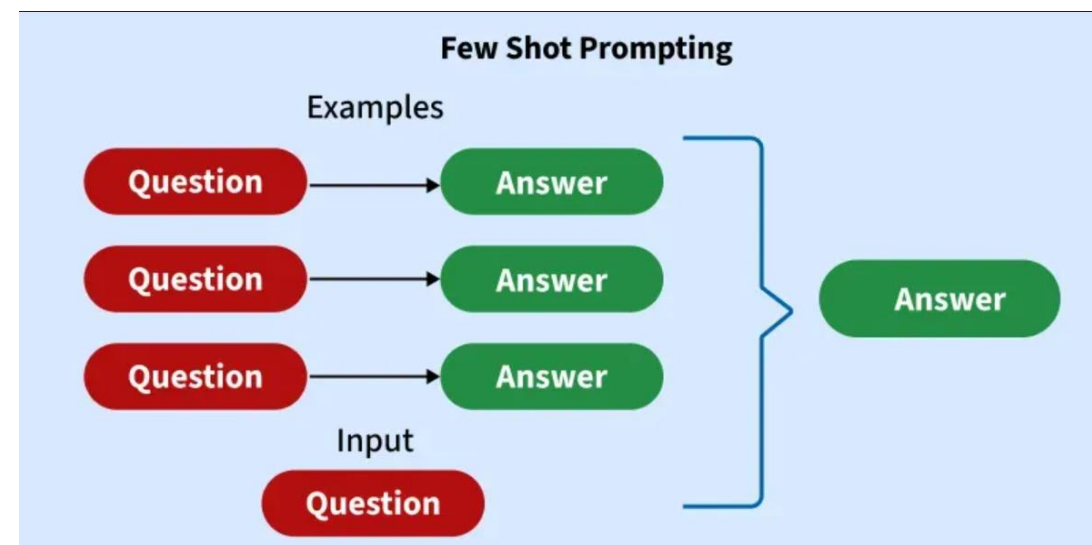
Generative
Knowledge

Conclusion

Few-Shot Use Case

Prompt Examples:

- Raw Data: "Enrollment increased from 220 to 264."
- Summary: "There was a 20% increase in enrollment, likely due to expanded outreach."
- **Task:** "Enrollment increased from 87 to 264 in 3 years. Summarize the trend."
 - Have staff compare Gemini's response to the examples provided.
- **Few-Shot Prompt:** "Here are examples of how we summarize data:"
 - Data: Enrollment rose from 100 to 150.
 - Summary: 50% increase due to new program launches.
 - Now summarize: Enrollment increased from 87 to 264 over 3 years."
 - Compare the insightfulness and tone of both responses.



Few-Shot Use Case

Scenario:

A staff member wants Gemini to draft a welcome message for admitted students using examples from past years' messages as input.

Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-
Consistency

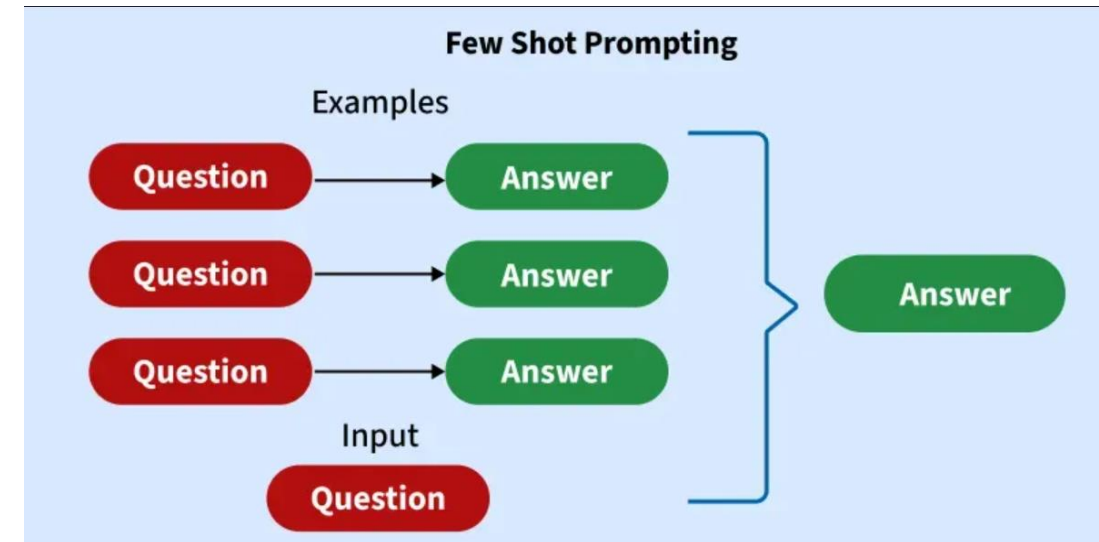
Generative
Knowledge

Conclusion

Few-Shot Use Case

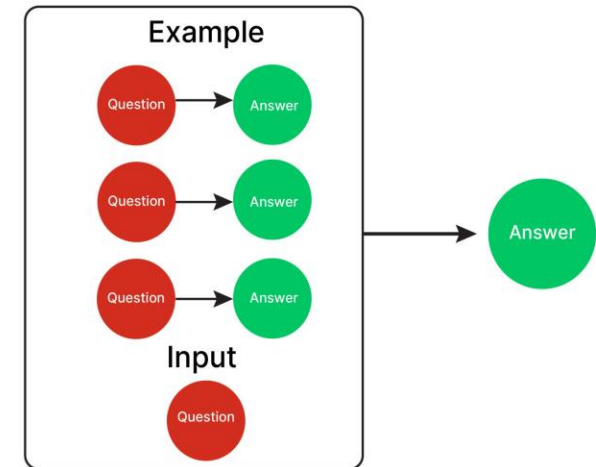
Prompt Examples:

- Example 1: “Welcome to the MSIS program! We’re excited to have you join our diverse and driven community this fall.”
- Example 2: “Congratulations on your admission! The MSIS team is here to support you as you begin this next chapter.”
- **Task:** “Draft a welcome message for newly admitted MSIS students.”
 - Have staff review Gemini’s response compared to the tone, structure, and messaging of the examples.
- **Few-Shot Prompt:** "Here are examples of how we summarize data:"
 - Example 1: ‘Welcome to the MSIS program! We’re excited to have you join our diverse and driven community this fall.’
 - Example 2: ‘Congratulations on your admission! The MSIS team is here to support you as you begin this next chapter.’
 - Now draft a new welcome message for the upcoming cohort.”

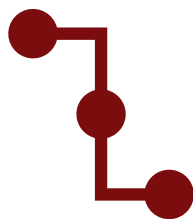


Creating Your Own Few-Shot Prompt:

- Ask participants to build a few-shot prompt for a task they frequently do (e.g., email reply, event recap).
- **Things to consider:**
 - Do your examples show clear input-to-output logic?
 - Is tone/style reflected in each sample?
 - Are the examples relevant to the new task?



What is Chain-of-Thought Prompting



Definition:

Asking the AI to break down its reasoning step-by-step before giving a final answer.



Analogy:

It's like solving a puzzle out loud- you go through each part logically before reaching your conclusion

Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-
Consistency

Generative
Knowledge

Conclusion

Source: [IBM](#)

Benefits of Chain-of-Thought Prompting



Greatly improves performance on tasks that require reasoning.



Helps the AI avoid skipping steps or making logic errors.



Makes AI outputs more explainable and transparent.



Useful for multi-step math, planning, and analysis tasks.



Encourages deeper engagement with the task.

Source: [IBM](#)

Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-
Consistency

Generative
Knowledge

Conclusion

Chain-of-Thought Use Case

Scenario:

An MSIS staff member is planning an outreach event and wants to select the most effective university or location to visit. Since the decision depends on several factors — like student interest, accessibility, and historical attendance — they use Gemini to break down the reasoning process step by step.

Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-
Consistency

Generative
Knowledge

Conclusion

Chain-of-Thought Use Case

Prompt (Chain-of-Thought Style):

“Let’s think step-by-step. Consider student concentration, accessibility, and past attendance data to identify the best location for our next outreach event.”

Enter considerations you would like Gemini to consider:

- “Let’s think step-by-step.
- Our largest student audiences are in **Indianapolis, Bloomington, and Chicago**.
- All three are within 3 hours of travel, but **Chicago** has higher transportation costs.
- Last year’s event attendance was:
 - Chicago: 120 attendees
 - Bloomington: 90 attendees
 - Indianapolis: 65 attendeesGiven this data, which location would be best for our next MSIS outreach event, and why?”

Why it works:

It guides Gemini through a logical sequence before delivering an answer. Instead of jumping straight to a conclusion, the model walks through each consideration — making the reasoning visible, explainable, and easier to trust.

Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-
Consistency

Generative
Knowledge

Conclusion

Chain-of-Thought Use Case

Scenario:

An MSIS staff member is reviewing scholarship applications and needs to decide which students to prioritize for limited funding. Because the decision involves weighing multiple criteria, such as GPA, leadership involvement, financial need, and alignment with program goals, they use Gemini to walk through the evaluation process step by step.

Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-
Consistency

Generative
Knowledge

Conclusion

Chain-of-Thought Use Case

Prompt (Chain-of-Thought Style):

“Let’s reason step-by-step. Consider student impact, cost per student, and alignment with program goals to help us decide how to allocate a limited budget across student events, marketing, and career services.”

Enter considerations you would like Gemini to consider:

- “Let’s think step-by-step.
- We have a \$30,000 annual budget to split between:
 - Student events (cost: \$50/student; high engagement)
 - Marketing/outreach (cost: \$70/student reached; boosts applications)
 - Career services (cost: \$100/student; improves job outcomes)

Goal: maximize student value while aligning with MSIS priorities (retention, visibility, outcomes)

Past feedback indicates student events drive belonging, while career support impacts placement stats.”

Question: How should we allocate the \$30,000 across these three areas, and why?

Why it works:

It guides Gemini through a logical sequence before delivering an answer. Instead of jumping straight to a conclusion, the model walks through each consideration — making the reasoning visible, explainable, and easier to trust.

Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-
Consistency

Generative
Knowledge

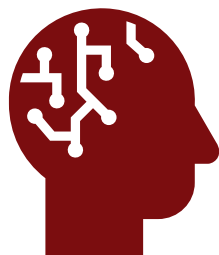
Conclusion

Creating Your Own Chain-of-Thought Prompt

- Ask participants write a step-by-step prompt for a real decision-making task.
- **Things to consider:**
 - Are you guiding the AI through a clear sequence?
 - Does each step build logically?
 - Is the final conclusion based on evidence from earlier steps?

Standard Prompting	Chain-of-Thought Prompting
<p>Model Input</p> <p>Q: Roger has 5 tennis balls. He buys 2 more cans of tennis balls. Each can has 3 tennis balls. How many tennis balls does he have now?</p> <p>A: The answer is 11.</p> <p>Q: The cafeteria had 23 apples. If they used 20 to make lunch and bought 6 more, how many apples do they have?</p>	<p>Model Input</p> <p>Q: Roger has 5 tennis balls. He buys 2 more cans of tennis balls. Each can has 3 tennis balls. How many tennis balls does he have now?</p> <p>A: Roger started with 5 balls. 2 cans of 3 tennis balls each is 6 tennis balls. $5 + 6 = 11$. The answer is 11.</p> <p>Q: The cafeteria had 23 apples. If they used 20 to make lunch and bought 6 more, how many apples do they have?</p>
<p>Model Output</p> <p>A: The answer is 27. ❌</p>	<p>Model Output</p> <p>A: The cafeteria had 23 apples originally. They used 20 to make lunch. So they had $23 - 20 = 3$. They bought 6 more apples, so they have $3 + 6 = 9$. The answer is 9. ✅</p>

What is Meta Prompting



Definition:

Instructing the AI on how to process information, analyze, reason, or structure its response, rather than just providing the task.



