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## TypedThinker: Diversify Large Language Model Reasoning With Typed Thinking

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### Human Reasoning: Diverse Types



### LLM Reasoning: Deduce, and Deduce



Is deduction always the best way to solve the problem?

Some problems can only be solved by one specific reasoning type (within limited trials)



# Specify and Diversify Reasoning with TypedThinker



### How to get typed thinking?

- Meta-thinker: Trained from experience to identify the suitable reasoning types
- **Demonstration**: Explicitly retrieval previous traces for reasoning, e.g. analogy
- **Reasoner:** Implicitly learn how to reason with types



### Why we need TypedThinker

- Can LLM identify the reasoning type? No!
  - choose deduction >50% problems, but only 34% can be solved with deduction
- Just apply all possible reasoning types? No!
  - Simply Mix all reasoning types will harm performance
- Meta-thinker have high correlation with empirical scores. Yes!



#### Average Accuracy over Four benchmarks