



Q: What is the binary number for 48?



- A. 0110000
- B. 1100000
- C. 011000
- D. 110100
- E. None of the options



CPSC 100

Computational Thinking

Intro to Prompt Engineering

Instructor: Parsa Rajabi
Department of Computer Science
University of British Columbia



Agenda

- Learning Goals
- Course Admin
- Intro to Prompt Engineering
 - Techniques
 - In-class activity



Learning Goals

After this today's lecture, you should be able to:

- Define **prompt engineering** & explain its significance in optimizing interactions with large language models (LLMs).
- Identify key components of **effective prompts**, including instructions, context, and examples.
- Develop and implement prompts using techniques like **zero-shot** and **few-shot prompting** to achieve desired outputs from LLMs.





Course Admin

Course Admin

- **Project Milestone 1**

- Due on Wednesday, Feb 12 at 11:59pm [Tonight!]

- **Midterm**

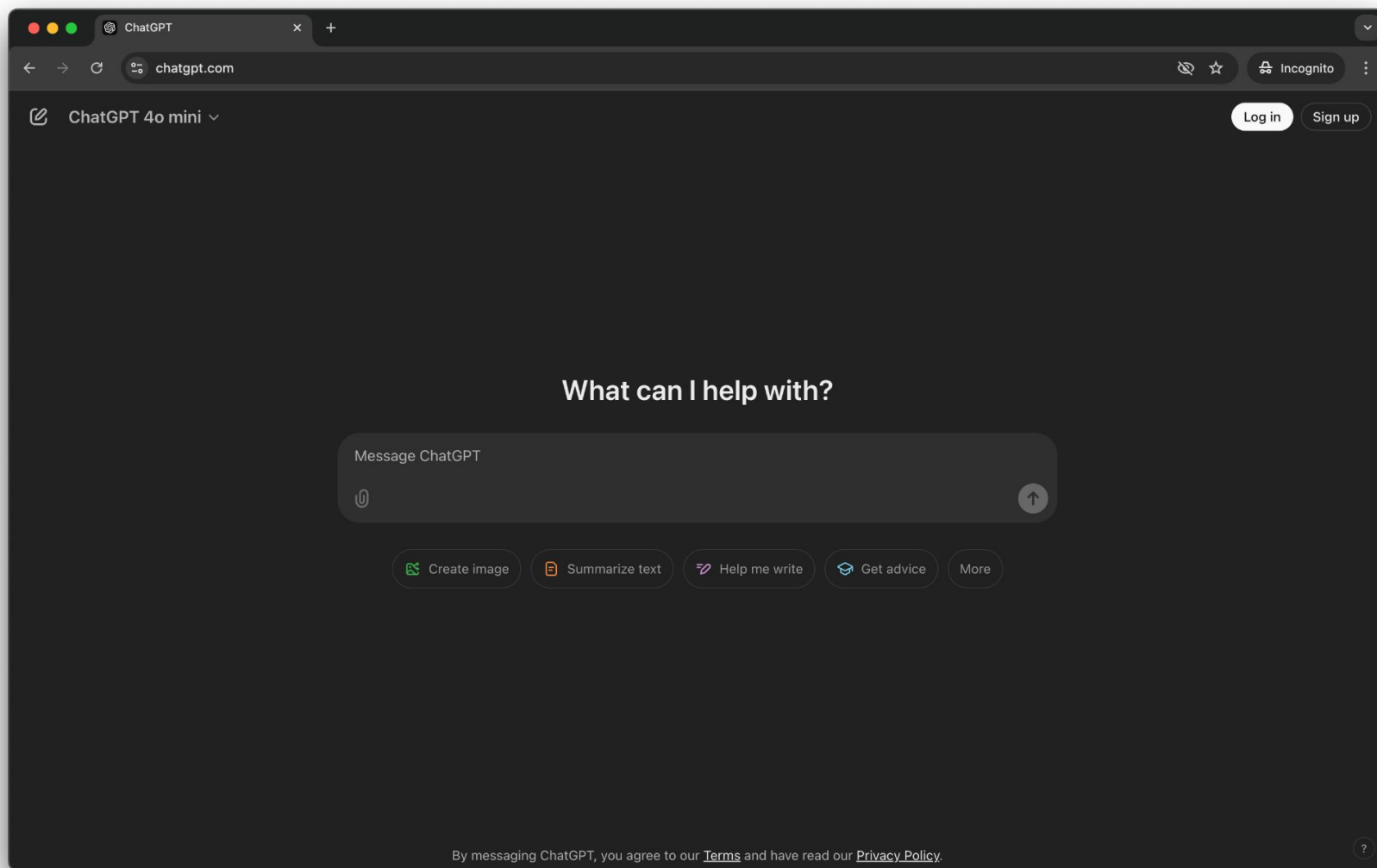
- Review exam details [here](#)
- You're allowed a cheat sheet: **1 side of an A4 sized paper**
-  February 14 💕
-  3:00-3:50 pm
- **!!**  CHBE 101 [Chemical and Biological Engineering Building]  **!!**
- Practice Problems [available here](#)
- Past Exams posted on Canvas



Prompt Engineering

Motivation





Mini Activity

lmarena.ai

✕ Arena (battle)
✕ Arena (side-by-side)
💬 Direct Chat
🏆 Leaderboard
🔍 Arena Explorer
ℹ About Us

✕ Chatbot Arena (formerly LMSYS): Free AI Chat to Compare & Test Best AI Chatbots

[小红书](#) | [Twitter](#) | [Discord](#) | [Blog](#) | [GitHub](#) | [Paper](#) | [Dataset](#) | [Kaggle Competition](#)

New Launch! WebDev Arena: web.lmarena.ai - AI Battle to build the best website!

