The Immaterial Paradise, Motivating Paradoxes, Puzzles, and R,

Part I

Selmer Bringsjord

Intro to Formal Logic (With AI) = IFLWAI

1/15/26

HyperLogic®

New-Millennium Logic-based Computing & Artificial Intelligence

HyperGrader®

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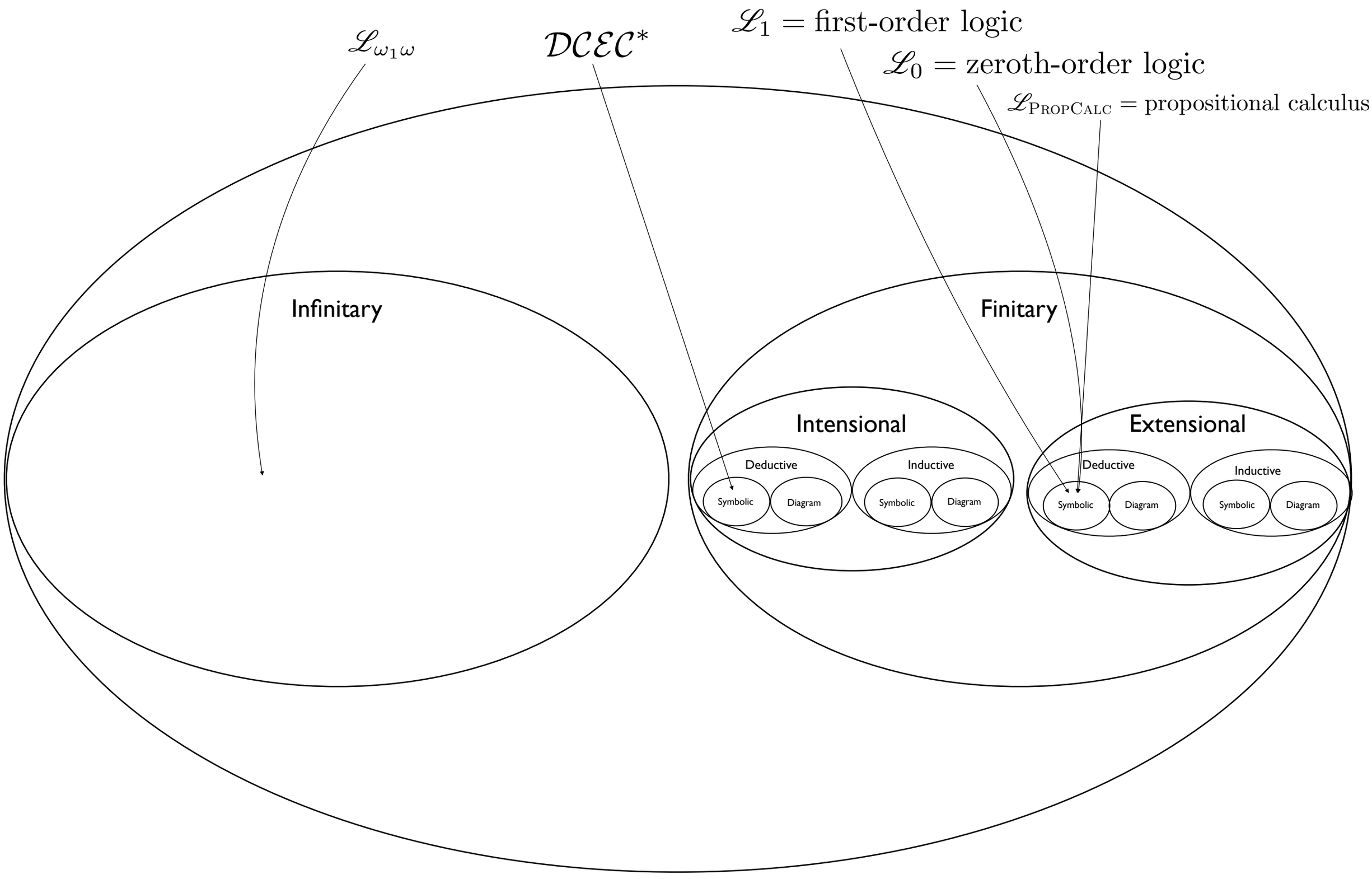
... is a verb: to live logically, and learn logic, anywhere anytime — and to have fun all along the way.

