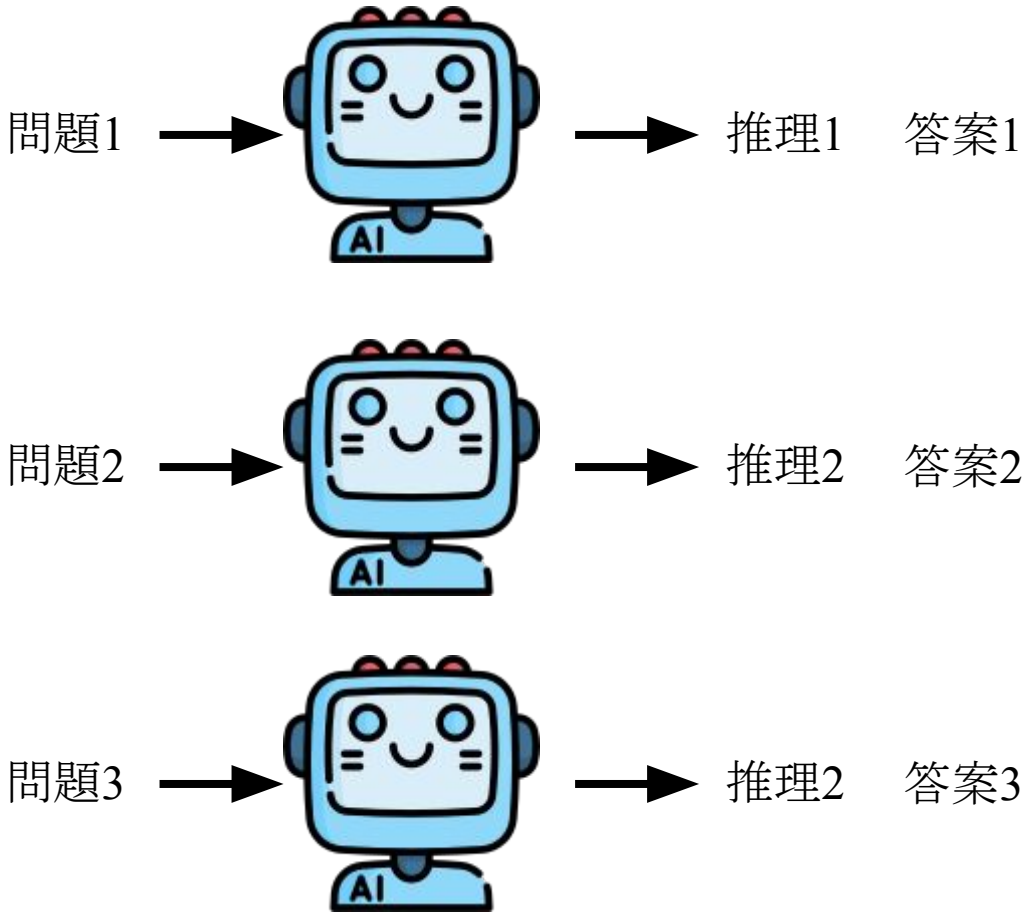
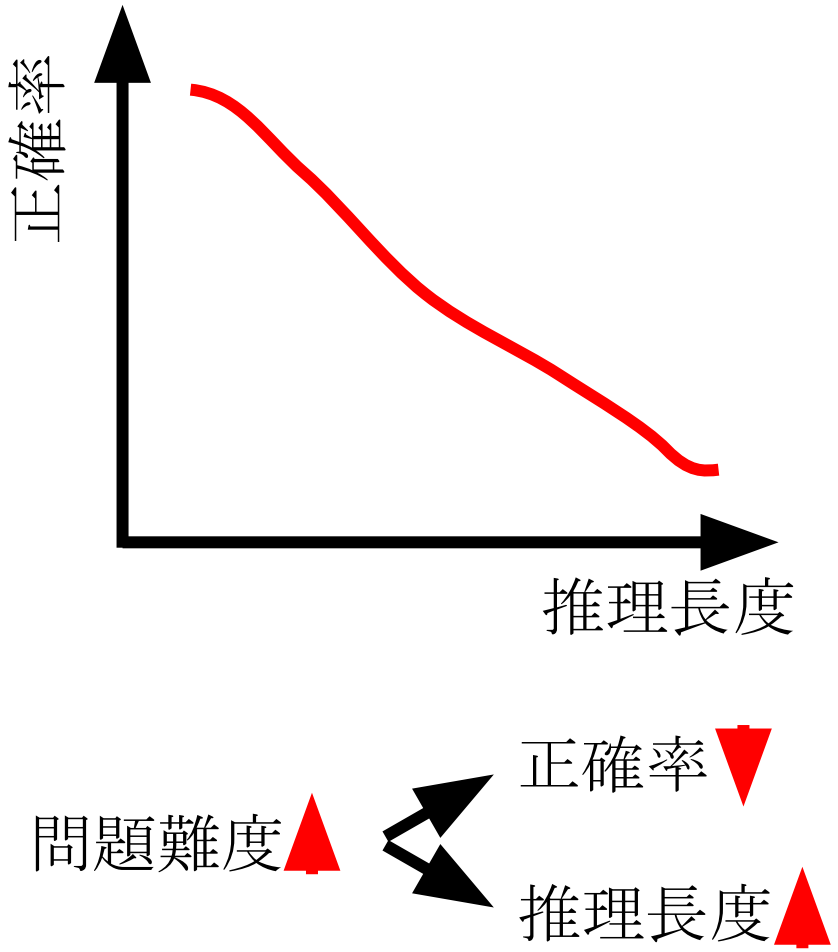
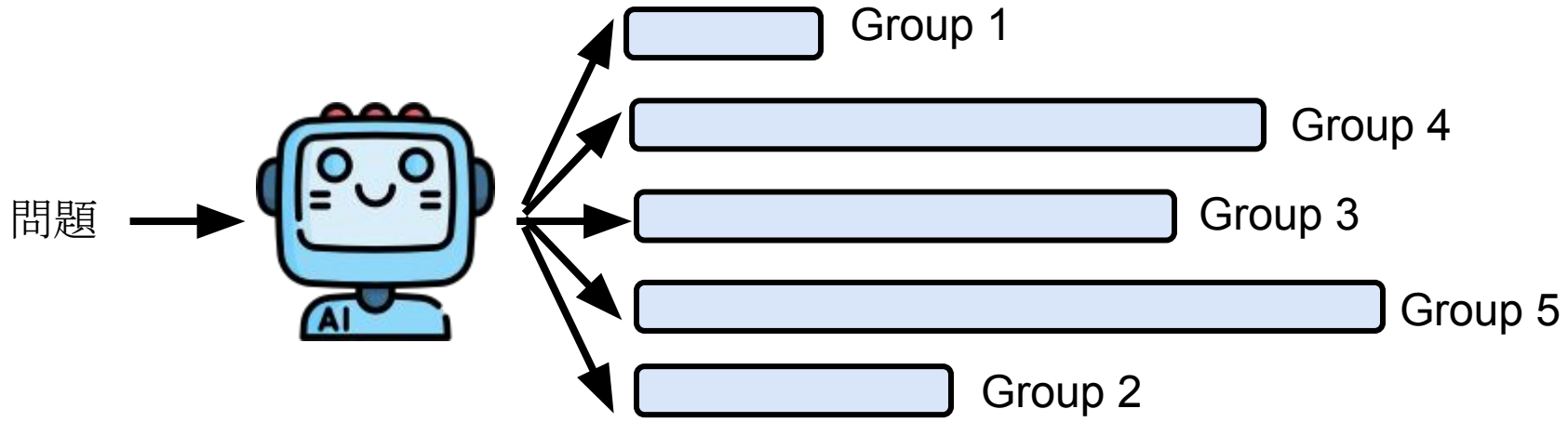
別讓「推理」大型語言模型想太多