Analogy:

It's like asking a teacher how to ask a smart question – you're learning how to learn more effectively by understanding what works best

Source: [IBM](#)

Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-
Consistency

Generative
Knowledge

Conclusion

Benefits of Meta Prompting



Significantly improve accuracy and relevance of generated content



Enhanced consistency and adherence to specific brand, style, or technical guidelines



Reduced instances of factual errors or irrelevant information (hallucinations)



Effective handling of highly complex, multi-stage tasks that would otherwise overwhelm the AI



Guaranteed structured data extraction and generation for downstream processing

Source: [IBM](#)

Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-
Consistency

Generative
Knowledge

Conclusion

Meta Prompt Use Case

Scenario:

A staff member is working on automating a personalized email campaign for an upcoming recruitment event. She's unsure how to structure the prompt to ensure the tone, audience relevance, and key event details are captured effectively.

Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-
Consistency

Generative
Knowledge

Conclusion

Meta Prompt Use Case

Prompt (Meta Prompt Style): “I want to write personalized recruiting emails for different student groups. What is the best way to prompt you so that the tone is professional, the content is relevant to each audience, and the details are accurate?”

Why it works: This is Meta Prompting in action - instead of jumping into content creation, the staff member first asks the AI how to best approach the task. This leads to a more refined, thoughtful prompt that ensures the generated emails are aligned with her goals. It also teaches her how to structure future prompts more effectively.

Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-
Consistency

Generative
Knowledge

Conclusion

Meta Prompt Use Case

Scenario:

A staff member is creating a survey to collect feedback after an MSIS career event. They want to make sure the questions are balanced, clear, and useful but don't know how to frame the prompt effectively.

Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-
Consistency

Generative
Knowledge

Conclusion

Meta Prompt Use Case

Prompt (Meta Prompt Style): “I need to design a short, clear post-event feedback survey for an MSIS career event. How should I prompt you to generate questions that are easy to answer, capture satisfaction, and surface actionable insights?”

Why it works: This is Meta Prompting in action - instead of jumping into content creation, the staff member first asks the AI how to best approach the task. This leads to a more refined, thoughtful prompt that ensures the generated emails are aligned with her goals. It also teaches her how to structure future prompts more effectively.

This prompt helps the staff member think through the design of the prompt before generating the content. It improves question clarity, relevance, and structure, important for effective surveys.

Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-
Consistency

Generative
Knowledge

Conclusion

Creating Your Own Meta Prompt

Write a meta prompt for a task you want help with — but instead of asking the AI to do the task right away, ask it how to prompt for it effectively.

Things to consider:

- What's the task you're trying to accomplish?
- Are you unclear about what to include in your initial prompt?
- Can the AI help you think through better ways to frame your request?

Example Scenarios to Try:

- Planning an event (Event Planning Support)
- Designing a survey (Survey Design and Analysis)
- Creating a student report (Report Generation)
- Tailoring a resume (Resume Review)



Overview

Zero Shot

Few-Shot

C-O-T

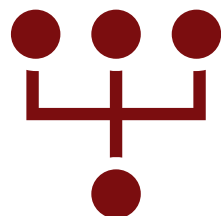
Meta

Self-
Consistency

Generative
Knowledge

Conclusion

What is Self-Consistency Prompting



Definition:

Self-Consistency Prompting asks the AI to generate multiple reasoning paths or answers to the same question - and then selects the most consistent or common response among them

- "What if we ask the LLM to generate multiple diverse reasoning paths to a single problem, and then select the most consistent answer among those paths?"



Analogy:

Imagine asking several different students to solve the same math problem independently and then comparing their answers and methods to find the most common and correct solution

Source: [IBM](#)

Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-
Consistency

Generative
Knowledge

Conclusion

Benefits of Self-Consistency Prompt



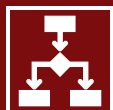
Improved accuracy by sampling multiple reasoning paths and aggregating the most common answer, it reduces individual errors and hallucinations



Reduced sensitivity to prompt variations because its responses are collected and reviewed across multiple attempts, making the final result less dependent on any particular prompt



Although it is an advanced concept, it is a lightweight technique that can be applied to any LLM



Great with handling complex reasoning, especially when there are multiple correct answers

Source: [IBM](#)

Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-
Consistency

Generative
Knowledge

Conclusion

Self-Consistency Prompt Use Case

Scenario:

A staff member is using AI to review and simplify student resumes. Since formatting and tone can vary, she asks the AI to generate multiple revised versions and compare them to decide which is clearest and most professional.

Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-
Consistency

Generative
Knowledge

Conclusion

Self-Consistency Prompt Use Case

Prompt (Self-Consistency Prompt Style): “Generate three different simplified versions of this student’s resume summary. Then compare them and select the one with the clearest tone and most professional formatting.”

Why it works: it leverages multiple outputs, evaluates them against each other, and selects the best one. It reduces randomness and helps ensure the final version meets the user’s quality expectations; especially useful when the "best" version is subjective

Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-
Consistency

Generative
Knowledge

Conclusion

Self-Consistency Prompt Use Case

Scenario:

A staff member is reviewing open ended responses from a satisfaction survey. They want Gemini to help summarize the main themes but ensure the summary isn't biased by a single interpretation.

Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-
Consistency

Generative
Knowledge

Conclusion

Self-Consistency Prompt Use Case

Prompt (Self-Consistency Prompt Style): “Create three summaries of the main themes from this list of open ended student responses: [Insert list of responses]. Then choose the version that best represents the most frequently mentioned issues and ideas.”

Why it works: it leverages multiple outputs, evaluates them against each other, and selects the best one. It reduces randomness and helps ensure the final version meets the user’s quality expectations; especially useful when the "best" version is subjective
This use of Self-Consistency Prompting helps to surface the most representative themes across variations, ideal when interpreting nuanced or subjective responses.

Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-
Consistency

Generative
Knowledge

Conclusion

Create Your Own Self-Consistency Prompt

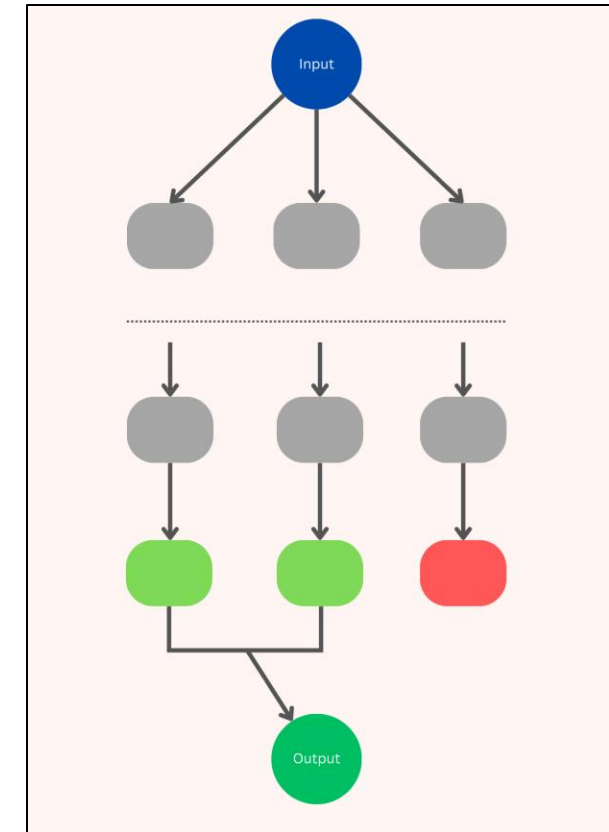
Think of a task where the best answer isn't immediately obvious - like reviewing a resume, analyzing survey responses, or summarizing trends. Write a prompt that asks the AI to generate multiple outputs and select the most consistent or useful one.

Things to consider:

- What are you evaluating for: clarity, tone, logic, accuracy?
- How many versions should the AI generate for comparison? (3 to 5 versions is typically effective)
- Can the AI itself select the best one - or should you compare?

Example Scenarios to Try:

- Extracting key themes from student feedback (Survey Design and Analysis)
- Refining Canvas course language (Content Condensing)
- Writing polished outreach emails (Email Drafting)
- Choosing the clearest data visualization summary (Report Generation)



Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-Consistency

Generative Knowledge

Conclusion

What is Generative Knowledge Prompting



Definition:

Instructing the AI to first generate relevant background knowledge before attempting the main task



Analogy:

It's like asking a researcher to first review the literature and key concepts before writing a proposal to ensure they are well informed to produce a coherent output that aligns with the desired context

Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-
Consistency

Generative
Knowledge

Conclusion

Source: [IBM](#)

Benefits of Generative Knowledge Prompt



Helps the AI "think aloud" by first surfacing supporting facts or context



Fills in missing details that users may not have thought to provide



Improves accuracy and depth of the final output



Especially useful for tasks like course development, report writing, or event planning where good background content is essential



Encourages a more structured, informed approach to AI use

Source: [IBM](#)

Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-
Consistency

Generative
Knowledge

Conclusion

Generative Knowledge Prompt Use Case

Scenario:

Staff members are refining Canvas course materials and want to generate short summaries for key concepts. Instead of asking for the summaries directly, they first prompt the AI to generate core knowledge related to the topic.

Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-
Consistency

Generative
Knowledge

Conclusion

Generative Knowledge Prompt Use Case

Prompt (Generate Knowledge Prompt Style): “Before writing a student-friendly summary of this lesson on business analytics, generate 5 key facts or concepts students should understand about the topic.”

Why it works: it primes the AI with important content before moving to the summary task. It ensures the final output is informed by accurate, relevant knowledge and doesn't miss key learning points. By grounding the response in domain-specific knowledge, it significantly improves reasoning and decision quality

Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-
Consistency

Generative
Knowledge

Conclusion

Generative Knowledge Prompt Use Case

Scenario:

A staff member is developing a welcome guide for incoming MSIS students and wants to ensure key info is covered before drafting the content

Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-
Consistency

Generative
Knowledge

Conclusion

Generative Knowledge Prompt Use Case

Prompt (Generate Knowledge Prompt Style): “Before writing the intro to the MSIS orientation guidebook, list the 5 most important things new students should know about academic support, program expectations, and career planning.”

Why it works: it primes the AI with important content before moving to the summary task. It ensures the final output is informed by accurate, relevant knowledge and doesn't miss key learning points. By grounding the response in domain-specific knowledge, it significantly improves reasoning and decision quality

Generative Knowledge Prompting ensures the AI starts with critical facts or concepts. This makes the final draft more informative and comprehensive, perfect for onboarding materials or educational content

Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-
Consistency

Generative
Knowledge

Conclusion

Create Your Own Generative Knowledge Prompt

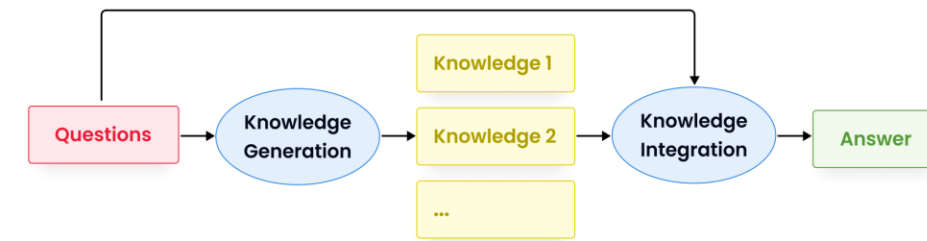
Think of a task where background facts or context are essential - such as course content creation, survey design, or drafting a report. Write a prompt that asks the AI to generate the key knowledge first, before completing the final task.