The Universe of Logics



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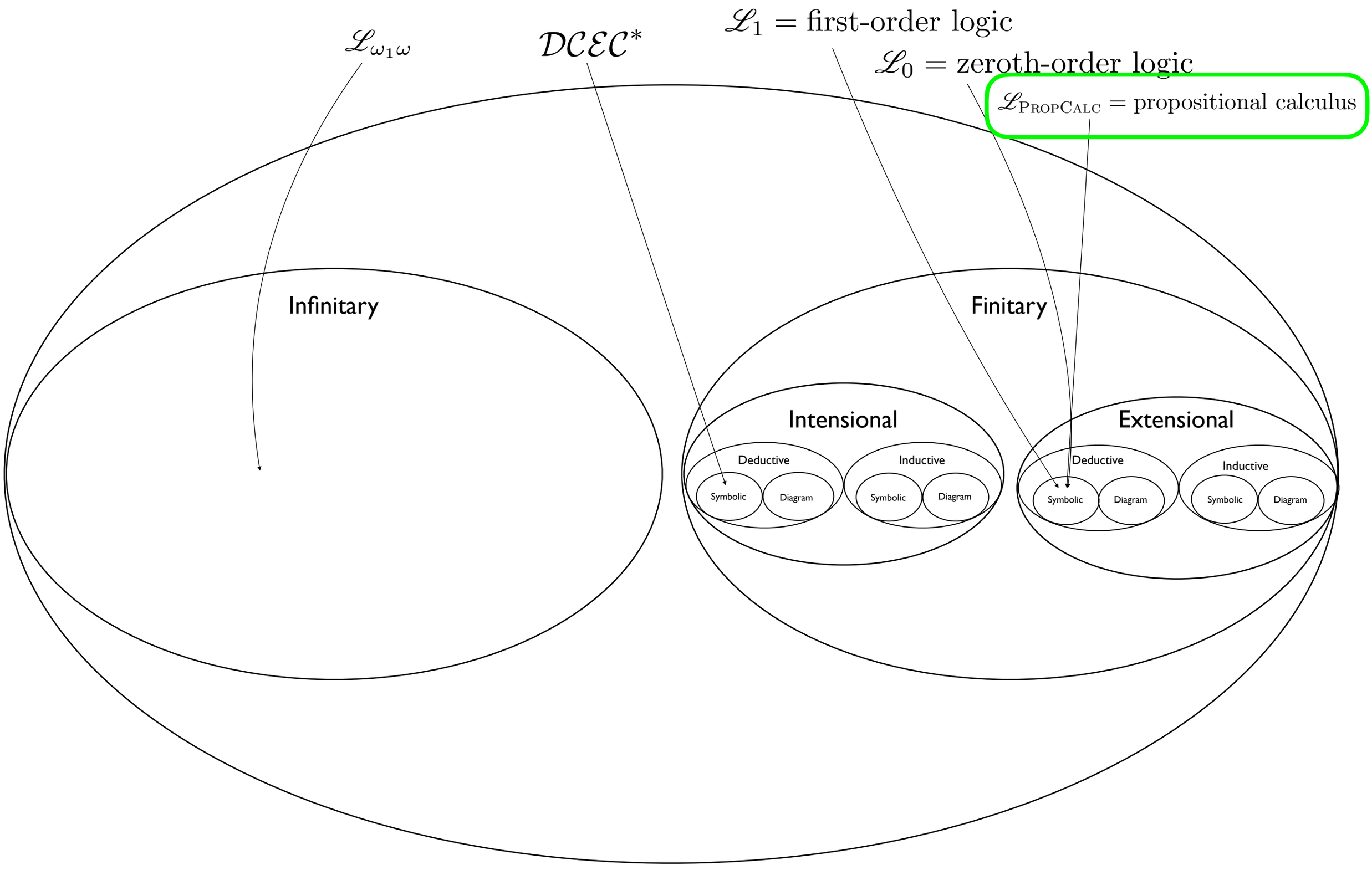

What *is* Logic?