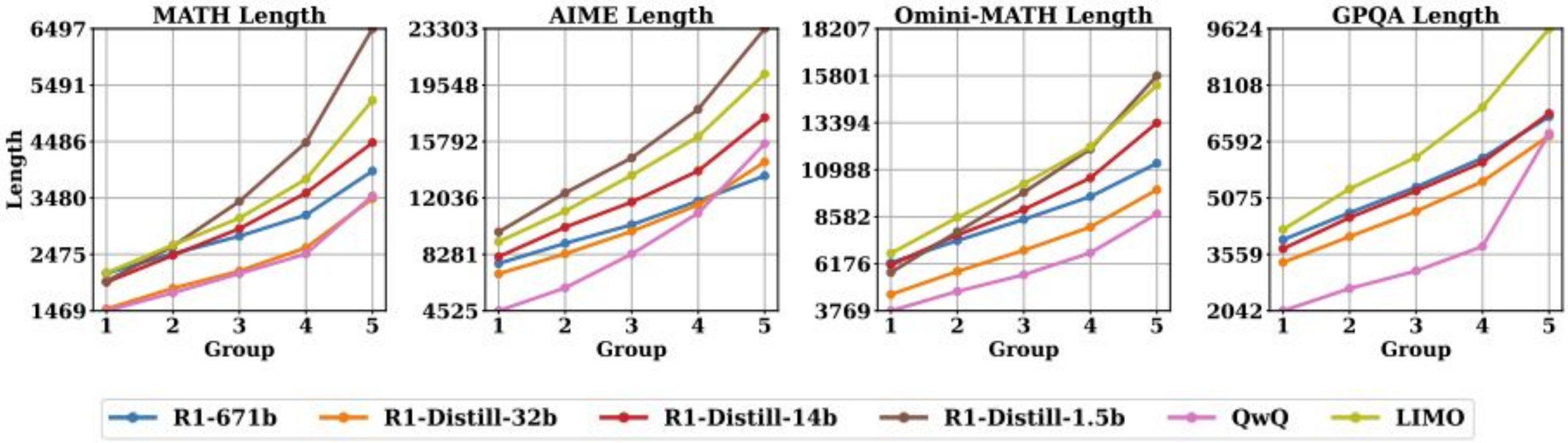
2025/05/02

「推理」越長、結果越好？

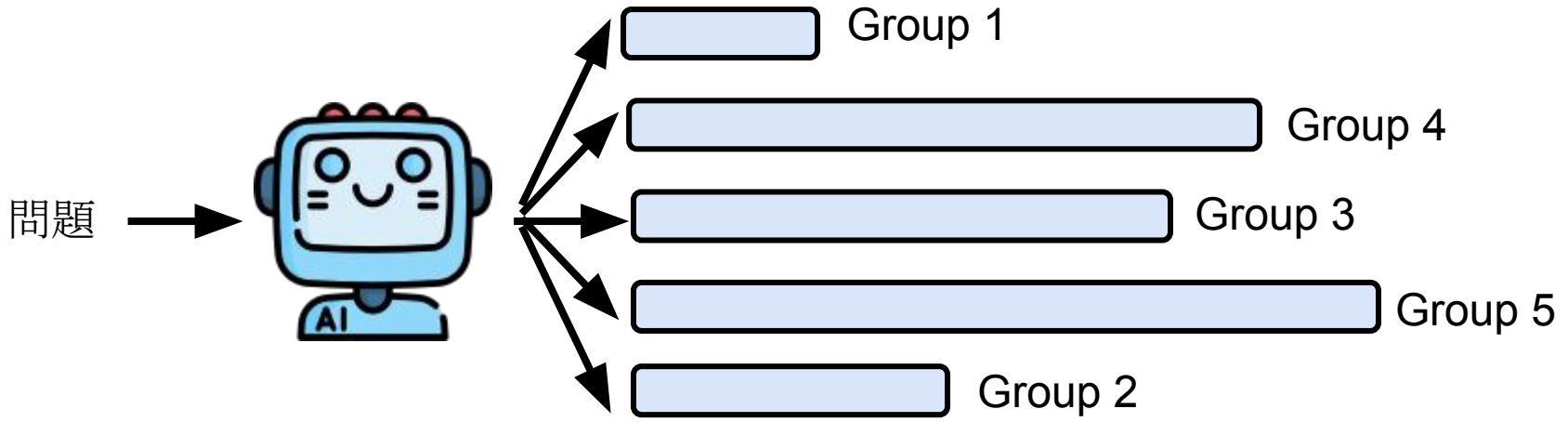

問題1
AI
推理1
答案1
問題2
AI
推理2
答案2
問題3
AI
推理2
答案3

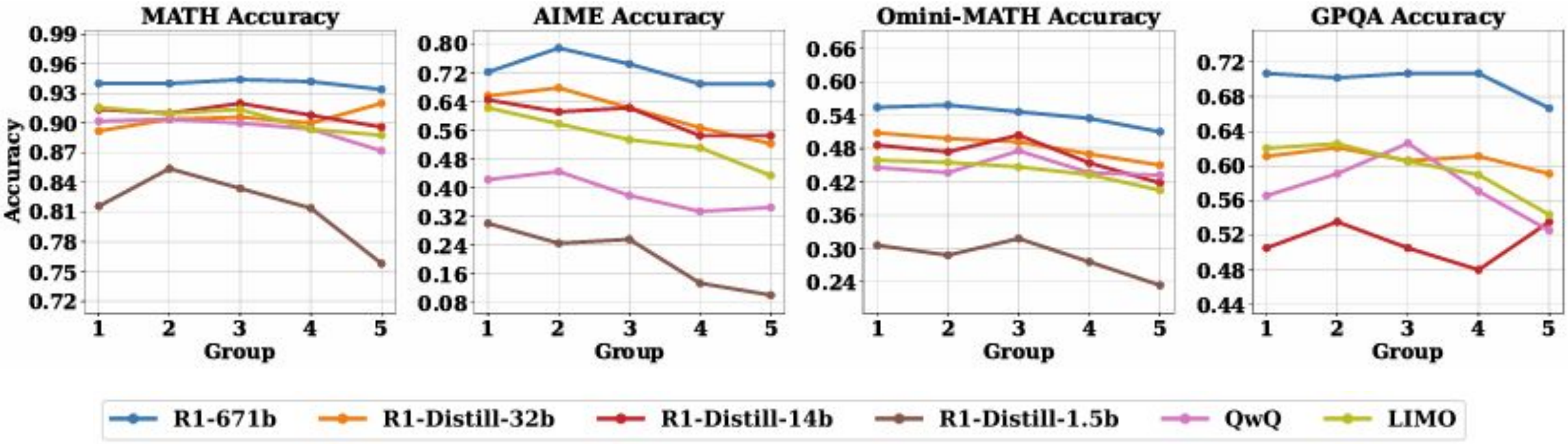

正確率
推理長度
問題難度
正確率
推理長度





https://arxiv.org/abs/2502.12215





https://arxiv.org/abs/2502.12215

人工智慧也是一樣

最好的工程師

不是把事情做到完美

而是在有限資源下

把事情做到最好

如何避免「想太多」

- 更強的思維鏈 (Chain-of-Thought, CoT)
- 給模型推論工作流程
- 教模型推理過程 (Imitation Learning)
- 以結果為導向學習推理 (Reinforcement Learning, RL)

Chain of Draft