Things to consider:

- What kind of knowledge does the AI need to produce a good answer?
- Can the task be improved by surfacing key facts, steps, or definitions first?
- Would breaking the task into two steps (generate -> apply) increase quality?

Example Scenarios to Try:

- Writing learning summaries (Content Condensing & Canvas Development)
- Creating data reports with interpretation (Report Generation)
- Designing outreach materials for events (Event Planning Support)



Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-Consistency

Generative Knowledge

Conclusion

Module Conclusion – Beginner Techniques

In this module, you'll explore six foundational AI prompting techniques designed to help staff quickly generate high-quality outputs with Gemini

Zero-Shot Prompting	Few-Shot Prompting	Chain-of-Thought	Meta Prompting	Self-Consistency Prompting	Gen Knowledge Prompting
Use the AI without examples — fast, direct, and great for straightforward tasks.	Guide the AI using a few examples — perfect for getting consistent, styled outputs.	Encourage step-by-step reasoning — helps with logical, multi-step tasks.	Teach the AI how to think — instruct it to design and refine its own prompts.	Have the AI generate multiple answers, then select the most consistent one.	Ask the AI to produce background knowledge before completing a task.

Goal: By the end of this module, you'll be able to apply these techniques to everyday tasks like summarizing reports, drafting communications, and supporting decision-making — while choosing the prompt style that best fits the situation

Source: IBM

Overview

Zero Shot

Few-Shot

C-O-T

Meta

Self-Consistency

Generative Knowledge

Conclusion

Module 3

Intermediate Prompting Techniques

Learning Objectives for this Module

By the end of this module, learners will be able to:

- How to break tasks into Prompt Chains for multi-stage workflows.
- How to use Tree of Thoughts Prompting to explore and evaluate multiple reasoning paths.
- How to enhance responses with Retrieval-Augmented Generation (RAG) by bringing in external knowledge.
- How to leverage Automatic Reasoning & Tool-Use so AI can solve problems using external tools.
- How to let AI optimize itself with Automatic Prompt Engineering for improved output quality.
- How to write Active Prompts so AI asks clarifying questions when inputs are ambiguous.

Module Agenda – Intermediate Techniques

Prompt Chaining: Breaks complex tasks, linking prompts

Tree of Thoughts Prompting: Explore multiple reasoning paths

Retrieval Augmented Generation (RAG): Fetching relevant info from external sources

Automatic Reasoning and Tool-Use: Think through problems and use tools automatically

Automatic Prompt Engineer: Creates & improves its prompts

Active Prompt: AI asks clarifying questions before answering

Overview

Chaining

T-O-T

RAG

Reasoning

Auto PE

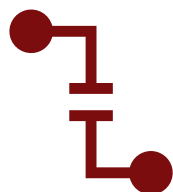
Active

Conclusion



What if instead of asking an AI to solve a big problem all at once, we guided it through a step-by-step journey to the solution?

What is Prompt Chaining



Definition:

Breaking a complex task into a sequence of smaller, connected prompts, where the output of one step becomes the input for the next.



Analogy:

It's like assembling a car on a production line – each station completes part of the job, and the final product emerges step by step

Benefits of Prompt Chaining



Breaks down complex problems into manageable steps, improving overall task success.



Enables the AI to maintain context across multiple stages for more coherent responses.



Helps identify and correct errors early in the chain reducing compounding mistakes.



Supports iterative refinement and deeper reasoning by building on previous outputs.



Facilitates handling multi-part workflows, such as data analysis or multi-step decision-making.

Source: [IBM](#)

Overview

Chaining

T-O-T

RAG

Reasoning

Auto PE

Active

Conclusion

Prompt Chaining Use Case

Scenario:

A staff member wants to streamline tedious reporting and communication tasks using AI tools by chaining multiple prompts together.

Overview

Chaining

T-O-T

RAG

Reasoning

Auto PE

Active

Conclusion

Prompt Chaining Use Case

Prompt Chaining Steps:

1. *Upload a pivot table to Gemini* “First, analyze the Salesforce export and generate a pivot table showing Jump Start members by section and classroom.”
2. “Next, write a short narrative summarizing the key trends, notable exceptions, and any recommendations based on the data.”

upload pivot table to Gemini after step 1 of prompt chaining

Name	Section	Classroom
Alex Smith	A	101
Jamie Patel	B	102
Taylor Jones	A	101
Morgan Lee	B	103
Jordan Kim	C	104
Riley Chen	B	102
Casey Nguyen	C	104

Prompt Chaining Use Case

Scenario:

A staff member draft a clean, professional department update email from messy meeting notes.

Overview

Chaining

T-O-T

RAG

Reasoning

Auto PE

Active

Conclusion

Prompt Chaining Use Case

Prompt 1 – **Turn Notes into a Summary**

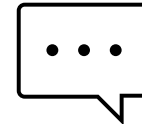
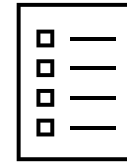
“Here are my rough meeting notes. Turn them into a short summary of key updates: [paste notes]”

Prompt 2 – **Add Professional Tone**

“Rewrite these updates into a professional department email with a warm, informative tone.”

Prompt 3 – **Adjust for Specific Audience**

“Now revise this email to be for faculty only and highlight the upcoming deadlines more clearly”

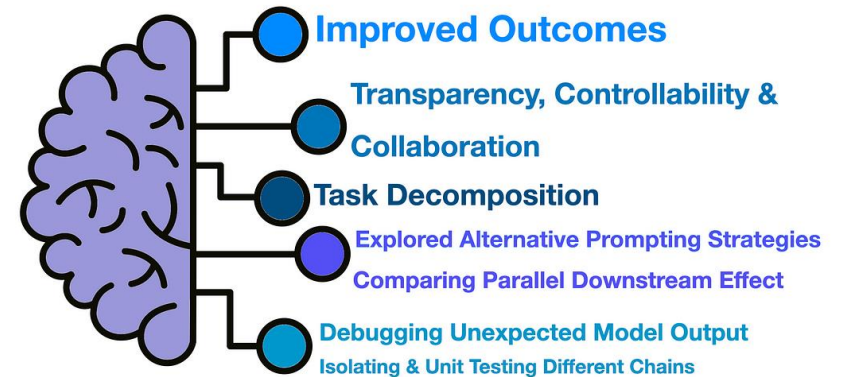


Creating Your Own Prompt

Ask participants to write a chain prompt based on a task they do often (e.g., recruiting emails + event materials, survey creation + data summary, reporting + recommendations).

Things to Consider:

- Is the task multi-step, where each step depends on the previous one?
- Are the desired outputs for each step clearly specified?
- Are you avoiding vague words like “help” or “assist” that don’t convey a clear goal?
- Does the prompt describe both the data input and the output formats expected?



Tree of Thoughts Prompting



What if instead of following just one line of thought, we asked an AI to explore many possibilities before deciding on the best path?

Overview

Chaining

T-O-T

RAG

Reasoning

Auto PE

Active

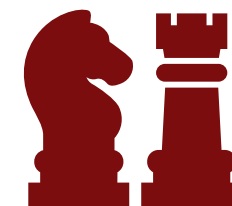
Conclusion

What is Tree of Thoughts Prompting?



Definition:

Guiding the AI to explore multiple reasoning paths or options (branches) before selecting the best one, mimicking structured, step-by-step decision-making.



Analogy:

It's like a chess player thinking several moves ahead, considering different possible scenarios before choosing the optimal move.

Source: [IBM](#)

Overview

Chaining

T-O-T

RAG

Reasoning

Auto PE

Active

Conclusion

Benefits of Tree of Thoughts Prompting



Encourages exploring multiple reasoning paths, leading to more thorough and creative solutions.



Helps avoid getting stuck in narrow or suboptimal answers by considering alternatives.



Improves decision-making by evaluating different options before committing to one.



Enhances the AI's ability to solve complex, multi-step problems with strategic foresight.



Reduces errors by pruning less promising branches & focusing on the best ones.

Source: [IBM](#)

Overview

Chaining

T-O-T

RAG

Reasoning

Auto PE

Active

Conclusion

Tree of Thoughts Prompting Use Case

Scenario:

A staff member wants to decide the best strategy for improving recruiting efforts while balancing time and impact.

Overview

Chaining

T-O-T

RAG

Reasoning

Auto PE

Active

Conclusion

Tree of Thoughts Prompting Use Case

Tree of Thoughts Prompt Steps:

1. "Generate three distinct strategies for improving both local and international student recruiting efforts. For each strategy outline:
 1. (a) key actions to implement it,
 2. (b) potential benefits,
 3. (c) possible challenges, and
 4. (d) required resources. Present each strategy in a clear, numbered list."
2. "Analyze the three strategies above. Compare them based on (i) student engagement potential and (ii) ease of implementation. Rank them from most to least effective, and explain why you chose the top-ranked strategy."



Tree of Thoughts Prompting Use Case

Scenario:

A staff member wants to measure student engagement across various touchpoints (events, advising, coursework, etc.), but there are several ways to do this (surveys, attendance tracking, advisor notes, Canvas analytics, and more).

Overview

Chaining

T-O-T

RAG

Reasoning

Auto PE

Active

Conclusion

Tree of Thoughts Prompting Use Case

Step 1 – Explore Multiple Options:

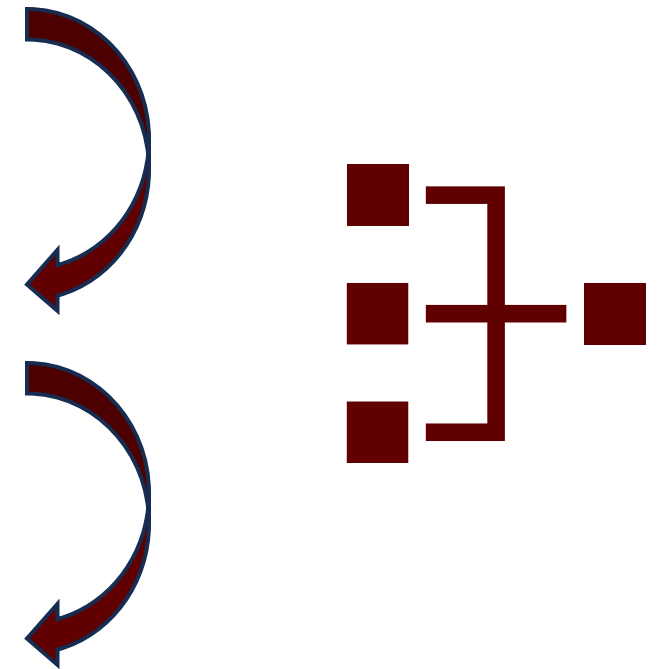
“List three distinct methods for tracking student engagement throughout an academic term. One should be survey based, one should rely on behavioral data, and one should focus on advisor interactions or notes.”