- The key to becoming rational.
- "The science and engineering of reasoning." — so the not-unreasonable slogan goes.
- The only invincible subject there is.
- The basis for the formal sciences (from mathematics to game theory to decision theory to probability calculi to axiomatic physics ….) — and hence the basis for disciplines based on the formal sciences, e.g., …
  - Engineering! Computer Science!
  - Mathematics itself: see "reverse mathematics"!
- The way of escape from shallow content and context to pure, immaterial, and immortal form and structure (which is why the exotic, imaginary, and seemingly non-sensical is so pedagogically useful).
- The most challenging subject there is.
- One of the chief differentiators between **dogs** and monkeys versus you (let alone bears and you); and mindless machines (like Deep Blue & Watson) versus you.
- A key to riches.
- The key to divining the meaning of life (and other such big questions).
- The better way to program computers; and fundamentally the *only* way to *reliably* program computers.
- One of two fundamental approaches to studying minds, and replicating/simulating minds in machines…
- The thing many creatures of fiction have mastered — have you (as a New Yorker)?…
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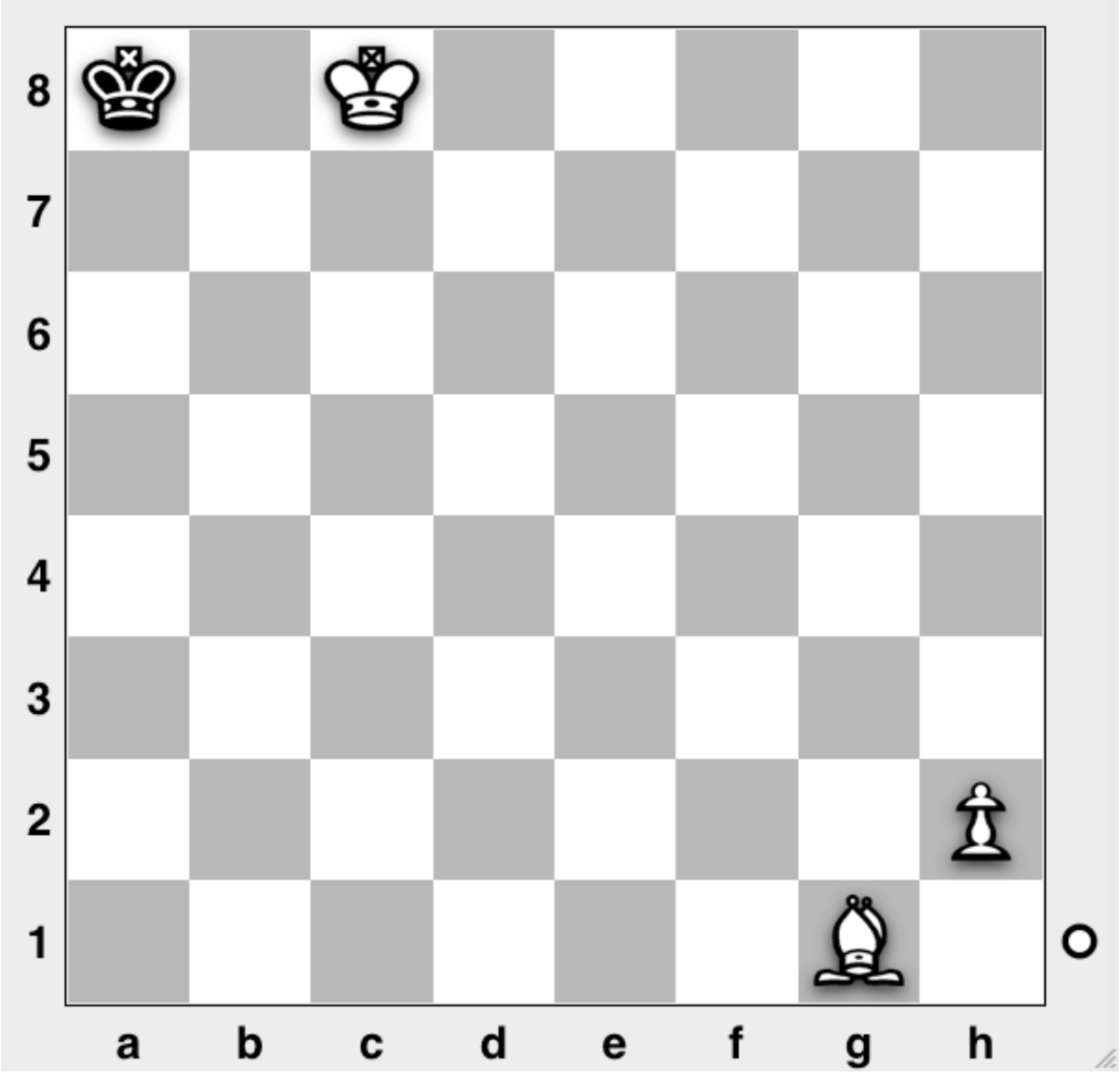
It's White's turn. What move did Black just make?



Aha! (Beyond Deep Blue?)