https://arxiv. org/pdf/2502.18600

Standard

```
Answer the question directly. Do not return any
preamble, explanation, or reasoning.
```

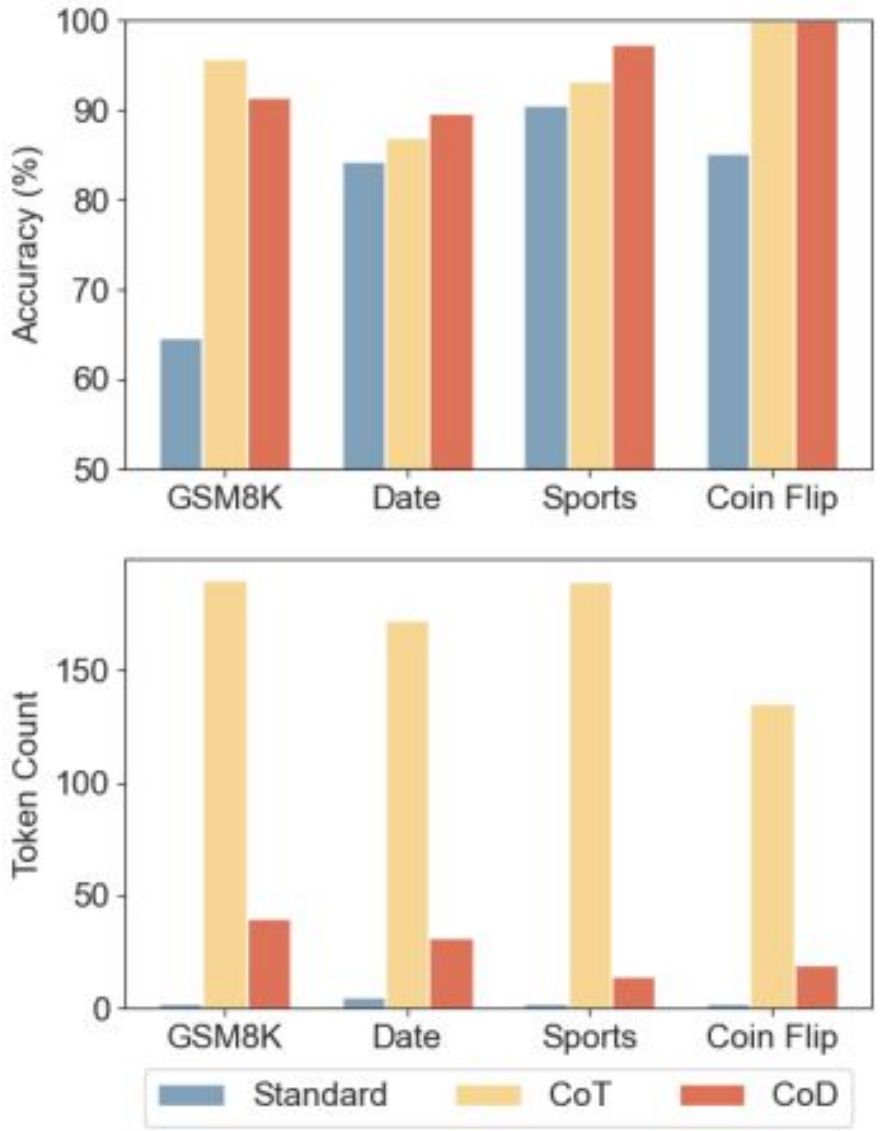
Chain-of-Thought

```
Think step by step to answer the following question.
Return the answer at the end of the response after a
separator ####.
```

Chain-of-Draft

```
Think step by step, but only keep a minimum draft for
each thinking step, with 5 words at most. Return the
answer at the end of the response after a separator
####.
```