📖 How It Works

- **Blind Test:** Ask any question to two anonymous AI chatbots (ChatGPT, Gemini, Claude, Llama, and more).
- **Vote for the Best:** Choose the best response. You can keep chatting until you find a winner.
- **Play Fair:** If AI identity reveals, your vote won't count.
- **NEW features:** Upload an image 🖼 and chat, or use 🗣️ **Text-to-Image** models like DALL-E 3, Flux, Ideogram to generate images! Use 🐙 **RepoChat** tab to chat with Github repos.

🏆 Chatbot Arena LLM Leaderboard

- Backed by over 1,000,000+ community votes, our platform ranks the best LLM and AI chatbots. Explore the top AI models on our LLM [leaderboard](#)!

📌 Chat now!

🔍 Expand to see the descriptions of 85 models

Model A

Model B

Explore
Imarena.ai

Pulse Check

What is Prompt Engineering?

Prompt Engineering

"A relatively new discipline for developing and optimizing prompts to efficiently use language models (LMs) for a wide variety of applications and research topics."

- promptingguide.ai

Prompt Engineering

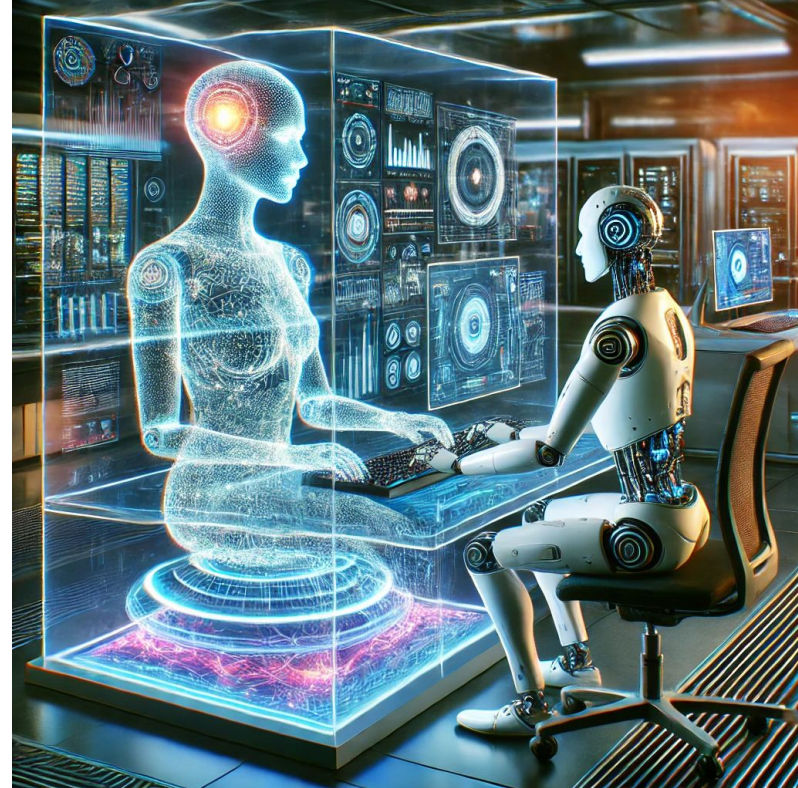
"A relatively new discipline for developing and optimizing prompts to efficiently use language models (LMs) for a wide variety of applications and research topics."

- promptingguide.ai

Note: This is a **fast changing topic** and not all techniques are applicable to every model.

Prompt Engineering

1. Zero-shot Prompting
2. Few-shot Prompting
3. Chain of Thought
4. Context Prompting
5. Persona Prompting



AI Generated Image "Prompt Engineering"

Zero-shot Prompting

Strategy

- Prompt directly instructs the model to perform a task
- No context/examples included in prompt
- Result accuracy: 😐

Prompt

Q: Summarize the plot of squid games, season 1

A: Summary of Squid Game (Season 1)

....

Few-shot Prompting

Strategy

- Include a few examples
- Help model understand style
- Model is good at **predicting!**

Prompt

"Q: What is the capital of France?

A: Paris

Q: What is the capital of Germany?

A: Berlin

Q: What is the capital of Italy?

