

Assignment 4.1: Prompt Design and Comparison

1. Task Description

We compare three types of prompts used for solving the same task using a Large Language Model (LLM). The task is to solve a basic math word problem:

"If a train travels 60 km in 1.5 hours, what is its speed in km/h?"

2. Prompt Designs and Outputs

Prompt 1: Direct Prompt

Prompt:

What is the speed of a train that travels 60 kilometers in 1.5 hours?

LLM Output:

The speed is $60 \div 1.5 = 40$ km/h.

Prompt 2: Few-Shot Prompt

Prompt:

Example 1: A car travels 100 km in 2 hours. Speed = $100 \div 2 = 50$ km/h.

Example 2: A bike travels 30 km in 1 hour. Speed = $30 \div 1 = 30$ km/h.

Now you try: A train travels 60 km in 1.5 hours. What is its speed?

LLM Output:

Speed = $60 \div 1.5 = 40$ km/h.

Prompt 3: Chain-of-Thought Prompt

Prompt:

To find the speed, we divide the distance by the time.

The distance the train travels is 60 km.

The time taken is 1.5 hours.

So, speed = $60 \div 1.5 = 40$ km/h.

LLM Output:

The train's speed is 40 km/h.

3. Comparison Table

Prompt Type	Explanation Style	Accurate	Reasoning Transparency	Trans-
Direct Prompt	One-step answer	Yes	No	
Few-Shot Prompt	Pattern-based imitation	Yes	No	
Chain-of-Thought Prompt	Step-by-step reasoning	Yes	Yes	

Table 1: Comparison of Prompting Techniques

4. Conclusion

All three prompting techniques correctly answered the math problem. However, the **Chain-of-Thought** prompt stood out due to its clear reasoning and better interpretability. It is especially useful in more complex problems, where intermediate steps are crucial. While direct and few-shot prompts are faster, chain-of-thought prompting is more reliable for reasoning-based tasks.