Assignment 4.2: Prompt Tuning Experiment

1. Task Chosen

We experiment with prompt tuning on the task of **Sentiment Analysis**. The input text used for evaluation is:

> *"The movie was unexpectedly amazing and kept me glued to my seat."*

2. Prompt Variations and Outputs

1. Basic Prompt (Zero-shot)

Prompt:

```
What is the sentiment of the following sentence?
'The movie was unexpectedly amazing and kept me glued to my seat.'
```

LLM Output:

Positive

2. Few-Shot Prompt Tuning

Prompt:

```
Classify the sentiment as Positive, Neutral, or Negative.

Example 1: 'I hated the food.' → Negative
Example 2: 'The performance was okay.' → Neutral
Example 3: 'The book was incredible!' → Positive

Now classify: 'The movie was unexpectedly amazing and kept me glued to my seat.'
```

LLM Output:

Positive

3. Chain-of-Thought Prompt Tuning

Prompt:

```
Let's think step by step.
The sentence says the movie was amazing and kept the person glued to the seat.
These are strong positive emotions.
Therefore, the sentiment is:
```

LLM Output:

Positive

3. Comparison Table

Prompt Type	**Explanation Capability**	**Robustness**	**LLM Output**
Basic Prompt	Low	Medium	Positive
Few-Shot Prompt	Medium	High	Positive
Chain-of-Thought Prompt	High	High	Positive

Table 1: Comparison of Prompt Tuning Methods

4. Conclusion

All three prompts correctly identified the sentiment as **Positive**. However, prompt tuning clearly enhances reliability and interpretability:

- **Few-Shot Prompting** provides contextual grounding through examples.
- **Chain-of-Thought Prompting** improves reasoning transparency and is ideal for explainability.
- While the **Basic Prompt** works for simple cases, tuned prompts are more robust for nuanced inputs.