Challenges [Xingjian Zhang]

1. Current literature focus on **incorporating human heuristics** into LLMs. Consider when deep learning is not invented, researchers try to perform feature engineering manually. But then we realize there is a systematic way to automate this process. The research of these LLM papers is somewhat similar to "**feature engineering**" - maybe call it "**reasoning engineering**"? Is there any potential path to automate this process? (Perhaps reinforcement learning?)

2. All of today's papers are based on careful **design of the prompting**, demonstrating strong potentials of LLM without additional training. However, is there any potential way to train LLM to discover and/or generalize these symbolic reasoning? How might LLM **benefit from additional training than simple prompting**?

3. Some literature argue that symbolic reasoning (like CoT) is possible only for models that are large enough. **Is large models (**over-parameterization**) the necessary conditions for symbolic reasoning?**