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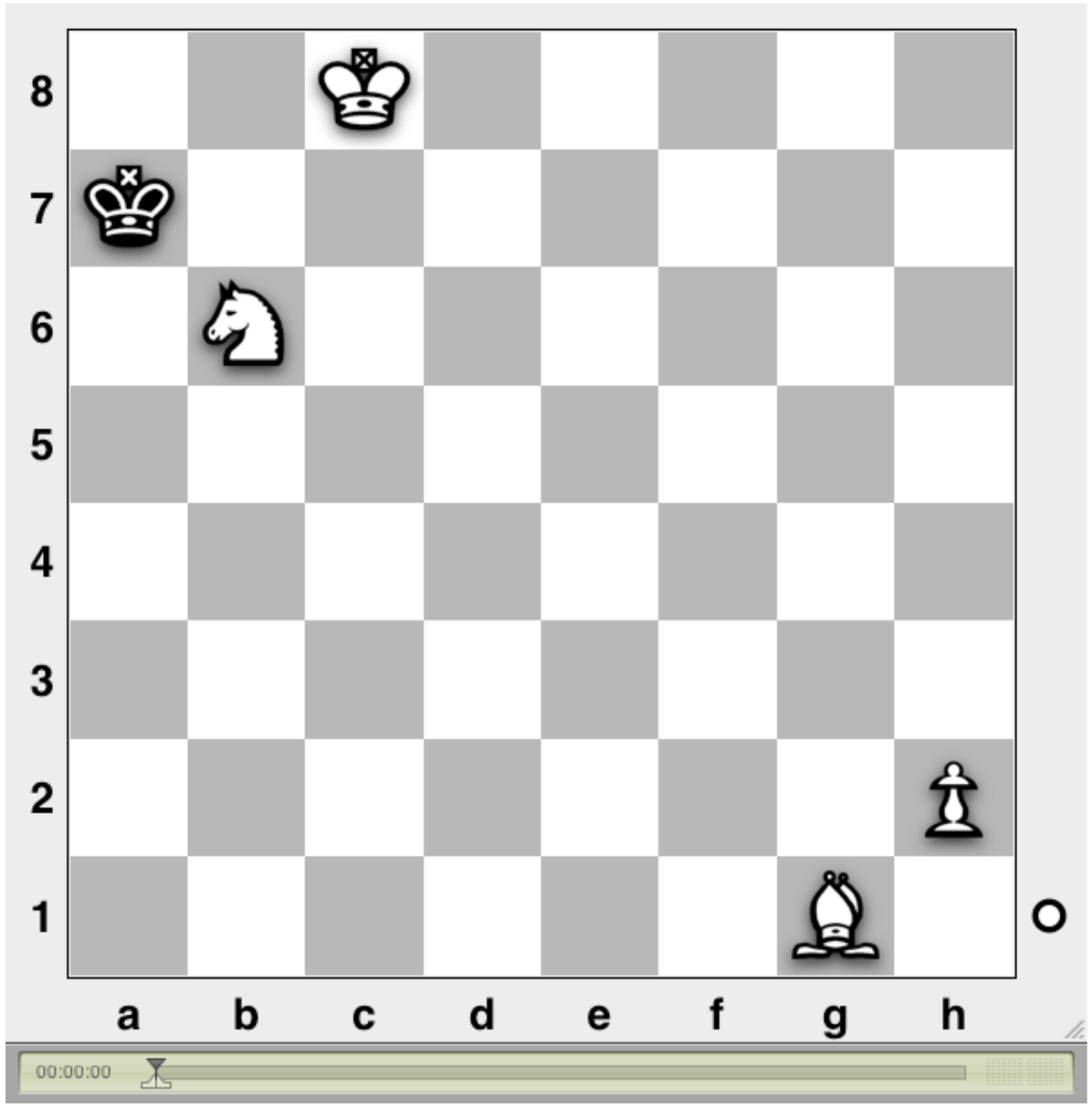
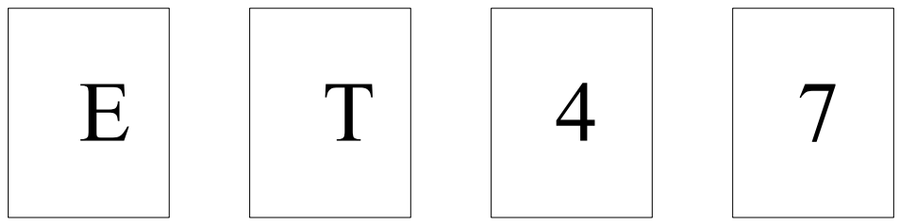


Interlude:

Re. that inadvertent card problem on our website …

NOTE: Every card in this game has a capital Roman letter on one side, and a number from 1 to 9, inclusive.

Simple Selection Task



Suppose I claim that the following rule is true.

> If a card has a vowel on one side, it has an even number on the other side.