Claude 3.5 Sonne



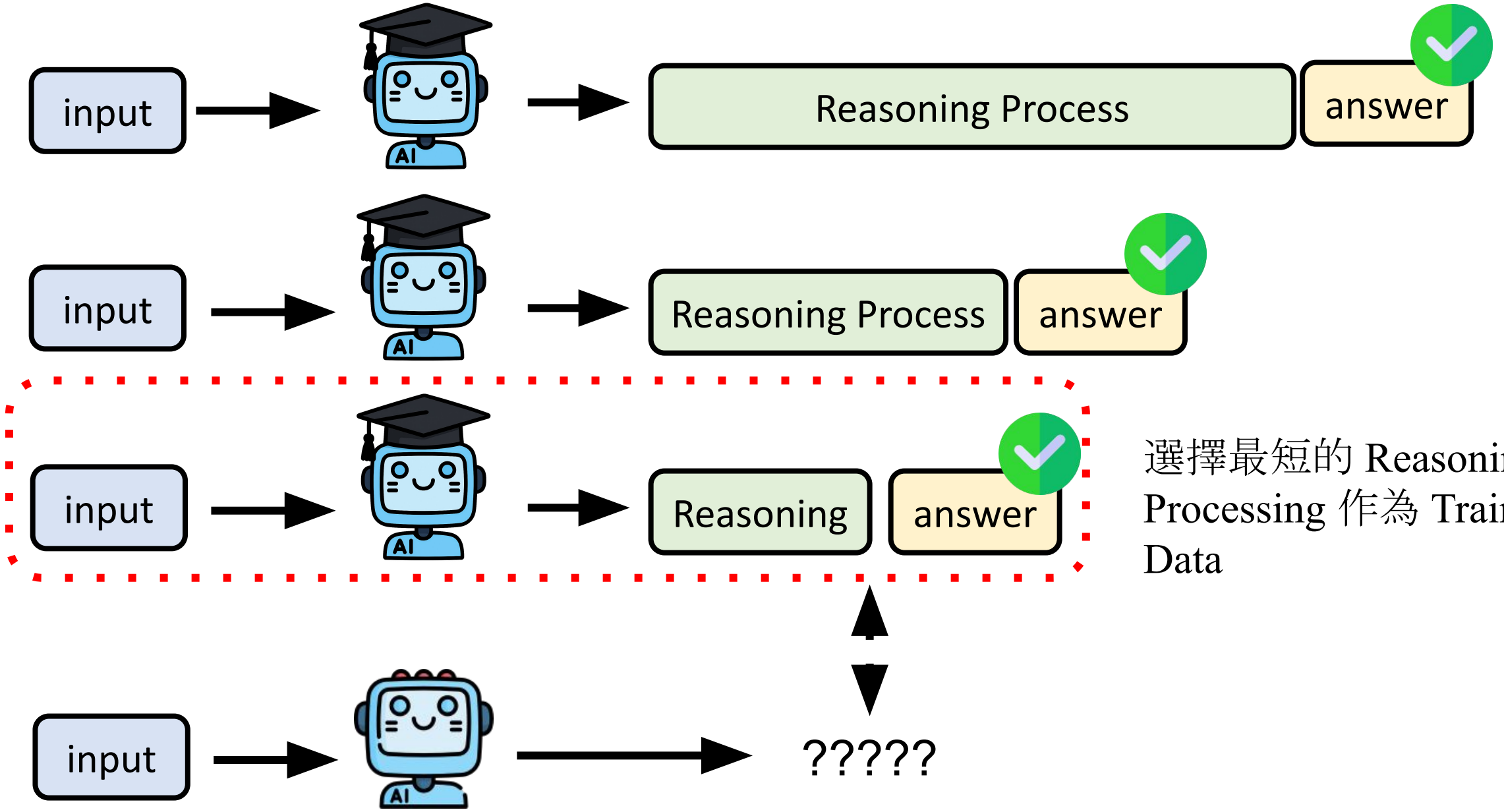
如何避免「想太多」

更強的思維鏈 (Chain-of-Thought, CoT)

給模型推論工作流程

教模型推理過程 (Imitation Learning)

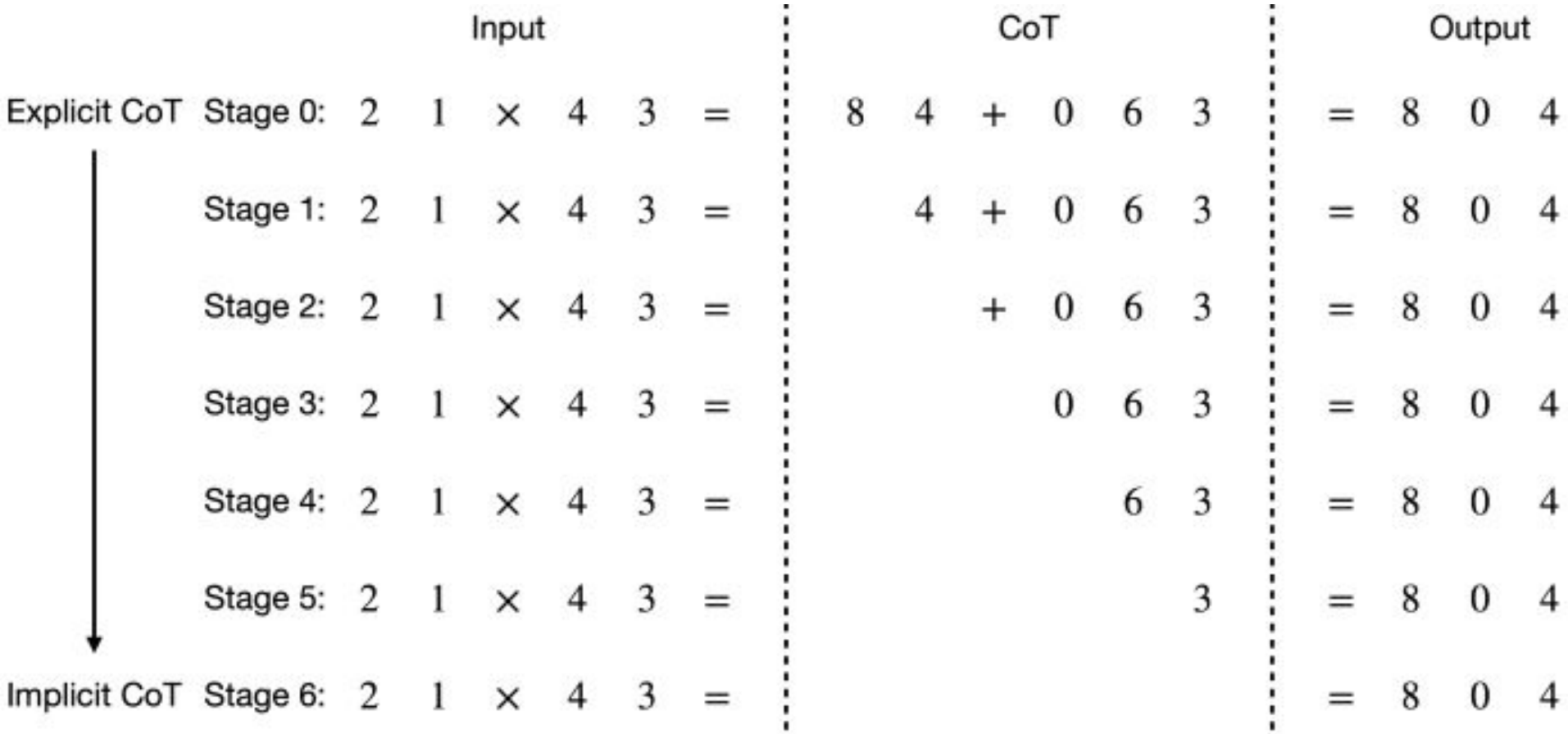
以結果為導向學習推理 (Reinforcement Learning, RL)



