

Why write out the work instead of answering right away? — Thinking before answering

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Once it wrote out its work instead of answering right away, it started getting right what it used to get wrong.

In a nutshell

- 1 The secret to AI suddenly getting good at hard problems wasn't getting bigger — it was making it **go through the steps before answering**.
- 2 At first, it worked when a person told it 'think step by step,' but later came **models trained to write out their work on their own first**. These are called reasoning models.
- 3 But there's a price. The longer it thinks, **the slower the answer and the more text it writes**. So for easy questions, it doesn't bother.

Answering right away vs. thinking first

Answer right away

- Sees the problem, answers at once
- Fast, writes very little
- Often gets hard math wrong



Think, then answer

- Writes out the steps first
- Slow, writes a lot
- Accuracy on hard problems jumps

On the same US high school math competition problems, the model that answered right away got 12% right, while the model specially trained to write out its work first got 74%.

Key idea: instead of making the model bigger, 'letting it think longer' also boosts performance

Put the steps of the work in order

The apple problem

- 1 There are 23 apples
- 2 Use 20, and 3 are left
- 3 Buy 6 more: now 9
- 4 So the answer is 9

Write down each in-between number and you won't get mixed up. Models are the sa...

A reasoning model's turn

- 1 Restate the problem
- 2 Write out the steps
- 3 Check in-between answers
- 4 Say only the final answer

The key is the third one. It looks back at the in-between answers it wrote and...

The price you pay

- 1 Thinks for longer
- 2 Writes a lot more text
- 3 Answers come slower
- 4 But gets hard ones right

Thinking time isn't free. So for easy questions like 'what's the weather today,...

Tap the mixed-up pieces in the order you think is right. When you've picked them all, it'll grade you. The poin...

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Just three questions

Q1

What makes a reasoning model different from earlier models?

- ① It memorizes whole answers
- ② It makes its answers shorter
- ③ It always searches the internet
- ④ It works through the steps before answering

Q2

What happened on the same math competition problems?

- ① It went up from 12% to 74%
- ② It dropped from 74% to 12%
- ③ Both got 100%
- ④ There was no difference

Q3

What does thinking first cost?

- ① Accuracy
- ② Time and words written
- ③ Internet speed
- ④ Screen brightness

Know the why, too

Q1

④

Instead of answering straight away, it writes out its work and checks the in-between answers. That's why it makes fewer mistakes on hard problems.

Q2

①

The model that answered right away got 12%, and the one that thinks first got 74%. It was specially trained to write out its work before answering, and that's why the gap got...

Q3

②

The longer it thinks, the slower the answer and the more text it writes. So for easy questions, it doesn't bother with this.

**Once it wrote out its work instead of answering right away,
it started getting right what it used to get wrong.**



Tomorrow: AI that uses tools — when should it stop working things out itself and grab a calculator?