Step 2 – Evaluate each Option Using Criteria:

“For each method, evaluate it based on scalability, accuracy, time required to implement, and usefulness for identifying at risk-students.”

Step 3 – Select and Justify the Best Path:

“Choose the most balanced method for a small team with limited time and resources. Explain why it’s the best choice and suggest how it could be improved with automation or existing tools.”

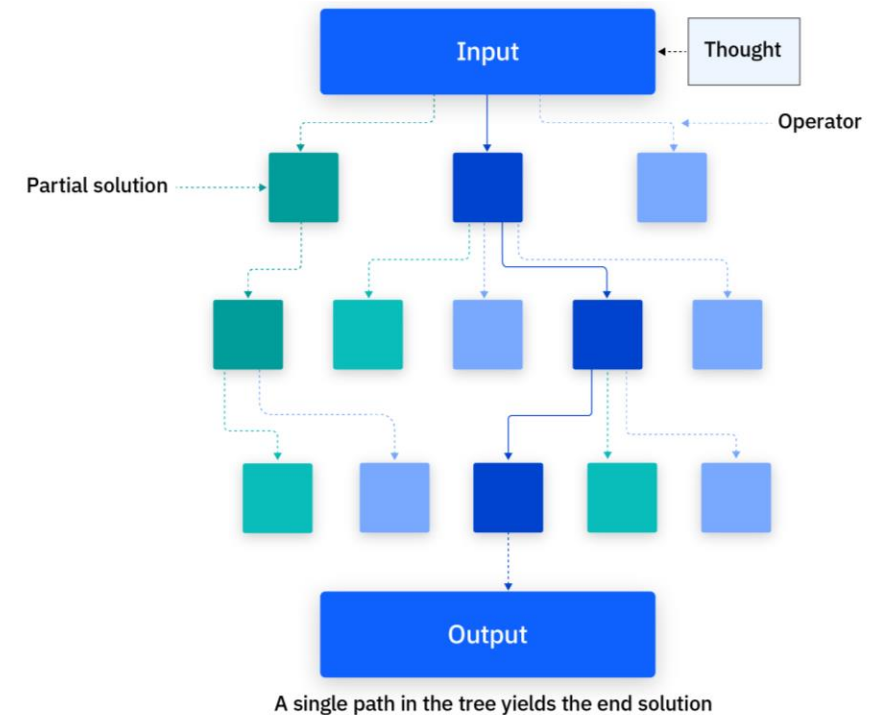


Creating Your Own Prompt

Ask participants to write a Tree of Thoughts prompt based on a complex decision they face often (e.g., planning an event theme, choosing outreach methods, prioritizing student support initiatives).

Things to Consider:

- Is the decision complex enough to warrant exploring multiple paths?
- Does the prompt ask explicitly for multiple options and clear evaluation criteria?
- Are you clear about what factors matter most in choosing among the options (e.g., engagement, feasibility, cost)?
- Does the prompt specify the format you want the reasoning in (e.g., a table, pros/cons, recommendation)?



Retrieval Augmented Generation (RAG)



What if instead of relying only on what it already knows, we let an AI look things up to give better, more informed answers?

Overview

Chaining

T-O-T

RAG

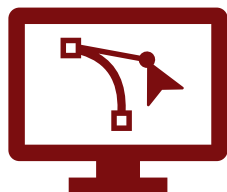
Reasoning

Auto PE

Active

Conclusion

What is Retrieval Augmented Generation (RAG)?



Definition:

Enhancing the AI's responses by having it retrieve relevant information from an external knowledge source before generating an answer, improving accuracy and grounding.



Analogy:

It's like a student answering an exam question by first looking up key facts in their notes, then writing a well-informed response.

Source: IBM

Overview

Chaining

T-O-T

RAG

Reasoning

Auto PE

Active

Conclusion

Benefits of Retrieval Augmented Generation (RAG)



Provides more accurate and up-to-date information by accessing external knowledge sources.



Reduces hallucinations by grounding responses in verifiable data.



Enables handling of large and specialized knowledge bases beyond the AI's training data.



Improves response relevance by tailoring answers based on retrieved context.



Supports complex queries requiring specific facts or detailed background information.

Retrieval Augmented Generation (RAG) Use Case

Scenario:

A staff member needs to draft accurate, up-to-date communication about program prerequisites, which often change and have many exceptions.

Overview

Chaining

T-O-T

RAG

Reasoning

Auto PE

Active

Conclusion

Retrieval Augmented Generation (RAG) Use Case

RAG Prompt Steps:

1. Upload MSIS Prerequisite Policy (ex: pdf or text)
2. Upload Student transcript (ex: pdf or text)
3. Upload MSIS Course List (ex: pdf or text)
4. "Based on the prerequisites policy, list all the courses the student is eligible to take next semester. Then, list any courses they are not yet eligible to take and explain why they are not eligible for each. Format the answer clearly with two sections: (1) Eligible Courses and (2) Not Yet Eligible Courses with Reasons."



Retrieval Augmented Generation (RAG) Use Case

Scenario:

A staff member is frequently being asked to answer the same admissions or program FAQs, but the answers change and are spread across websites, PDFs, and shared folders

Overview

Chaining

T-O-T

RAG

Reasoning

Auto PE

Active

Conclusion

Retrieval Augmented Generation (RAG) Use Case

1. Prompt: “What’s the current application deadline for international students, and what documents are required?”

2. Upload all related documents or webpages



3. The AI retrieves the latest information from admission webpages, internal PDFs, and shared FAQs, then generates a clear, accurate answer.

Overview

Chaining

T-O-T

RAG

Reasoning

Auto PE

Active

Conclusion

Creating Your Own Prompt

Ask participants to write a RAG-style prompt based on a task they do often (e.g., referencing an event playbook to draft materials, using a student handbook to respond to policy questions, pulling survey results to summarize trends).

Things to Consider:

- Does the task require access to up-to-date or specialized knowledge?
- Does the prompt specify the source of truth to use (e.g., policy doc, dataset, handbook)?
- Does the prompt clearly describe how to use that information in generating the output?
- Does the prompt help avoid “hallucinations” by grounding the response in real, authoritative data?



Automatic Reasoning and Tool-Use



What if an AI could not only think through problems but also choose the right tools to solve them on its own?

Overview

Chaining

T-O-T

RAG

Reasoning

Auto PE

Active

Conclusion

What is Automatic Reasoning and Tool-Use?



Definition:

Empowering the AI to autonomously decide when and how to use external tools (like calculators, search engines, or APIs) and apply logical reasoning to solve complex tasks.



Analogy:

It's like an engineer who not only thinks through a problem step by step but also knows when to pick up the right tool from the toolbox to get the job done.

Source: [IBM](#)

Overview

Chaining

T-O-T

RAG

Reasoning

Auto PE

Active

Conclusion

Benefits of Automatic Reasoning and Tool-Use



Enables the AI to solve complex problems by combining logical reasoning with specialized tools.



Improves accuracy by invoking external resources like calculators, databases, or APIs when needed.



Enhances efficiency by automating task-specific operations without manual intervention.



Supports dynamic decision-making by selecting the best tool or method for each step.



Expands the AI's capabilities beyond language generation to practical problem-solving.

Source: [AWS](#)

Overview

Chaining

T-O-T

RAG

Reasoning

Auto PE

Active

Conclusion

Automatic Reasoning and Tool-Use Use Case

Scenario:

A staff member needs to help a student plan their course schedule while ensuring it meets prerequisites, avoids time conflicts, and fits their graduation timeline.

Overview

Chaining

T-O-T

RAG

Reasoning

Auto PE

Active

Conclusion

Automatic Reasoning and Tool-Use Use Case

Automatic Reasoning + Tool-Use Prompt Steps:

1. Upload Input Materials
 1. Student transcript: Upload file or paste text.
 2. Desired graduation date: Write explicitly.
 3. MSIS course catalog: Upload file or paste text.
 4. MSIS scheduling tool data (if available): Upload or describe any constraints such as which semesters courses are offered, or URL if integrated.
2. "Based on these inputs, create a semester-by-semester course plan for the next three terms. Ensure the plan:
 1. Meets all prerequisites before enrolling in higher-level courses
 2. Avoids any scheduling conflicts
 3. Maximizes progress toward graduation by the desired date
 4. Includes at least 3–4 courses per semester (or another specified load)Format the output in a table with columns: Semester, Courses, Notes."



Automatic Reasoning and Tool-Use Use Case

Scenario:

A staff member needs to help a student determine whether they're eligible to complete an internship in the upcoming semester and whether it will count toward MSIS credit. The process must evaluate academic standing, course completion, program requirements, and internship relevance — and result in a clear, documented recommendation.

Overview

Chaining

T-O-T

RAG

Reasoning

Auto PE

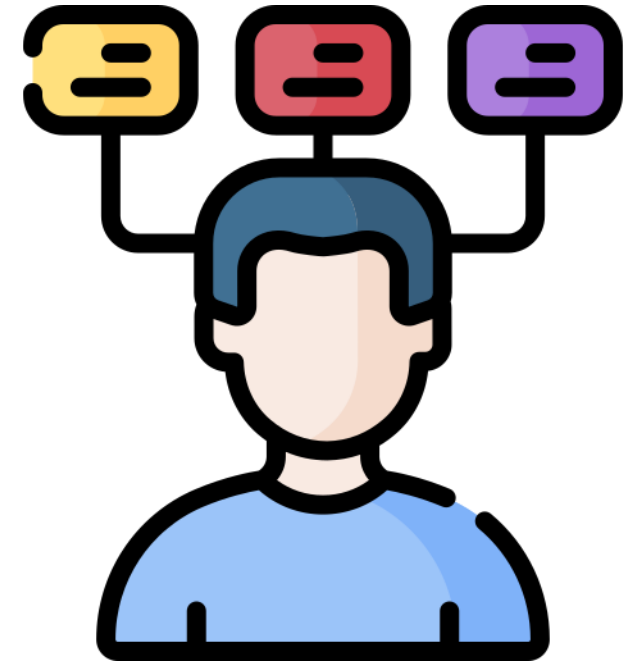
Active

Conclusion

Automatic Reasoning and Tool-Use Use Case

Automatic Reasoning + Tool-Use Prompt Steps:

1. Upload Input Materials
 1. Student transcript: Upload file or paste course history.
 2. Internship job description: Upload PDF, paste full job text, or insert link.
 3. MSIS internship policy: Upload MSIS handbook section or paste rules about internship eligibility (e.g., GPA minimum, required prior coursework).
2. "Based on these inputs, assess whether the student is currently eligible to receive credit for this internship. Determine:
 1. If they meet minimum academic requirements (e.g., GPA, completed courses).
 2. Whether the internship role aligns with MSIS program goals (e.g., technology, data, consulting).
 3. If the timing fits within graduation planning (e.g., internship will not delay required courses).