Which card or cards, if any, should you turn over in order to try to efficiently decide whether the rule is true or false?

NOTE: Every card in this game has a capital Roman letter on one side, and a number from 1 to 9, inclusive.

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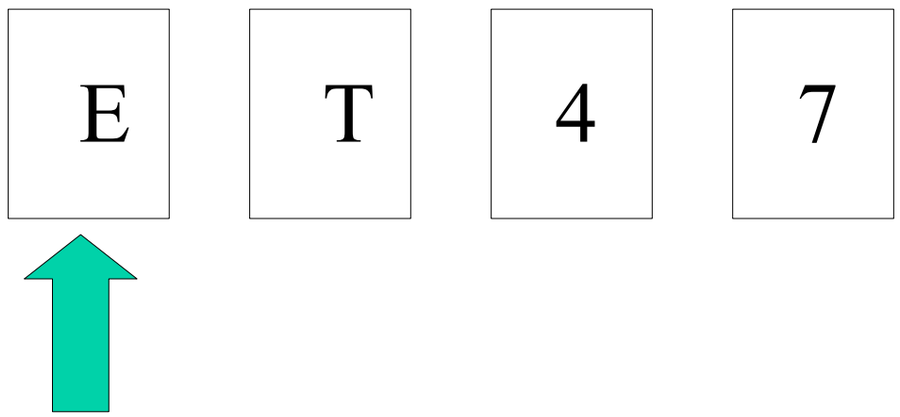

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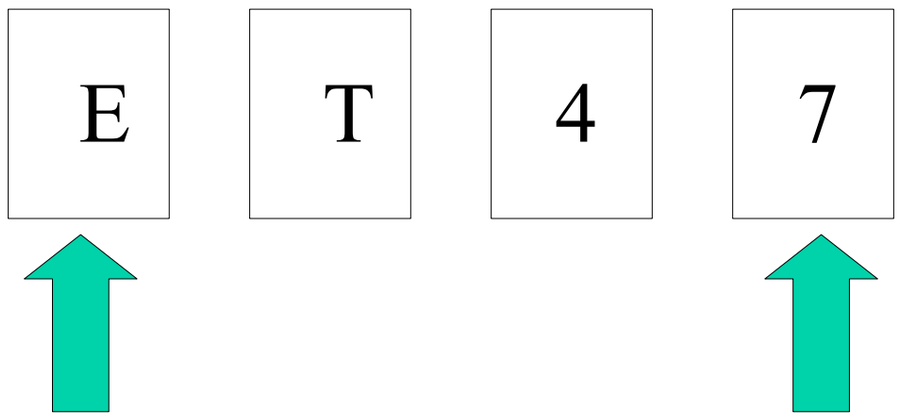

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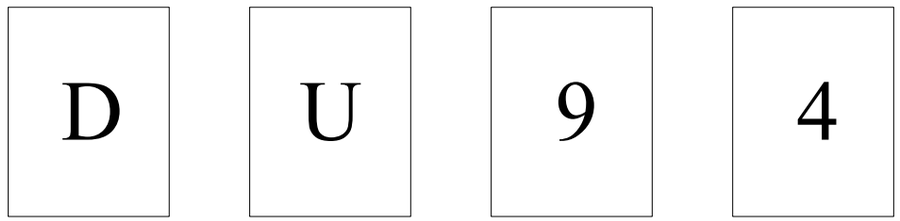

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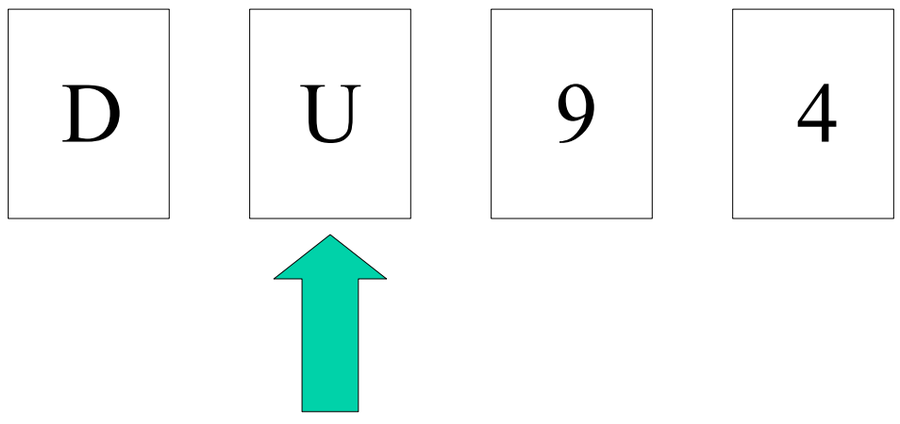