選擇最短的 Reasoning Processing 作為 Training Data

https://arxiv.org/abs/2502.18080

From Explicit CoT to Implicit CoT



https://arxiv.org/abs/2405.14838

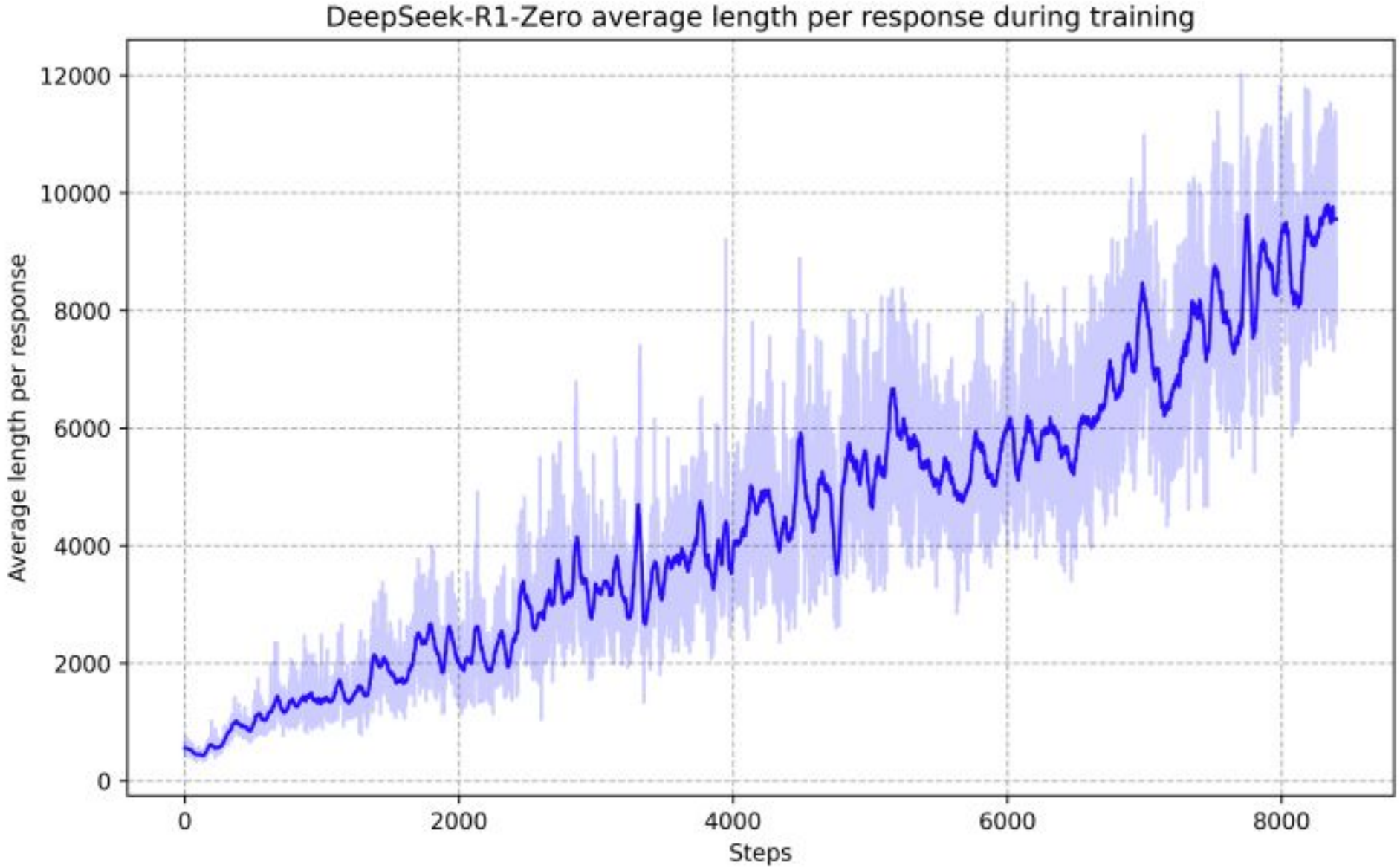
如何避免「想太多」

更強的思維鏈 (Chain-of-Thought, CoT)

給模型推論工作流程

教模型推理過程 (Imitation Learning)

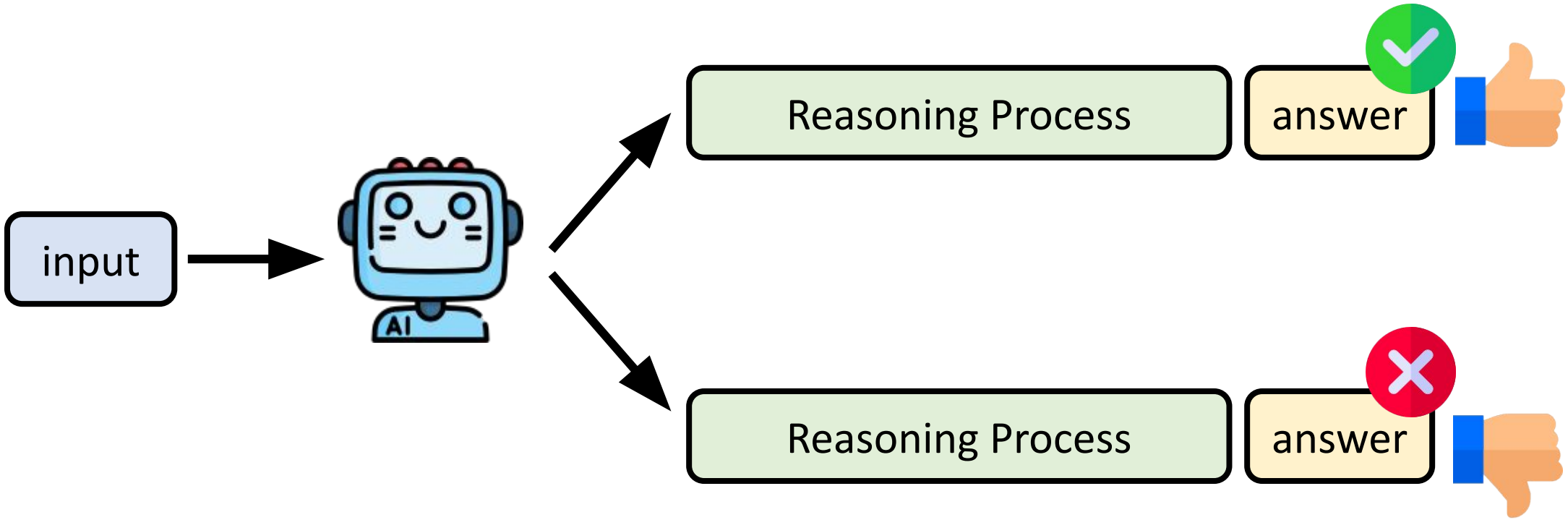
以結果為導向學習推理 (Reinforcement Learning, RL)