Overview

Chaining

T-O-T

RAG

Reasoning

Auto PE

Active

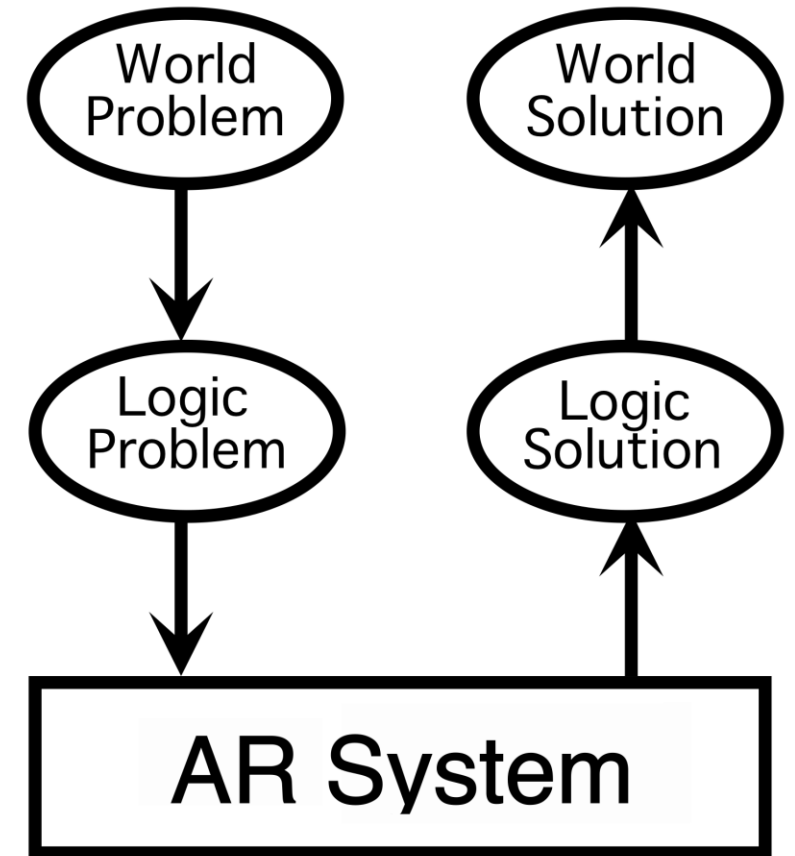
Conclusion

Creating Your Own Prompt

Ask participants to write a prompt that leverages automatic reasoning and tool-use for a task they do often (e.g., drafting personalized recruiting emails while checking event schedules, building surveys that align with policy requirements, creating reports with live Salesforce data).

Things to Consider:

- Does the task involve multiple constraints or rules that require step-by-step reasoning?
- Are there external tools or datasets the AI should use as part of its process?
- Does the prompt specify how to integrate the tools and apply the reasoning to achieve the desired result?
- Does the prompt avoid leaving out key requirements that could lead to incomplete or impractical outputs?



Automatic Prompt Engineer



What if an AI could write and improve its own instructions to get better at its tasks without human help?

Overview

Chaining

T-O-T

RAG

Reasoning

Auto PE

Active

Conclusion

What is an Automatic Prompt Engineer



Definition:

An approach where the AI generates and optimizes its own prompts through trial and evaluation, to improve performance on a given task.



Analogy:

It's like a writer drafting multiple versions of a question, testing which one gets the clearest answer, and then using the best one.

Source: [IBM](#)

Overview

Chaining

T-O-T

RAG

Reasoning

Auto PE

Active

Conclusion

Benefits of Automatic Prompt Engineer



Saves time and effort by automatically generating and optimizing prompts for specific tasks.



Improves the quality of AI outputs by finding the most effective prompt wording through iterative testing.



Reduces the need for expert prompt engineering knowledge among staff or users.



Adapts to different tasks and audiences by tailoring prompts to context and goals.



Enhances consistency and performance of AI-assisted workflows without manual trial-and-error.

Automatic Prompt Engineer Use Case

Scenario:

A staff member wants to improve the quality of email drafts generated for different recruiting events by automatically refining the prompts based on past outputs and feedback.

Overview

Chaining

T-O-T

RAG

Reasoning

Auto PE

Active

Conclusion

Automatic Prompt Engineer Use Case

Automatic Prompt Engineer Prompt:

1. Gather Inputs and Upload

1. Email Format:
 1. Tone should be warm and inclusive, but still professional
 2. Clarity: avoid jargon, keep sentences concise
 3. Engagement: start with a hook to draw attention, include RSVP link early
2. Event Details:
 1. Event Name: Women in Technology Recruiting Event
 2. Date/Time: Thursday, Sept 19, 6–8 PM
 3. Location: Kelley Hall, Room 101
 4. RSVP Link: [insert link]
 5. Audience: Undergraduate students interested in technology careers

2. “Write a warm, inclusive, and professional email inviting undergraduate students to attend the Women in Technology recruiting event. Start with an engaging hook to capture interest, clearly explain event details in concise language, and include the RSVP link early in the message to encourage responses. Ensure clarity by avoiding jargon and using short, readable sentences.”

Automatic Prompt Engineer Use Case

Scenario:

A graduate assistant in the MSIS program is running a resume workshop for students applying to fall internships. They want to promote the event on LinkedIn to attract more attendees and showcase how MSIS supports career development. But they aren't sure how to write a LinkedIn post that feels professional *and* authentic; not too corporate, but not too casual either.

Overview

Chaining

T-O-T

RAG

Reasoning

Auto PE

Active

Conclusion

Automatic Prompt Engineer Use Case

Automatic Prompt Engineer Prompt:

1. Gather Inputs and Upload
2. “Write a LinkedIn post promoting the event described above. Use a tone that is supportive, motivational, and student-centered. Start with a hook that speaks to the urgency or benefit of attending. Highlight the event name, purpose, and key logistics. Make the RSVP link easy to spot. Keep the post under 150 words and make it feel authentic, like it's coming from a student or staff member who wants others to succeed.”
3. “Make the tone more humorous but still professional.”

upload data into Gemini

Event Name: Resume Refresh Workshop

Date/Time: Tuesday, Sept 10, 5-6 PM

Location: Hodge Hall, Room 2043

Audience: MSIS students preparing for fall internship recruiting

Goal: Help students refresh and refine their resumes before internship season

Tone: Supportive, motivational, student-centered

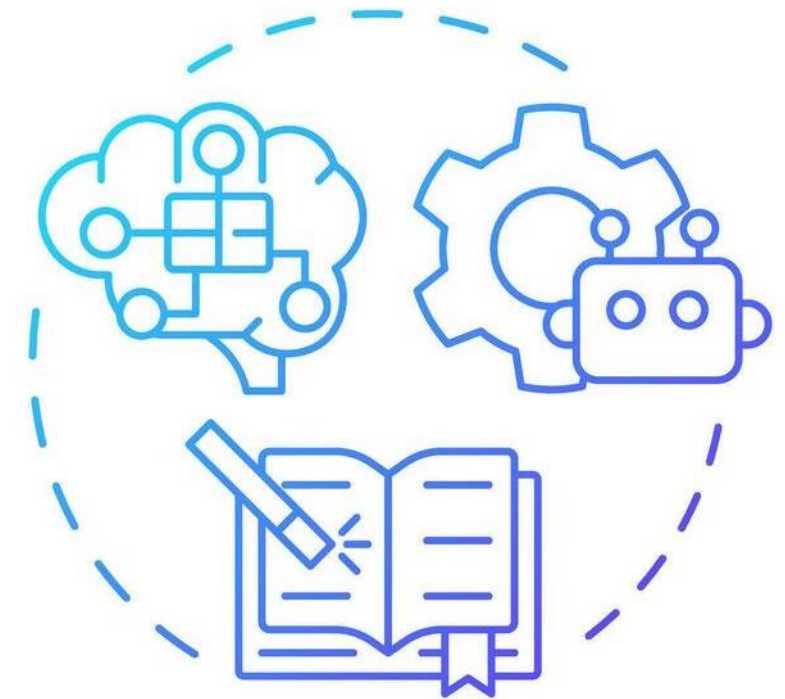
RSVP Link: [insert link]

Creating Your Own Prompt

Ask participants to write a APE-style prompt based on a task they do often (e.g., refining prompts for survey questions over multiple iterations, improving event social media posts by learning from past performance, optimizing follow-up email templates).

Things to Consider:

- Is the task repetitive and does it benefit from learning over time?
- Does the prompt clearly ask the AI to refine itself based on feedback or prior outputs?
- Does it specify what kind of improvements are desired (tone, clarity, engagement, etc.)?
- Does the workflow allow for iterative improvement of both prompts and outputs?





What if an AI didn't just respond, but asked questions first to make sure it truly understood the task?

Overview

Chaining

T-O-T

RAG

Reasoning

Auto PE

Active

Conclusion

What is an Active Prompt?



Definition:

A prompting technique where the AI actively asks clarifying questions or gathers more information before completing the task, ensuring more accurate and context-aware responses.



Analogy:

It's like a doctor who, before giving a diagnosis, asks the patient follow-up questions to fully understand the symptoms.

Overview

Chaining

T-O-T

RAG

Reasoning

Auto PE

Active

Conclusion

Benefits of Active Prompt



Improves response accuracy by clarifying ambiguous or incomplete input through follow-up questions.



Enhances context-awareness by gathering essential details before answering.



Reduces misunderstandings and irrelevant answers by ensuring the AI fully understands the task.



Supports dynamic interactions, making AI conversations more natural and effective.



Enables better handling of complex or nuanced queries by iteratively refining input.

Source: [IBM](#)

Overview

Chaining

T-O-T

RAG

Reasoning

Auto PE

Active

Conclusion

Active Prompt Use Case

Scenario:

A staff member wants to help a student explore multiple options for addressing academic probation, while actively guiding the AI through the reasoning process step by step.

Overview

Chaining

T-O-T

RAG

Reasoning

Auto PE

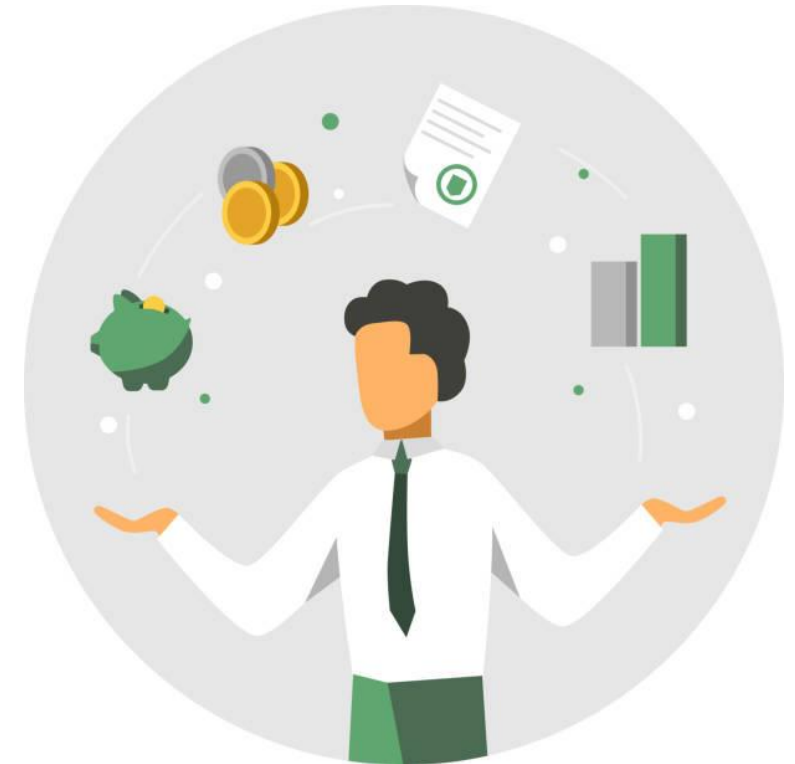
Active

Conclusion

Active Prompt Use Case

Active Prompt Steps:

1. "You are an academic advisor helping a student who is currently on academic probation. Step by step, walk through the decision process to help them recover academically. As you go, ask clarifying questions about their situation to choose the best strategies. Identify at least three possible strategies, list pros and cons of each based on their answers, and at the end, recommend the best strategy with justification."
2. "The student is a sophomore majoring in business, has a 1.9 GPA after last semester, failed two required courses, works 20 hours a week, and feels overwhelmed. Please take this into account as you ask further questions."
3. Gemini will ask clarifying questions. For example: "Does the student plan to continue working 20 hours a week?"
4. Answer the clarifying questions to refine the model's advice
5. Gemini will give you an output of the different recommendation strategies. You can ask it to analyze these strategies to help you make the best decision.



