CS685 Quiz 4: *in-context learning*
Released 4/25, due 5/1 on Gradescope (please upload a PDF!)
Please answer both questions in 2-4 sentences each.

1. You find that chain-of-thought prompting significantly outperforms zero-shot prompting at solving complex math word problems. However, when you look at the rationales generated via chain-of-thought prompting, you notice that they almost always incorrect (i.e., if you followed the steps in the rationale, you would end up with the wrong answer). Explain how chain-of-thought prompting can still outperform zero-shot prompting with incorrect rationales.

   Chain-of-thought prompting can outperform zero-shot prompting even with incorrect rationales because the final answer is extracted separately from the reasoning chain. While the reasoning process may be flawed, the language model can still arrive at the correct final answer through its general knowledge and capabilities. The key advantage is that chain-of-thought prompting encourages step-by-step reasoning, guiding the model towards more structured and logical thinking compared to zero-shot prompting.

2. Imagine some aliens come down to Earth and hand you a file containing documents written in their native language. Joey is convinced that LLMs can translate these documents to English if given a grammar book about the language (written in English), a bilingual dictionary, and a few parallel alien←→English sentence pairs. Should Joey be so certain that this is possible? Why or why not?

   Joey should not be certain that LLMs can translate the alien language documents to English using only a grammar book, dictionary, and parallel sentence pairs. While LLMs have good translation capabilities, translating an entirely new language requires extensive training data and context that may not be provided by those limited resources alone. The complexity of language and the potential for ambiguities or nuances not captured by basic resources could pose significant challenges for accurate translation by LLMs without further adaptation or fine-tuning.