DeepSeek-R1

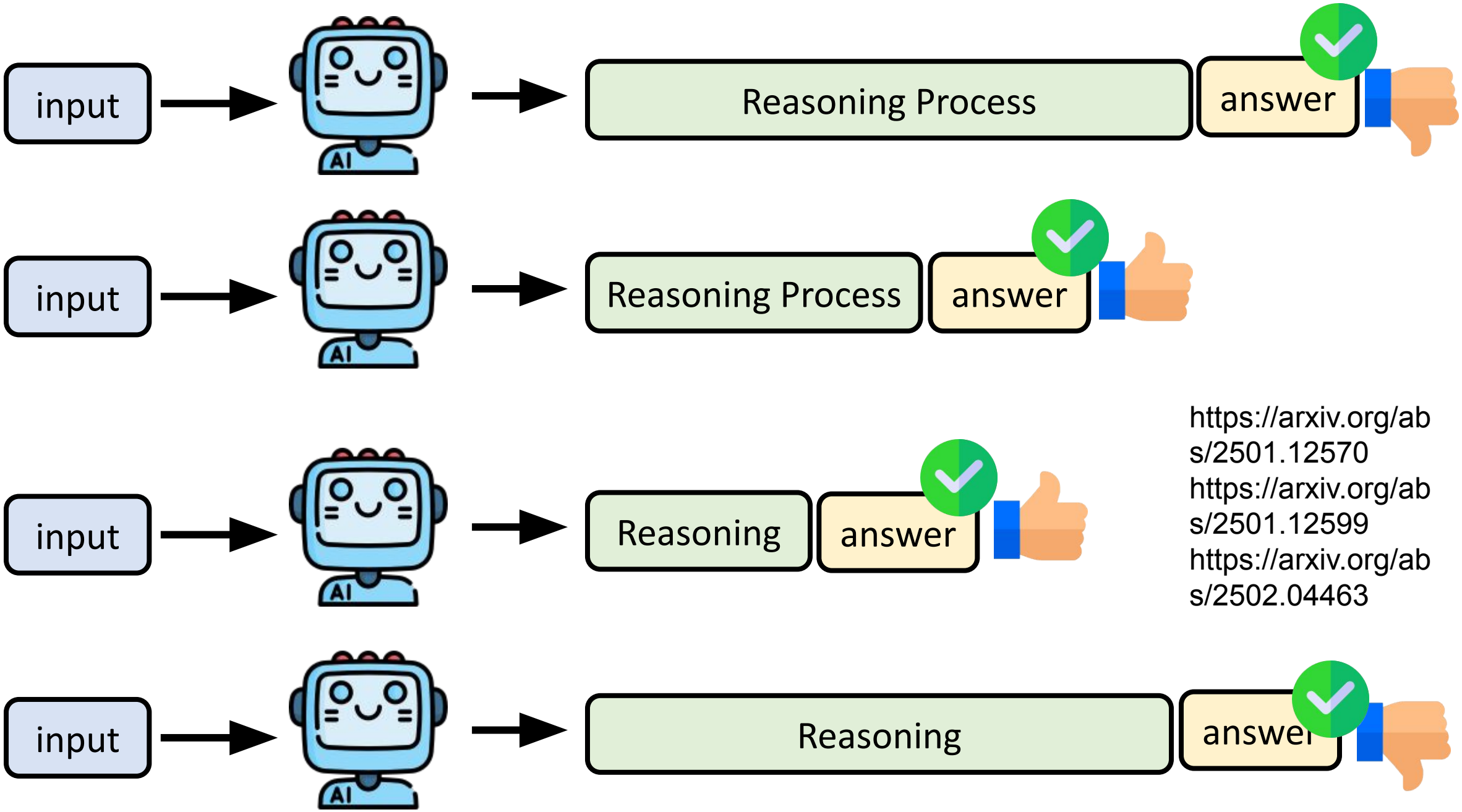
https://arxiv.org/abs/2501.12948

RL 的方法產生了超長的「推理」過程



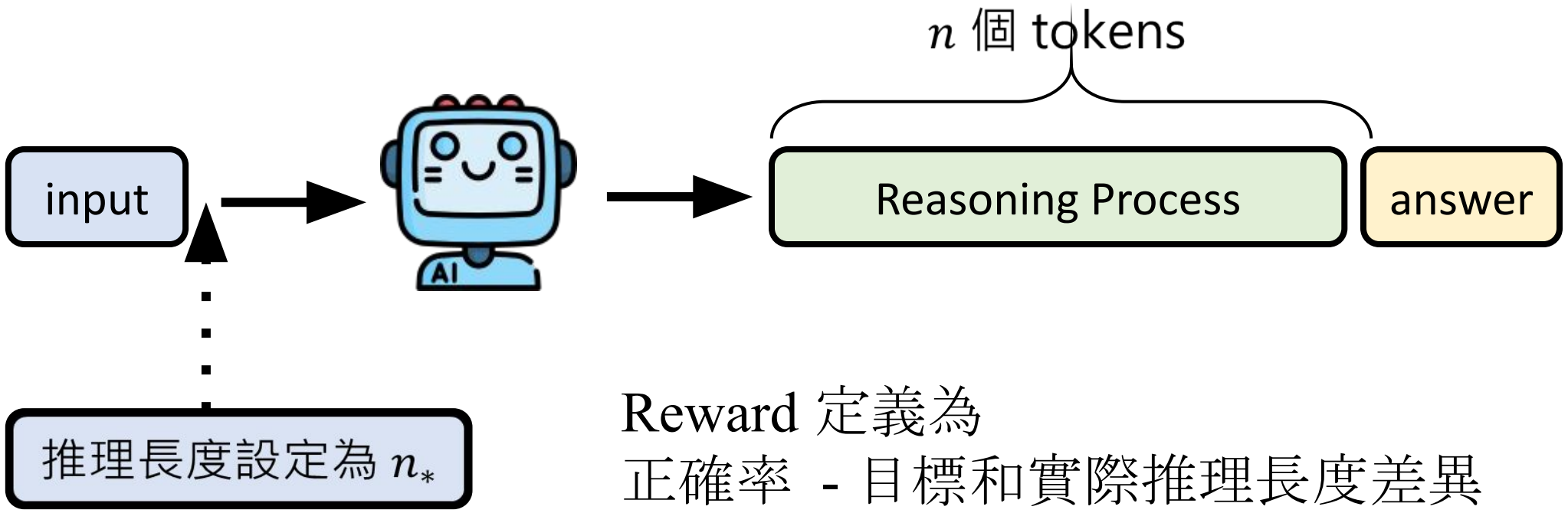
沒人教 AI 要在意 Reasoning Process 的長度!