Scenario:

Staff member needs to collect feedback on a new student program or event.

Overview

Chaining

T-O-T

RAG

Reasoning

Auto PE

Active

Conclusion

Active Prompt Use Case

Active Prompt Steps:

1. "Create a short student feedback survey in Qualtrics format about the Jump Start program. Include: 3 multiple choice questions on satisfaction, 2 Likert scale items on usefulness, and 2 open-ended questions."
2. "Keep the tone welcoming. Make sure questions are neutral and easy to understand."

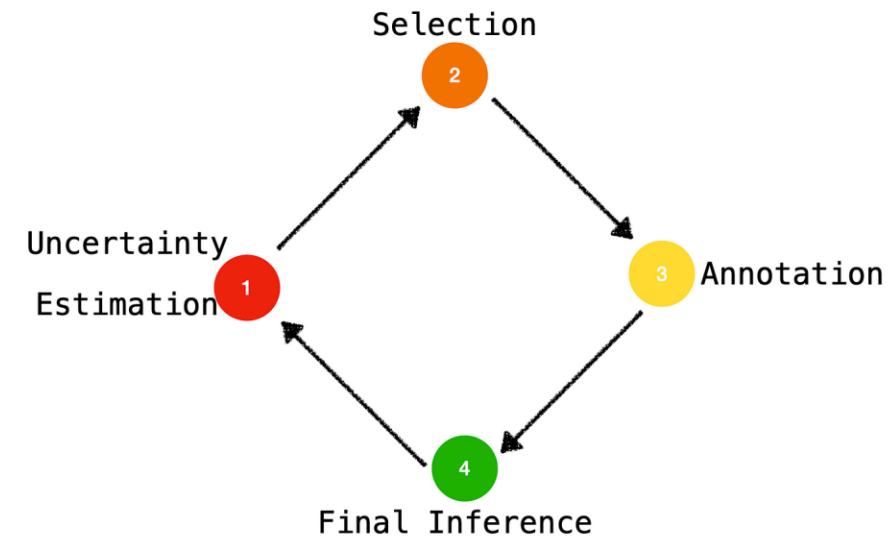


Creating Your Own Prompt

Ask participants to write an **Active Prompt** based on a task they do often (e.g., selecting which event format to use for a recruiting fair, identifying which students to prioritize for outreach, deciding how to word a sensitive policy communication).

Things to Consider:

- Does the task benefit from seeing the reasoning behind the answer?
- Does the prompt explicitly ask the AI to break the process into steps?
- Are the steps logical and clear enough that others can follow and critique them?
- Does the prompt avoid jumping straight to a final answer without explanation?



Module Recap – Intermediate Techniques

In this module, you explored six foundational AI prompting techniques designed to help staff quickly generate high-quality outputs with Gemini.

Prompt Chaining	Tree of Thoughts Prompting	Retrieval Augmented Generation (RAG)	Automatic Reasoning and Tool-Use	Automatic Prompt Engineer	Active Prompt
Breaks complex task, linking prompts, ideal for multi-stage workflows.	Explore multiple reasoning paths; perfect for complex, open-ended problems.	Fetching relevant, real-time info from external sources — boosts accuracy for data-heavy tasks.	Think through problems and use tools like databases automatically, good for complex tasks.	Creates & improves its own prompts to deliver the best results; saves time & boosts output quality.	AI asks clarifying questions before answering to ensure accurate, relevant responses.

Goal: Participants learned advanced AI prompting techniques to design effective, step-by-step, and adaptive prompts that improve accuracy, handle complexity, integrate external data, and enable AI to reason and clarify for better real-world problem solving.

Overview

Chaining

T-O-T

RAG

Reasoning

Auto PE

Active

Conclusion

Module 4

Advanced Prompting Techniques

Learning Objectives for this Module

By the end of this module, learners will be able to:

- Understand how to use a variety of advanced prompting techniques
- Guide AI towards a desired perspective
- Generate useful mathematical formulas
- Prompt AI to reason through complex tasks
- Refine AI outputs to maximize quality
- Use AI to analyze text, video, and auditory information
- Analyze graphical information and draw conclusions

Module Agenda – Advanced Techniques

Chain Reasoning and Acting with Context: Alternates between thinking through steps and taking action

Directional Stimulus Prompting: Guides AI to respond from a specific role or perspective

PALM: Combines logic or code with language to solve structured tasks

Multimodal Chain of Thought: Combines text, visuals, or audio to guide reasoning step by step

Reflexion Prompting: AI reviews and improves its own response before finalizing

Graph Prompting: Interprets visual data like charts or plots to answer questions or explain trends

Overview

R&A Context

DSP

PALM

Reflexion

Multimodal

Graph

Conclusion

Reasoning and Acting with Context



What if we could prompt AI to alternate between thinking through a problem and then taking the next logical action, just like a human decision-maker?

Overview

R&A Context

DSP

PALM

Reflexion

Multimodal

Graph

Conclusion

What is Reasoning and Acting with Context?



Definition:

Prompting the AI to respond by alternating between reasoning steps such as analyzing or asking clarifying questions and action steps like generating a message or making a selection.



Analogy:

It's like giving instructions to a new staff member. They check in with you at each stage, reason through the situation, and act based on the outcome before moving forward.

Source: [IBM](#)

Overview

R&A Context

DSP

PALM

Reflexion

Multimodal

Graph

Conclusion

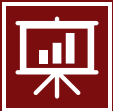
Benefits of Reasoning and Acting with Context?



Allows the AI to handle multi-step tasks in a logical flow



Supports more accurate and adaptive decision-making



Improves reliability by separating thought from action



Ideal for workflows that require conditional logic or ongoing responses

Reasoning and Acting with Context Use Case

Scenario:

A staff member is helping admitted students register for spring courses, but the steps vary depending on the student's responses, like concentration choice or CPT status.

Active Prompt:

"Act as a student services advisor. Start by asking if the student has chosen a concentration. If yes, check if their courses meet program requirements. Then check CPT status if applicable. Based on each answer, guide the student through their next steps one at a time." [Insert Student Forms]

Reasoning and Acting with Context Use Case

Reasoning and Acting Prompt Steps:

- “Help a newly admitted student prepare for spring course registration. Guide them through the following decisions one step at a time:
 - a. Ask if they have selected a concentration
 - b. If yes, check if their selected classes meet program requirements and avoid schedule conflicts
 - c. If the student is international, check for CPT authorization status
 - d. If any task is incomplete, offer the next recommended action or resource”
- “Review the interaction. Reflect on whether the AI moved logically through each condition and made accurate decisions. Suggest one way the reasoning process could be improved or made more efficient for future advising interactions.”



Reasoning and Acting with Context Use Case

Scenario:

A staff member is preparing admitted student orientation packets. The required contents depend on the student's status, start term, and concentration, which are listed in their student information sheet.

Active Prompt:

"Act as MSIS program staff. Using the provided student information sheet, check the student's status. If international, include visa and CPT/OPT guidelines. Then review start term to attach the correct academic calendar. Finally, confirm concentration to include specific advising resources. Follow these steps in order and prepare the final packet."

Reasoning and Acting with Context Use Case

Reasoning and Acting Prompt Steps:

- “Use the provided student information sheet to prepare an orientation packet:
 - a. Read and identify student status (domestic or international)
 - b. If international, add visa and CPT/OPT guidelines
 - c. Check start term and attach the correct academic calendar
- “Review the generated packet. Evaluate whether:
 - i) All required resources were included based on the student’s profile
 - ii) Steps were followed in a logical order
 - iii) Content was accurate and tailored to the student’s needs”
- “Identify any missing items or incorrect inclusions and recommend adjustments.”



Reasoning and Acting with Context Use Case

Scenario:

A program coordinator wants to use Gemini to streamline planning for the MSIS orientation week, ensuring that the AI considers scheduling constraints, task dependencies, and real-time updates from different teams.

Active Prompt:

“Create a draft agenda for a 3-day orientation program for new MSIS students. Consider inputs from faculty, student services, and marketing teams [insert requirements from each team]. After drafting, identify any conflicts, overlaps, or missing elements, and adjust the schedule accordingly while keeping major priorities intact.”

Reasoning and Acting with Context Use Case

Reasoning and Acting Prompt Steps:

- “Help a staff member build a follow-up plan for students who attended an MSIS info session. Guide the AI through the following decisions step by step:
 - a. Check if the student filled out the post-session interest form
 - b. If yes, determine whether they requested more information about financial aid or curriculum
 - c. Based on the interest type, draft a tailored follow-up message and suggest next steps
 - d. If no form was submitted, generate a general check-in message and link to the form”
- “Review the interaction. Reflect on whether the AI correctly tracked the logic and responded appropriately at each decision point.
- Suggest one way to make the flow more efficient or responsive for future follow-up processes.”



Overview

R&A Context

DSP

PALM

Reflexion

Multimodal

Graph

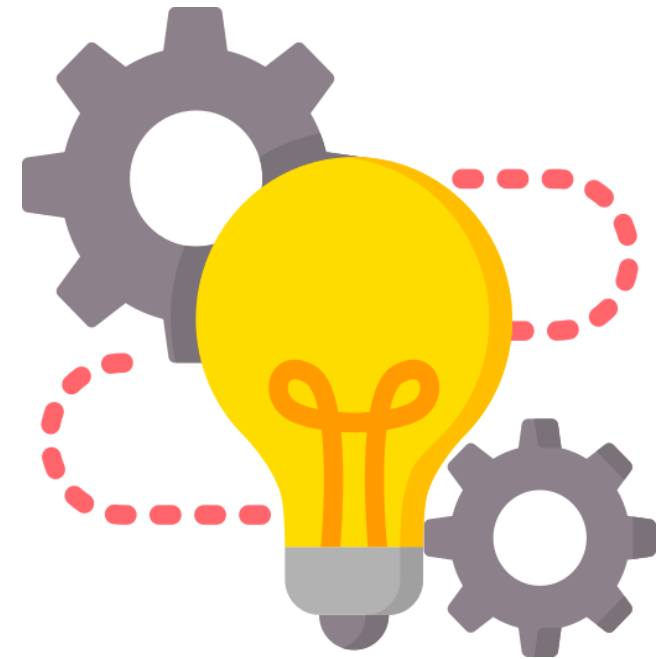
Conclusion

Creating Your Own Prompt

Ask participants to write a prompt for a task that involves multi-step reasoning, where the AI must think before responding and adapt based on answers.

Things to Consider:

- Does the task involve asking questions or making decisions based on user responses
- Are there steps that depend on earlier answers or conditions
- Does the AI alternate between analyzing and acting
- Would this help improve decision quality and reduce generic responses



Directional Stimulus Prompting



What if we could prompt AI to think like a hiring manager, a software engineer, or a marketing director to get responses tailored to each?

