# Lab 7: LLMs and Prompt Engineering

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This presentation is adapted from last year’s labs

# Today’s lab

- Mandatory Assignment 3
- Quick introduction to prompt engineering
- Self-studies and exercises

# MA3

# Introduction to prompt engineering

- Better prompts = better answers
- Is it still relevant?
- Common sense

# What makes a good prompt?

- Clarity
- Specificity
- Context
- Language
- Persona
- Tone and style
- Split up complex requests
- Iterate

# Clarity

| BAD | GOOD |
| --- | --- |
| “How do I add excel numbers?” | “How do I add up a row of dollar amounts in Excel? I want to do this automatically for a whole sheet of rows with all the totals ending up on the right in a column called "Total".” |
| “Who is the president?” | “Who was the president of Mexico in 2021, and how frequently are elections held?” |

# Specificity

| BAD | GOOD |
| --- | --- |
| "What are the benefits of using solar energy?" | List 3 key benefits of using solar energy for residential homes, focusing on cost savings, environmental impact, and energy independence. |
| “Who is the president?” | Who was the president of Mexico in 2021, and how frequently are elections held? |

# Context

| BAD | GOOD |
| --- | --- |
| “What’s a good workout?” | “Can you make a workout plan for me? I’m 25 years old, I have strained my left ankle but I want to improve my cardiovascular fitness at my local gym. I have 45 minutes to work out….etc.etc” |
| “Im going to Barcelona, any tips?” | "I’m planning a 5-day trip to Barcelona in July, and I’m interested in exploring local culture, historical landmarks, and trying authentic Spanish food. I’d like suggestions for must-see spots, cultural experiences, and a few restaurant recommendations that are budget-friendly." |

# Language

- Many models are trained in English, and might reason better in English
- If you get bad answers, consider switching to English.
- The model can translate afterwards
- (more relevant for older models)

# Persona

- Asking the LLM to adapt a persona can give it further context
- Particularly helpful for larger projects
- “You are an AI programming assistant. First, describe your plan in pseudocode, then output the code in a single block. Minimize other prose. Ask follow-up questions to the user.”

# Tone and style

- By telling the model how it should act, you can get answers that fit your own level of understanding better.
- “Explain this to a 5 year old”
- “Explain this to a third year Computer Science student”

# Split up complex requests

- Making smaller subtasks will allow you to control how much effort is put into each task.
- Context is extra important here

# Iterate

- If the answer seems a bit off, try again.
- Add context
- Add instructions
- Change the format
- Start a new conversation with it
- Try another model

# Be aware

- Be critical
- Take ethical and legal considerations
- Think of privacy
- Avoid overreliance

# The rest of the lab

- Extra reading (not pensum):
  - https://www.geeksforgeeks.org/blogs/what-is-prompt-engineering-the-ai-revolution/
  - https://www.geeksforgeeks.org/artificial-intelligence/large-language-model-llm/
- Exercises:
  - https://github.com/timothywarner/elements/blob/main/prompt_engineering_exercises.md