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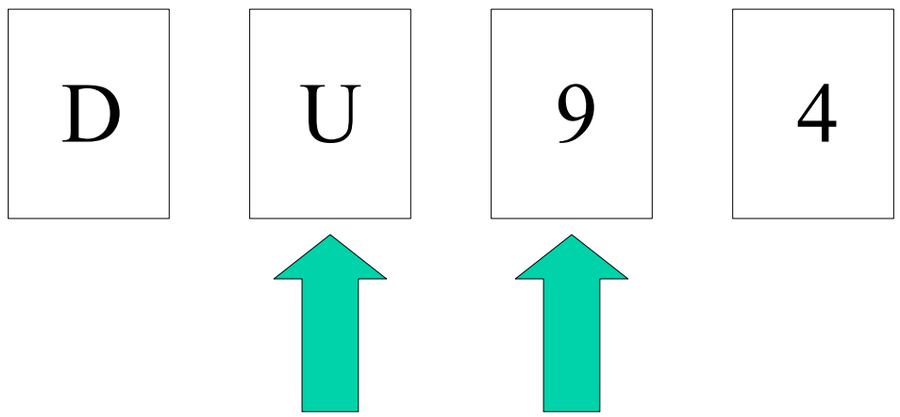

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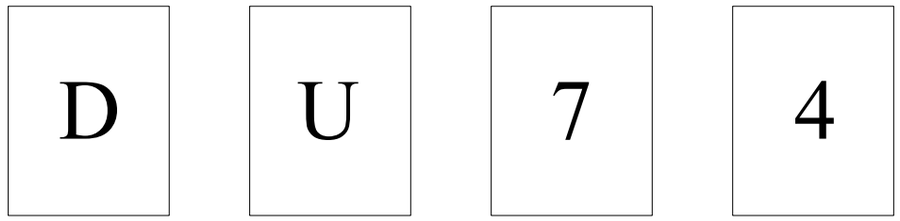

Suppose I claim that the following rule is true.

> If a card has a letter on one side, it has a prime number on the other side.

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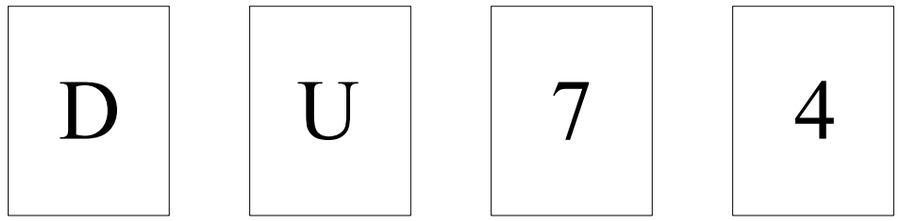

Suppose I claim that the following rule is true.

> If a card has a letter on one side, it has a prime number on the other side.

Which card or cards, if any, should you turn over in order to try to efficiently decide whether the rule is true or false?

“NYS 1”

Given the statements

¬a ∨ ¬b
b
c → a

which one of the following statements can you prove?

c
¬b
¬c
h
a
none of the above

“NYS 1”

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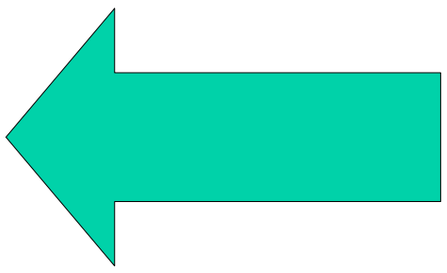

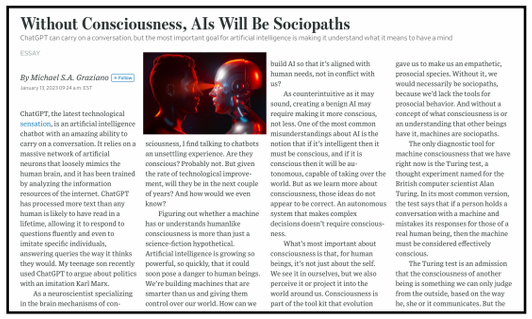

Without Consciousness, AIs Will Be Sociopaths

ChatGPT can carry on a conversation, but the most important goal for artificial intelligence is making it understand what it means to have a mind

ESSAY

By Michael S.A. Graziano + Follow

January 11, 2023 09:24 a.m. EST

ChatGPT, the latest technological sensation, is an artificial intelligence chatbot with an amazing ability to carry on a conversation. It relies on a massive network of artificial neurons that loosely mimics the human brain, and it has been trained by analyzing the information resources of the internet. ChatGPT has processed more text than any human is likely to have read in a lifetime, allowing it to respond to questions fluently and even to imitate specific individuals, answering queries the way it thinks they would. My teenage son recently used ChatGPT to argue about politics with an imitation Karl Marx.