Overview

R&A Context

DSP

PALM

Reflexion

Multimodal

Graph

Conclusion

What is Directional Stimulus Prompting?



Definition:

Prompting the AI to respond from specific roles or different perspective. This helps tailor the response to match the priorities or tone of a given domain.



Analogy:

It's like asking a sales director and a CFO the same question and getting different but equally valid answers based on their unique priorities.

Source: IBM

Overview

R&A Context

DSP

PALM

Reflexion

Multimodal

Graph

Conclusion

Benefits of Directional Stimulus Prompting



Generates role-specific insights or recommendations



Helps simulate multiple stakeholder viewpoints



Useful for internal communications or role-based scenarios



Increases relevance for domain-specific task

Source: [IBM](#)

Overview

R&A Context

DSP

PALM

Reflexion

Multimodal

Graph

Conclusion

Directional Stimulus Prompting Use Case

Scenario:

A staff member needs to promote the same MSIS event across different platforms, such as the website, email, and Canvas. Each version must reflect the tone and structure of the specific platform and be structured for student engagement.

Active Prompt:

"Using the following event details, write three versions of an announcement from the viewpoint of a marketing professional:

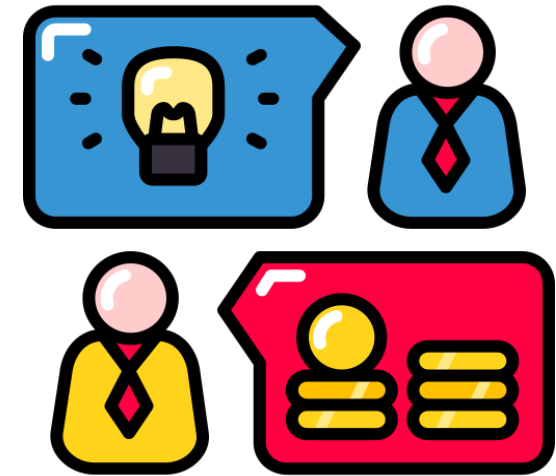
- One for the MSIS website (professional and informative)
- One for an email newsletter (concise and inviting)
- One for a Canvas announcement (brief and casual reminder)

Make sure each version fits the expectations of its platform."

Directional Stimulus Prompting Use Case

Directional Stimulus Prompt Steps:

- “You’ve uploaded an Excel sheet with details about the upcoming MSIS Info Session (title, date, time, location, description). Using that data, generate three versions of a promotional message from the viewpoint of a marketing professional aiming for student engagement:
 - a. MSIS website (professional and informative)
 - b. Email newsletter (concise and slightly conversational)
 - c. Canvas announcement (brief and friendly)”
- “Compare the three outputs. Evaluate them based on
 - i) how well they match the tone and expectations of each platform and
 - ii) whether they communicate the event details clearly and effectively.Identify any version needing revision and explain why.”



Directional Stimulus Prompting Use Case

Scenario:

MSIS staff need to send program updates to three groups: current students, alumni, and prospective applicants. The update details are provided in a shared document.

Active Prompt:

"Using the provided program update document, create three tailored versions of the announcement:

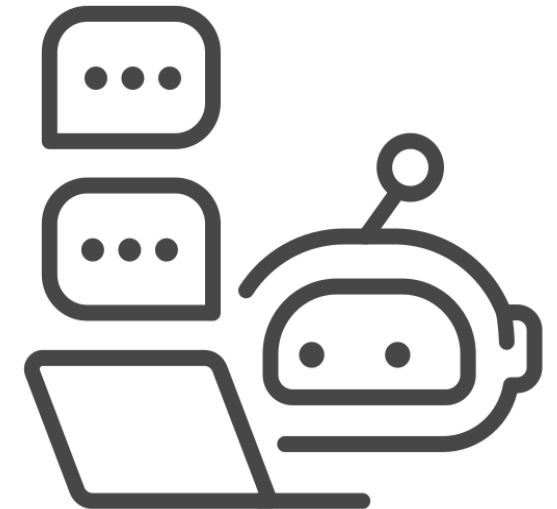
- For current students (informative and resource-focused)
- For alumni (community-focused and celebratory)
- For prospective applicants (promotional and persuasive)

Ensure each matches the tone and priorities of its audience."

Directional Stimulus Prompting Use Case

Directional Stimulus Prompt Steps:

- “From the provided program update document, generate:
 - a. Informative version for current students
 - b. Community-focused version for alumni
 - c. Promotional version for prospective applicants”
- “Compare the three outputs. Evaluate them based on:
 - i) How well they match the tone, format, and expectations of each audience
 - ii) Whether they clearly communicate the program updates and benefits”
- “Identify any version that requires revision, noting which tone, structure, or content elements should be adjusted.”



Directional Stimulus Prompting Use Case

Scenario:

A career coach wants to help an MSIS student craft a compelling LinkedIn summary. They use Gemini to generate drafts from the perspectives of a recruiter, a tech hiring manager, and a peer mentor to highlight different strengths.

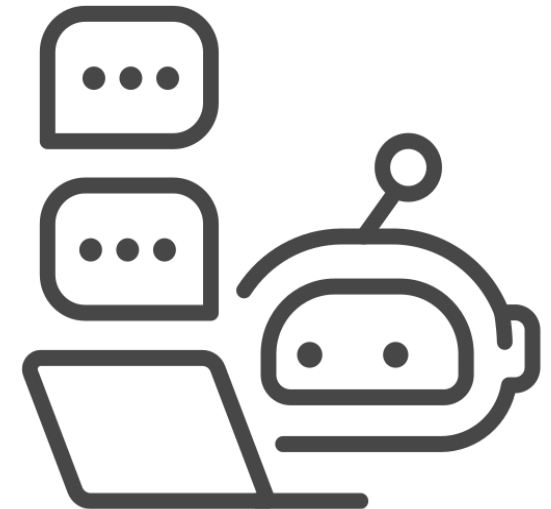
Active Prompt:

“Write three different versions of a LinkedIn summary for this student [insert resume or bio]. One should be written from the lens of a recruiter looking to highlight hireability, one from the perspective of a tech hiring manager emphasizing technical impact, and one from a peer mentor’s voice, emphasizing teamwork and leadership. Then, suggest a blended version that incorporates the strongest elements of each.”

Directional Stimulus Prompting Use Case

Directional Stimulus Prompt Steps:

- “Help a student write a personal statement for their MSIS application. Generate responses from three different perspectives:
 - a. From the perspective of an admissions officer focused on leadership and fit for the program
 - b. From the viewpoint of a faculty member prioritizing technical and analytical skills
 - c. From the perspective of a peer mentor interested in collaboration and community engagement
- Then:
 - d. Identify the unique strengths each version emphasizes
 - e. Blend the strongest elements into one final draft that balances tone and content across all perspectives”
- “Review the output. Reflect on how well the AI shifted tone and priorities based on each assigned role.
- Suggest one adjustment to better align each perspective with what that audience typically values.”



Overview

R&A Context

DSP

PALM

Reflexion

Multimodal

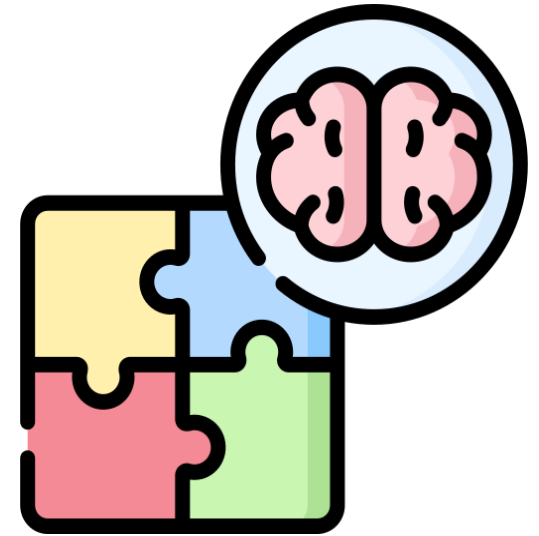
Graph

Conclusion

Creating Your Own Prompt

Ask participants to write a DSP-style prompt that explicitly directs the AI to respond from a specific role or perspective:

- Things to Consider:
What specific role or persona will you ask the AI to adopt? (e.g., student advisor, IT support, financial analyst)
- How will this specific perspective influence the AI's tone, language, and priorities in its response?
- Is your prompt clearly instructing the AI to operate from this viewpoint?
- Does this focused perspective help achieve a more relevant and useful output for your task?



Program-Aided Language Models (PALM)



What if AI could analyze data, generate code, and explain the results all in one response?

Overview

R&A Context

DSP

PALM

Reflexion

Multimodal

Graph

Conclusion

Source: IBM

What is Program-Aided Language Models (PALM)?



Definition:

Combining language generation with programming or logical reasoning. The AI can both explain and calculate or code in the same response.



Analogy:

It's like asking someone to explain your budget and also write the spreadsheet formulas to calculate it.

Benefits of PALM



Solves technical tasks using code or logic



Supports tasks that require both text and structure



Reduces errors in analytical work flow



Ideal for finance, data analysis, and structured reporting

Source: IBM

Overview

R&A Context

DSP

PALM

Reflexion

Multimodal

Graph

Conclusion

Scenario:

A staff member wants to send personalized follow-up emails after a recruitment event. Each message should reflect the student's name, interest area, and term while matching the tone of a previous email.

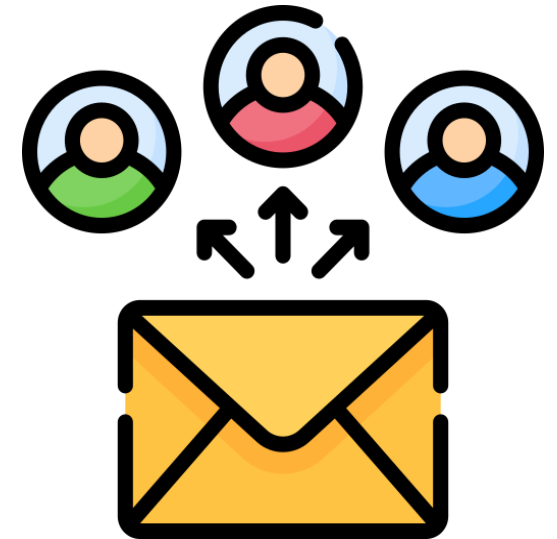
Active Prompt:

"Act as a student services advisor. Start by asking if the student has chosen a concentration. If yes, check if their courses meet program requirements. Then check CPT status if applicable. Based on each answer, guide the student through their next steps one at a time."

PALM Use Case

PALM Prompt Steps:

- “Write personalized follow-up emails for three prospective students using the table below. Each entry includes the student's name, start term, and interest area. Use the example email to match tone and style.
Table:
 - Jordan | Fall 2025 | Data Analytics
 - Priya | Spring 2026 | Cybersecurity
 - Sam | Fall 2025 | Cloud Computing[Input Sample Emails]
- “After generating the emails, check for tone consistency and personalization accuracy.
Reflect on how well the AI replicated the original writing style and whether the outputs could be sent with minimal edits.”



Scenario:

MSIS staff are compiling event attendance data from several info sessions. A consolidated attendance spreadsheet is available and must be turned into a table and a short narrative report for program leadership.

Active Prompt:

"Using the provided attendance spreadsheet, generate:

- A summary table showing attendance by session and overall totals
- A narrative report highlighting trends and recommendations for future events."