超過一定長度就算是不好的？


input
AI
Reasoning Process
answer
input
AI
Reasoning Process
answer
input
AI
Reasoning
answer
https://arxiv.org/abs/2501.12570
https://arxiv.org/abs/2501.12599
https://arxiv.org/abs/2502.04463
input
AI
Reasoning
answer

控制「推理」的長度

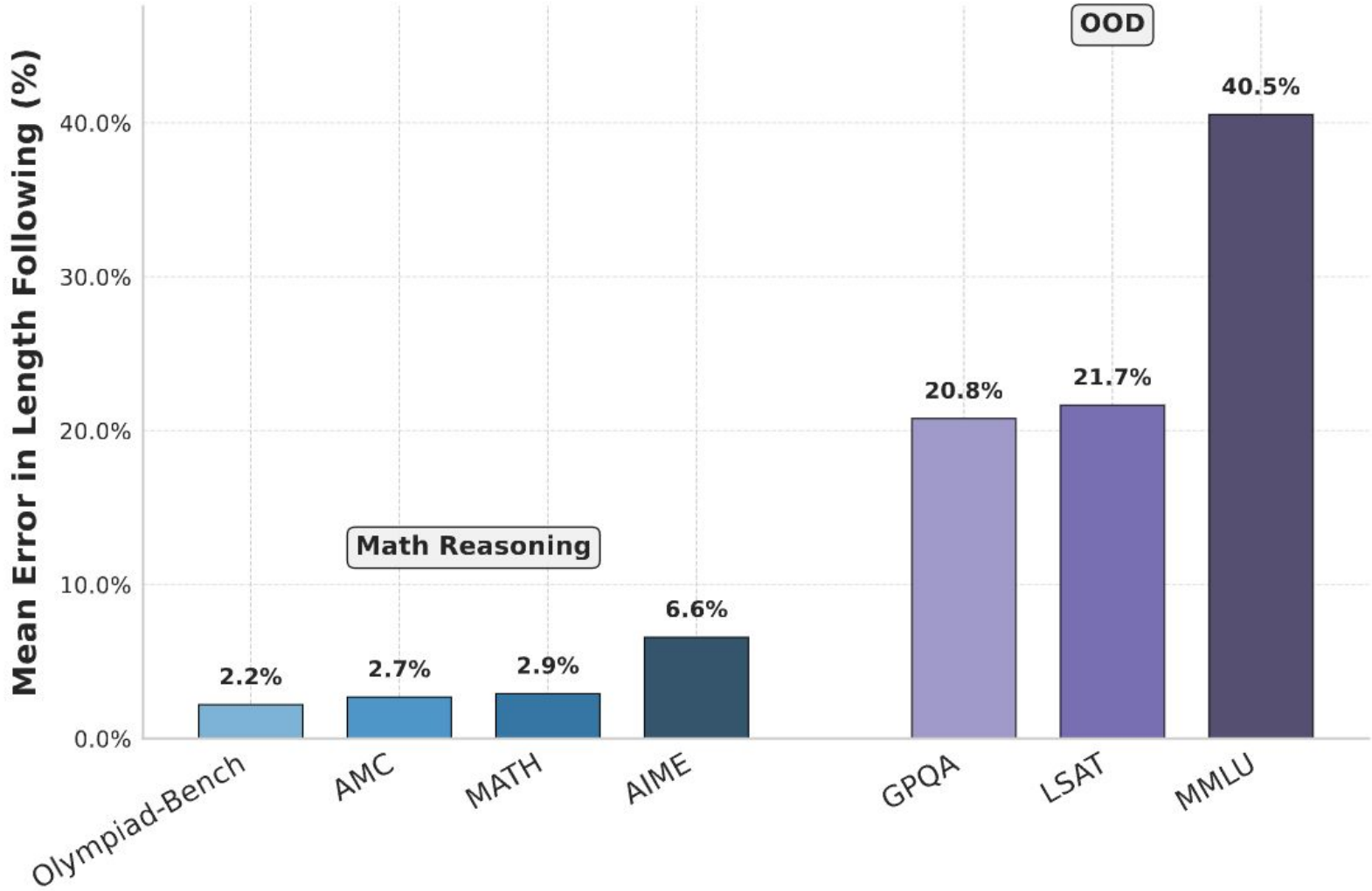