A: _____"



Chain of Thought: Provide

Strategy

- Explain/provide the thought process
- Allows model to follow your example
- Can be combined with with few-shot prompting

Chain of Thought: Provide

Standard Prompting

Model Input

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?

A: The answer is 11.

Q: The cafeteria had 23 apples. If they used 20 to make lunch and bought 6 more, how many apples do they have?

Model Output

A: The answer is 27. ❌

Chain-of-Thought Prompting

Model Input

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?

A: Roger started with 5 balls. 2 cans of 3 tennis balls each is 6 tennis balls. $5 + 6 = 11$. The answer is 11.

Q: The cafeteria had 23 apples. If they used 20 to make lunch and bought 6 more, how many apples do they have?

Model Output

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. ✅

Chain of Thought: Request

Strategy

- Encourage model to reason step-by-step by **explicitly requesting it**
- Improves accuracy and logic of the responses

Prompt

*"I'm hosting a birthday party for 20 children of age 5-7. Give me some game ideas to keep them entertained, **explain your reasoning step-by-step.**"*



Context Prompting

Strategy

- Provide model **background information** / context
- Helps model generate relevant and coherent responses

Prompt

"For a beginner baker, explain a simple method to bake a banana bread, without sugar or eggs."

Persona Prompting

Strategy

- Specifies **who or what** the AI should **emulate**
- Shapes the tone and perspective of the response

Prompt

"You are a professional hiker and tour guide, give me a packing list to hike mount Kilimanjaro"

Your Turn!



Q: What type of prompting is this?

- A. Zero-shot
- B. Few-shot
- C. Chain of Thought
- D. None of the above

Convert the following decimal numbers to binary.

Examples:

- Decimal: 5 → Binary: 101
- Decimal: 12 → Binary: 1100
- Decimal: 27 → Binary: 11011
- Decimal: 48 → Binary: ?

Guided Demo



Let's Make a Prompt!

Task:

In groups of 2-3, develop an effective prompt based on the techniques introduced earlier.

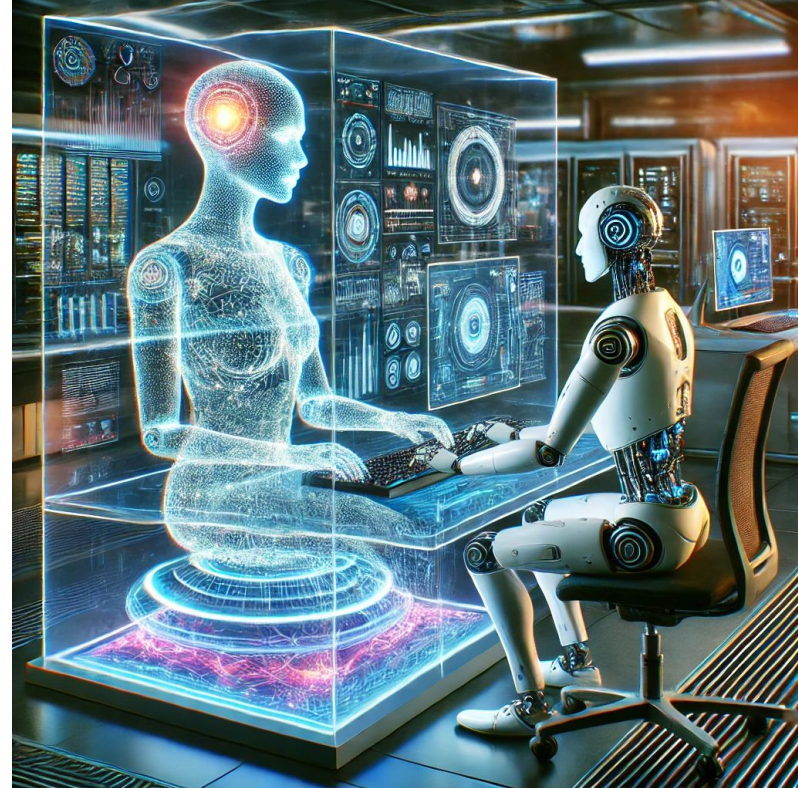
Senario:

You're planning a vacation during reading break in February. You're open to new places and want to relax with your partner. You turn to ChatGPT for help!

Wrap up

Prompt Engineering

1. Zero-shot Prompting
2. Few-shot Prompting
3. Chain of Thought
4. Context Prompting
5. Persona Prompting



AI Generated Image "Prompt Engineering"



What was your main takeaway from today's session?



Midterm Q/A



Midterm Breakdown

Total of 20 points





- 2 T/F questions
- 7 M/C questions
- 2 short answer questions
- 2 long answer questions

Wrap Up

- **Project Milestone 1**

- Due on Wednesday, Feb 12 at 11:59pm (tonight!)

- **Midterm**

- Review exam details [here](#)
- You're allowed a cheat sheet: **1 side of an A4 sized paper**
-  February 14 💕
-  3:00-3:50 pm
- !!  CHBE 101 [Chemical and Biological Engineering Building]  !!
- Practice Problems [available here](#)
- Past Exams posted on Canvas