

Chain-of-Thought Pattern

Instructor

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Chain-of-Thought Pattern

- Chain-of-thought (CoT) is a prompting pattern that improves the reasoning abilities of LLMs by generating a series of intermediate reasoning steps.
- Chain-of-thought allows models to decompose multi-step problems into intermediate steps.
- But this also leads to additional computation for problems that requires more reasoning steps.

Chain-of-Thought Prompting

Model Input

Q: Roger has 5 tennis balls. He buys 2 more cans of tennis balls. Each can have 3 tennis balls. How many tennis balls does he have now?

A: Roger started with 5 balls. 2 cans of 3 tennis balls each is 6 tennis balls. $5 + 6 = 11$. The answer is 11.

Q: The cafeteria had 23 apples. If they used 20 to make lunch and bought 6 more, how many apples do they have?

Model Output

A: The cafeteria had 23 apples originally. They used 20 to make lunch. So they had $23 - 20 = 3$. They bought 6 more apples, so they have $3 + 6 = 9$. The answer is 9. ✓

Zero-shot Chain-of-Thought Pattern

[a] Zero-shot prompting

Q: A juggler can juggle 16 balls. Half of the balls are golf balls, and half of the golf balls are blue. How many blue golf balls are there?

A: The answer (arabic numerals) is

(Output) 8 **X**

[b] “Let’s think step by step” trick

Q: A juggler can juggle 16 balls. Half of the balls are golf balls, and half of the golf balls are blue. How many blue golf balls are there?

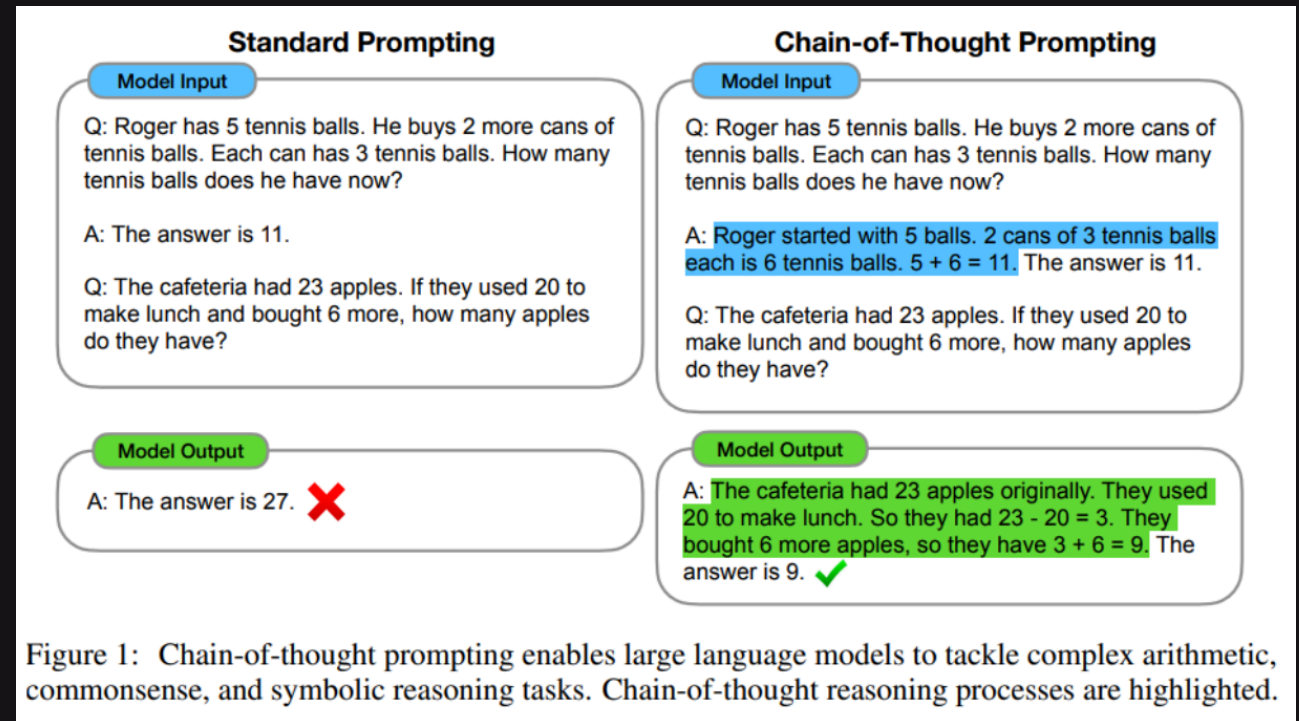
A: **Let’s think step by step.**

(Output) *There are 16 balls in total. Half of the balls are golf balls. That means that there are 8 golf balls. Half of the golf balls are blue. That means that there are 4 blue golf balls. ✓*

- Comparison between standard prompting and the usage of implicit CoT instructions
- Zero-shot CoT facilitates multi-step reasoning (blue text) and potentially generates the correct answer where standard prompting could fail
- Published in the paper, [Large Language Models are Zero-Shot Reasoners - Jan, 2023](#)

Few-shot Chain-of-Thought Pattern

- Comparison between standard prompting and the usage of CoT using few-shot examples with step-by-step reasonings
- Published in the paper, *Chain-of-Thought Prompting Elicits Reasoning in Large Language Models* - Jan, 2023



Thank You