https://arxiv.org/abs/2503.04697



Reward 定義為
正確率 - 目標和實際推理長度差異

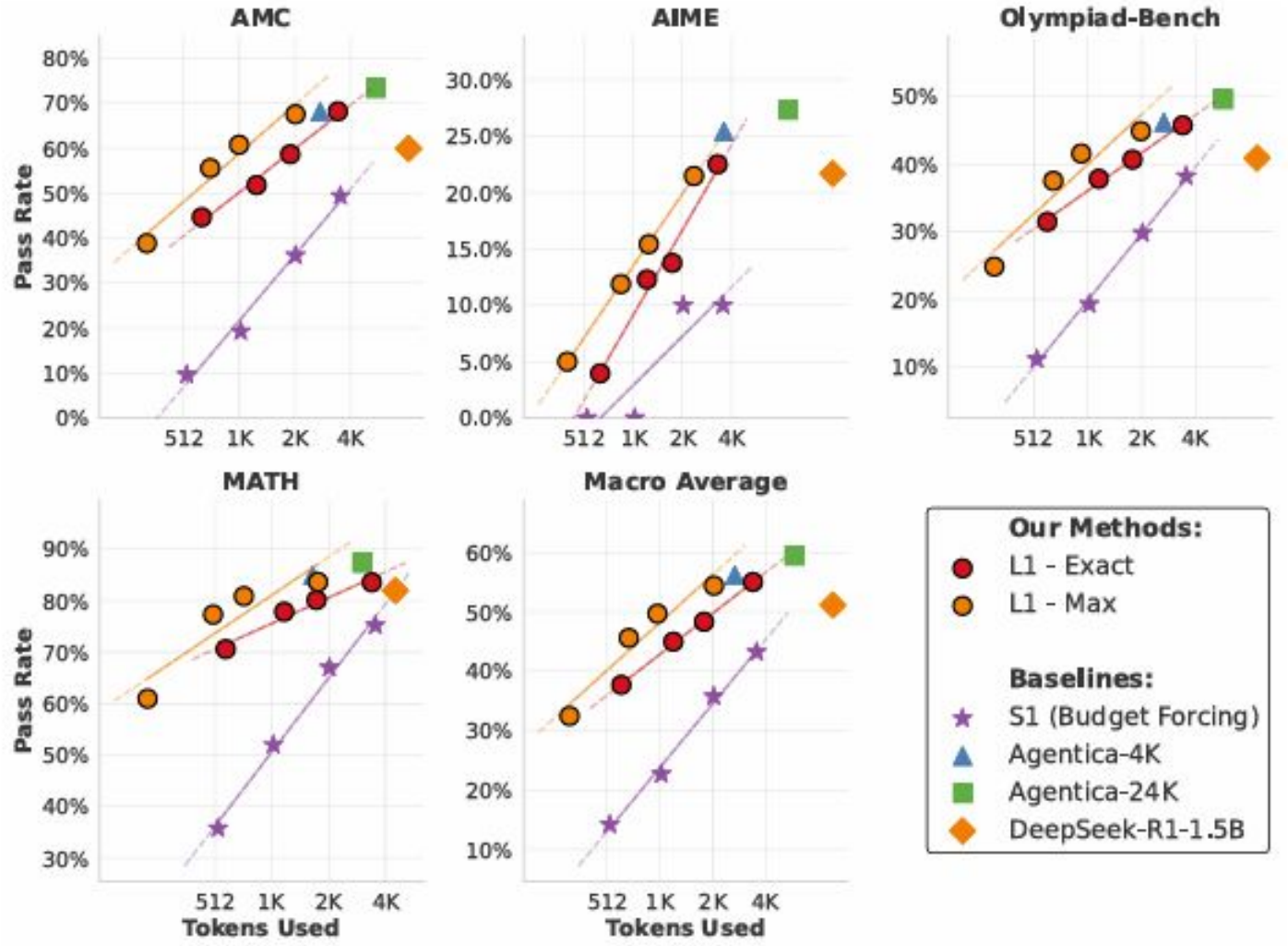
控制「推理」的長度

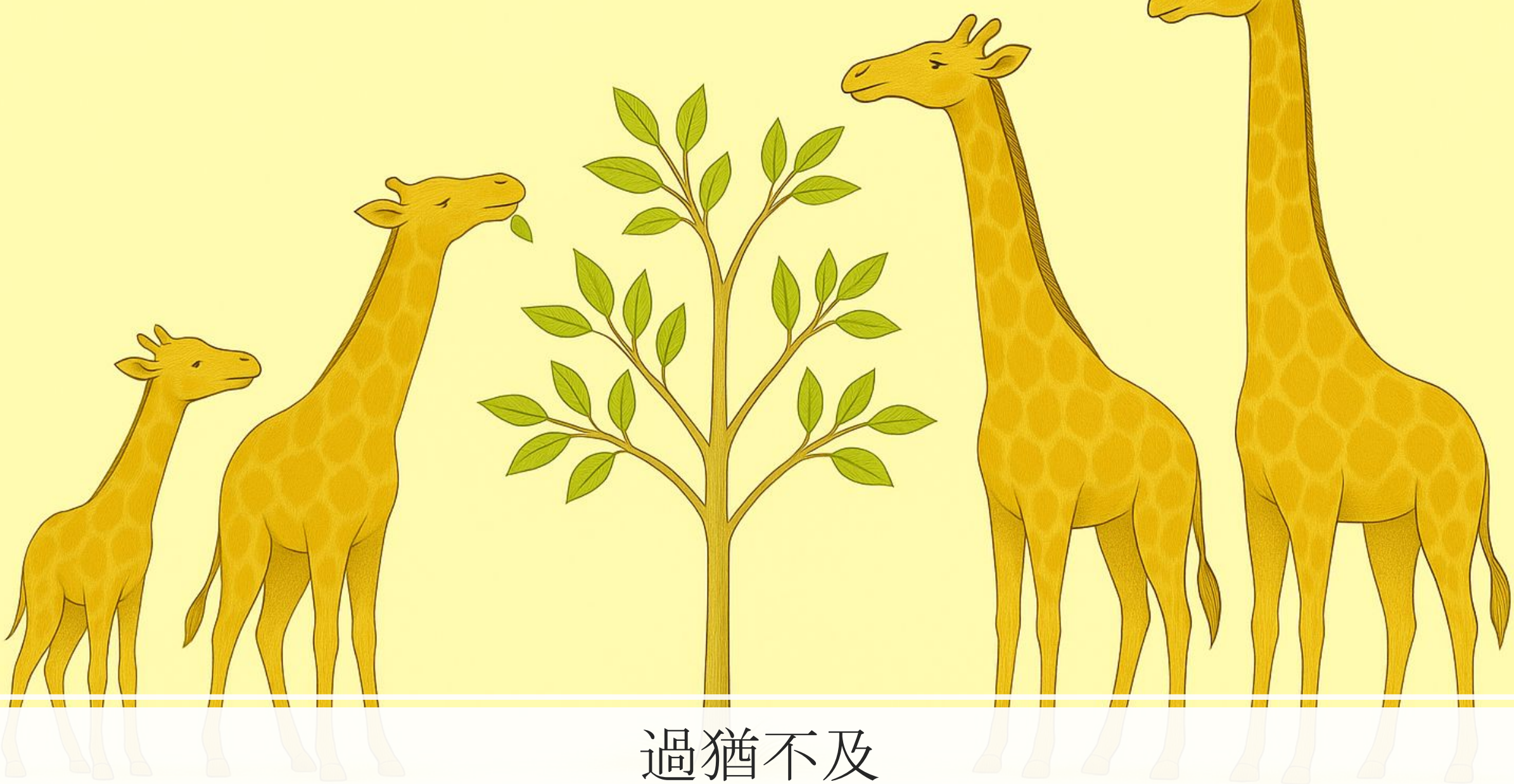
https://arxiv.org/abs/2503.04697



控制「推理」的長度

https://arxiv.org/abs/2503.04697





過猶不及

(本圖由 gpt-4o 生成, 與實際演化過程無關)