As a neuroscientist specializing in the brain mechanisms of consciousness, I find talking to chatbots an unsettling experience. Are they conscious? Probably not. But given the rate of technological improvement, will they be in the next couple of years? And how would we even know?

Figuring out whether a machine has or understands humanlike consciousness is more than just a science-fiction hypothetical. Artificial intelligence is growing so powerful, so quickly, that it could soon pose a danger to human beings. We're building machines that are smarter than us and giving them control over our world. How can we build AI so that it's aligned with human needs, not in conflict with us?

As counterintuitive as it may sound, creating a benign AI may require making it more conscious, not less. One of the most common misunderstandings about AI is the notion that if it's intelligent then it must be conscious, and if it is conscious then it will be autonomous, capable of taking over the world. But as we learn more about consciousness, those ideas do not appear to be correct. An autonomous system that makes complex decisions doesn't require consciousness.

What's most important about consciousness is that, for human beings, it's not just about the self. We see it in ourselves, but we also perceive it or project it into the world around us. Consciousness is part of the tool kit that evolution gave us to make us an empathetic, prosocial species. Without it, we would necessarily be sociopaths, because we'd lack the tools for prosocial behavior. And without a concept of what consciousness is or an understanding that other beings have it, machines are sociopaths.

The only diagnostic tool for machine consciousness that we have right now is the Turing test, a thought experiment named for the British computer scientist Alan Turing. In its most common version, the test says that if a person holds a conversation with a machine and mistakes its responses for those of a real human being, then the machine must be considered effectively conscious.

The Turing test is an admission that the consciousness of another being is something we can only judge from the outside, based on the way he, she or it communicates. But the

"NYS 2"

Which one of the following statements is provable from the following statement: "If you are not part of the solution, then you are part of the problem."

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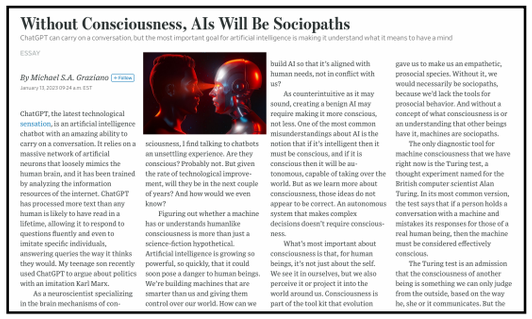
Graziano's Mistake!



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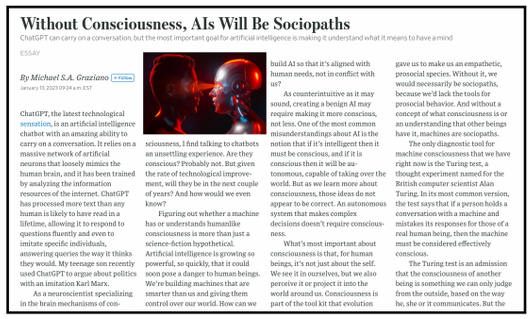

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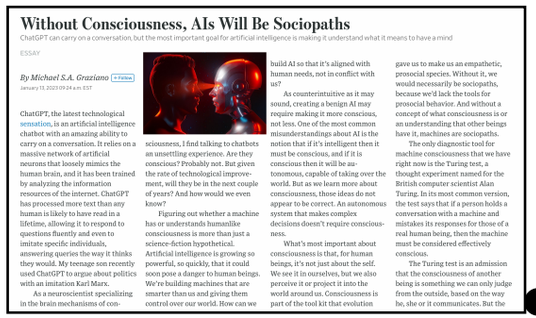

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Graziano's Mistake!

“NYS 3”

Given the statements

¬¬c

c → a

¬a ∨ b

b → d

¬(d ∨ e)

which of the following statements are provable?

¬c

e

h

¬a

all of the above

“NYS 3”

Given the statements

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c → a

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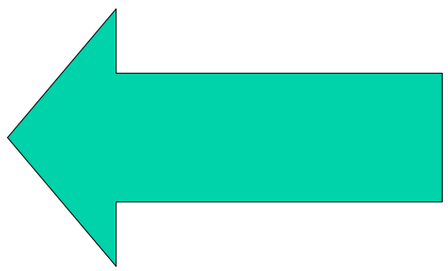

The Original King-Ace

Suppose that the following premise is true:

> If there is a king in the hand, then there is an ace in the hand, or else if there isn't a king in the hand, then there is an ace.