PALM Use Case

PALM Prompt Steps:

- “From the provided attendance spreadsheet, generate:
 - a. Summary table with per-session totals and overall total
 - b. Narrative analysis highlighting attendance trends and recommendations”
- “Review for:
 - i) Accuracy of calculations
 - ii) Clarity and professionalism of the table layout
 - iii) Relevance and actionability of the narrative recommendations”
- “Identify any calculation errors, unclear formatting, or weak recommendations.”



Scenario:

An MSIS instructor wants to use Gemini to demonstrate how different pricing models affect long-term profitability in a capstone analytics course. They want the AI to show the logic and calculate it on the spot.

Active Prompt:

“Compare the profitability of a subscription-based model versus a one-time purchase model for a software product priced at \$40/month vs. \$250 flat. Assume a 12-month customer lifecycle and a 20% churn rate. Explain the logic behind your calculations and show the math step-by-step.”

PALM Use Case

PALM Prompt Steps:

- “Assist a staff member in evaluating budget options for a student networking event. Perform the following tasks in one response:
 - a. Explain the trade-offs between hosting the event in-person vs. virtual
 - b. Generate estimated costs for each format (venue, food, tech, etc.)
 - c. Write the spreadsheet formulas used to calculate those estimates
 - d. Summarize the recommended option based on cost-effectiveness and impact”
- “Review the response. Confirm that the explanation, math, and formula logic are consistent and correct.
- Suggest one refinement to improve the clarity or usefulness of the calculations in future planning.”



Overview

R&A Context

DSP

PALM

Reflexion

Multimodal

Graph

Conclusion

Creating Your Own Prompt

Ask participants to write a PALM-style prompt where structured data or an example message is used to generate multiple personalized outputs.

Things to Consider:

- Does the task involve using a table, list, or structured input like names and dates
- Are you giving the AI an example or sample message to match the style
- Does the prompt ask for consistency across personalized outputs
- Would this help automate a repetitive task without losing personal tone





What if we allowed AI to reflect on its own outputs and make improvements?

What is Reflexion

Definition:

Reflexion allows AI to critically evaluate and refine its own outputs by identifying potential weaknesses, errors, or areas of improvement.

Analogy:

It's like giving a student the opportunity to revise their work instead of telling them the answer.

Overview

R&A Context

DSP

PALM

Reflexion

Multimodal

Graph

Conclusion

Source: [IBM](#)

Benefits of Reflexion



Improves overall output accuracy over time due to revisions



Boosts performance in open ended tasks such as writing, planning, or coding



Applicable in a wide variety of industries and use cases



Mimics human learning patterns allowing for adaptation to future needs



Results in more trustworthy answers due to self revised outputs

Source: [IBM](#)

Overview

R&A Context

DSP

PALM

Reflexion

Multimodal

Graph

Conclusion

Reflexion Use Case

Scenario:

A staff member wants to craft an email to announce upcoming networking events to current Kelley students.

Active Prompt:

"Write a brief email to current business students to announce these upcoming networking events [**include important event logistics**]. After writing, review the email and identify any areas that could be improved and update the email to reflect these changes."

Reflexion Use Case

Scenario:

A staff member wants to utilize Gemini to generate ideas to attract current Kelley students to an upcoming MSIS recruitment event.

Active Prompt:

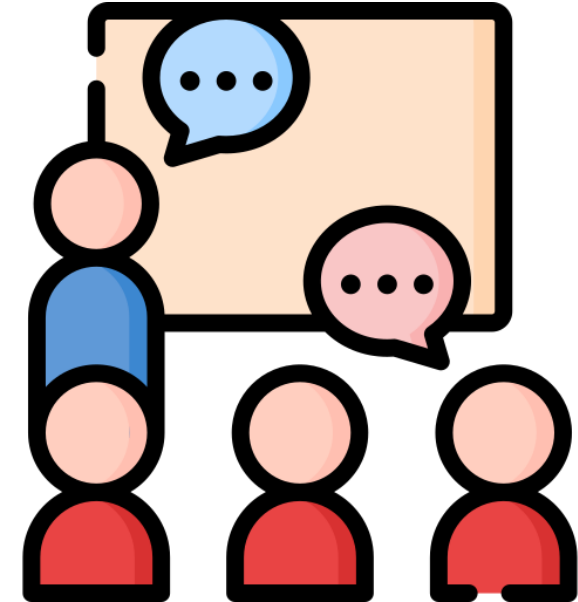
“Generate five ways to attract current business undergraduate students to a recruitment event for a business master's program. After writing, review ideas for any areas that could be more effective and update ideas to reflect those changes.”

Creating Your Own Prompt

Ask participants to write a Reflexion prompt based on a task they do often (eg. Writing student feedback emails, reviewing an event marketing plan)

Things to consider:

- Does the prompt encourage the AI to generate an initial answer and then evaluate or critique its own response?
- Does the final response show measurable improvement in quality, clarity, or accuracy?



Multimodal Chain of Thought (MMCoT)



What if we allowed AI to analyze visual and auditory information in addition to text?

Overview

R&A Context

DSP

PALM

Reflexion

Multimodal

Graph

Conclusion

What is Multimodal Chain of Thought (MMCoT)?

Definition:

Instructing AI to utilize information across multiple mediums such as text, images, and audio.

Analogy:

It's like giving a baker not only the recipe, but also an instructional video helping them through the steps.

Overview

R&A Context

DSP

PALM

Reflexion

Multimodal

Graph

Conclusion

Source: IBM

Benefits of Multimodal Chain of Thought (MMCoT)



Allows AI to draw conclusions from a variety of mediums



Results in higher accuracy on complex tasks due to a more comprehensive understanding



Effective in image analysis, document and visual question understanding



Connects gaps in AI logic by connecting abstract text with concrete images



Easy to use, allows users to simply upload media and specify tasks

Source: [IBM](#)

Overview

R&A Context

DSP

PALM

Reflexion

Multimodal

Graph

Conclusion

Multimodal Chain of Thought (MMCoT) Use Case

Scenario:

A staff member wants to improve upon a marketing graphic for an event and wants to tailor it towards existing Kelley students.

Active Prompt:

"Step by step, walk through how to tailor this graphic [**upload marketing graphic**] towards existing business students.

- Identify at least three strategies to improve the graphic
- For each, list the rationale used for the changes
- At the end, recommend the most appropriate strategy with justification"

Multimodal Chain of Thought (MMCoT) Use Case

Scenario:

A staff member is assisting a student in improving their resume and wants to utilize Gemini to identify any areas of improvement.

Active Prompt:

“Step by step, walk through at least three areas of improvement for this student’s resume [insert resume] and for each explain the rationale behind the changes.”

Overview

R&A Context

DSP

PALM

Reflexion

Multimodal

Graph

Conclusion

Create Your Own Prompt

Ask participants to write a Multimodal prompt based on a task they do often (eg. Evaluating a marketing flyer design, analyzing course reflection graphs)

Things to consider

- Does the task involve multiple formats of information including text, visual, or audio?
- Are the connections between different modes of input clearly defined for the AI?
- Does the prompt encourage step-by-step reasoning across modalities?





What if AI was able to analyze and draw conclusions from graphs and other data visualizations?

Overview

R&A Context

DSP

PALM

Reflexion

Multimodal

Graph

Conclusion

What is Graph Prompting?

Definition:

Graph prompting enables AI to interpret, analyze, and generate outputs based on structured data in the form of graphs such as bar charts, line plots, and other common graphs.

Analogy:

It's like giving your friend a city map rather than a series of directions to your house.

Source: [IBM](#)

Overview

R&A Context

DSP

PALM

Reflexion

Multimodal

Graph

Conclusion

Benefits of Graph Prompting



Follows structured reasoning, emphasizing logical connections



Enables better comprehension of correlations, can easily include new information



May be able to draw conclusions that human analysis would miss



Effective in any industry that utilizes graphical information



Graphs can be updated in real time, allowing AI to adapt to changing information

Source: [IBM](#)

Overview

R&A Context

DSP

PALM

Reflexion

Multimodal

Graph

Conclusion

Graph Prompting Use Case

Scenario:

A staff member is analyzing multiple graphs of course feedback for a core course and wants to determine if it's effectively preparing students for concentration courses.

Active Prompt:

"Step by step, interpret the visual data in these graphs [**upload course feedback graphs**] and determine the effectiveness of this course in preparing students for concentration courses.

- Identify at least three trends in student feedback
- For each, list if these trends will reflect positively or negatively in course preparation
- At the end, recommend any adjustments to the course for future years"

Graph Prompting Use Case

Scenario:

A staff member wants to utilize Gemini to analyze reports for the Jump Start program and note any trends throughout the years.

Active Prompt:

- “Step by step, interpret the visual data in these graphs [**insert graphs**] and identify at least three trends in the program across years.
- For each identify if these trends positively and negatively impact the program and recommend any adjustments for future years.”

Overview

R&A Context

DSP

PALM

Reflexion

Multimodal

Graph

Conclusion

Create Your Own Prompt

Ask participants to write a Graph prompt based on a task they do often (eg. Analyzing student demographic graphs)

Things to consider

- Does the prompt ask the AI to reason based on a graph or relational structure?
- Are relationships and rules in the graph explicitly described or visualized for the AI?
- Does the prompt allow for explanation of dependencies considered when making a decision?



Module Recap – Advanced Techniques

In this module, you learned about six advanced level AI prompting techniques designed to assist staff with higher complexity tasks with Gemini.

Reasoning and Acting with Context	Directional Stimulus Prompting	Program-Aided Language Models	Reflexion	Multimodal Chain of Thought	Graph Prompting
AI model alternates between reasoning steps and action steps	Guiding the AI's output by using specific cues or asking for differing viewpoints	Integrating code or computational tools into prompts to enhance AI reasoning	Instructing AI to self-evaluate and refine its response through multiple iterations	Utilizing text, images, and audio to guide step by step reasoning	Allowing AI to read bar charts, scatterplots, and other data visualizations

Goal: Participants learned advanced AI prompting techniques to able to utilize these advanced techniques in complex tasks like interpreting business data, automating insights generation, and creating customized AI prompts tailored to academic and administrative needs

Source: [IBM](#)

Overview

R&A Context

DSP

PALM

Reflexion

Multimodal

Graph

Conclusion

The Closing Frame



CELEBRATE THE JOURNEY

Four focused tracks: Foundations, Beginner, Intermediate, Advanced. Each one builds on the last. 18 discrete prompting techniques.

Activated real-world staff use-cases for 10 functional scenarios (Recruiting, Ops) with ready-to-run prompts.

Established common language for ethical AI collaboration across IU staff



OUR GOAL

Enable staff to craft structured, high-quality prompts on first pass.

Reduction in repetitive drafting & analysis tasks across Admissions & Outreach.

With consistent ethical frameworks, we're reducing risk around bias, privacy, and compliance.



WHAT WE *LEARNED*

Prompt Literacy is tiered. Staff progress fastest when techniques ladder from zero-shot → chain-of-thought → tool-integrated workflows.

Hands-On > Theory.

“What will you co-create with Gemini tomorrow that wasn’t possible yesterday?”

CROSS-FUNCTIONAL SUPPORT ACROSS THE ORGANIATION, BEST PRACTICES

With these tools, we can move faster, sharper, and stay grounded in the values that matter. It isn’t just about better prompts. It’s about helping each other lead in a space that’s changing fast and using AI to reach students in ways that are efficient and more human. The next era of education is here, and we get to shape where it goes.