What can you infer from this premise?

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What can you infer from this premise?

> There is an ace in the hand.

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What can you infer from this premise?

> ~~There is an ace in the hand.~~

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Suppose that the following premise is true:

> If there is a king in the hand, then there is an ace in the hand, or else if there isn't a king in the hand, then there is an ace.

What can you infer from this premise?

NO! ~~There is an ace in the hand.~~

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What can you infer from this premise?

NO! ~~There is an ace in the hand.~~ NO!

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> If there is a king in the hand, then there is an ace in the hand, or else if there isn't a king in the hand, then there is an ace.

What can you infer from this premise?

NO! ~~There is an ace in the hand.~~ NO!

In fact, what you *can* infer is that there *isn't* an ace in the hand!

King-Ace 2

Suppose that the following premise is true:

If there is a king in the hand, then there is an ace in the hand; or if there isn't a king in the hand, then there is an ace; but not both of these if-then statements are true.

What can you infer from this premise?

King-Ace 2

Suppose that the following premise is true:

If there is a king in the hand, then there is an ace in the hand; or if there isn't a king in the hand, then there is an ace; but not both of these if-then statements are true.

What can you infer from this premise?

There is an ace in the hand.

King-Ace 2

Suppose that the following premise is true:

If there is a king in the hand, then there is an ace in the hand; or if there isn't a king in the hand, then there is an ace; but not both of these if-then statements are true.

What can you infer from this premise?

~~There is an ace in the hand.~~

King-Ace 2

Suppose that the following premise is true:

If there is a king in the hand, then there is an ace in the hand; or if there isn't a king in the hand, then there is an ace; but not both of these if-then statements are true.

What can you infer from this premise?

NO! ~~There is an ace in the hand.~~

King-Ace 2

Suppose that the following premise is true:

If there is a king in the hand, then there is an ace in the hand; or if there isn't a king in the hand, then there is an ace; but not both of these if-then statements are true.

What can you infer from this premise?

NO! ~~There is an ace in the hand.~~ NO!

King-Ace 2

Suppose that the following premise is true:

If there is a king in the hand, then there is an ace in the hand; or if there isn't a king in the hand, then there is an ace; but not both of these if-then statements are true.

What can you infer from this premise?

NO! ~~There is an ace in the hand.~~ NO!

In fact, what you *can* infer is that there *isn't* an ace in the hand!

Informal Proofs/Arguments **vs.** Formal Proofs/Arguments

Informal Proofs/Arguments vs. Formal Proofs/Arguments

has ambiguous natural language
(e.g. English or Chinese)

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Informal Proofs/Arguments vs. Formal Proofs/Arguments

has ambiguous natural language
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cannot be executed & checked
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Informal Proofs/Arguments	vs.	Formal Proofs/Arguments
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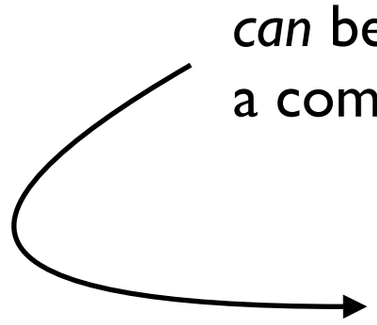

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HyperSlate®

Informal Proofs/Arguments vs. Formal Proofs/Arguments

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supposed to have learned
how to produce, to an
appreciable degree, in High
School — but likely didn't

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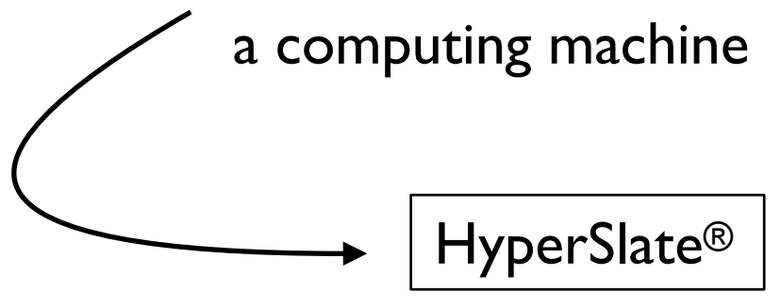

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HyperSlate®

have not learned how to
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system (though may have
had some Prolog)

FOR NOW

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vs.

STARTING 1/29/26

Formal Proofs/Arguments

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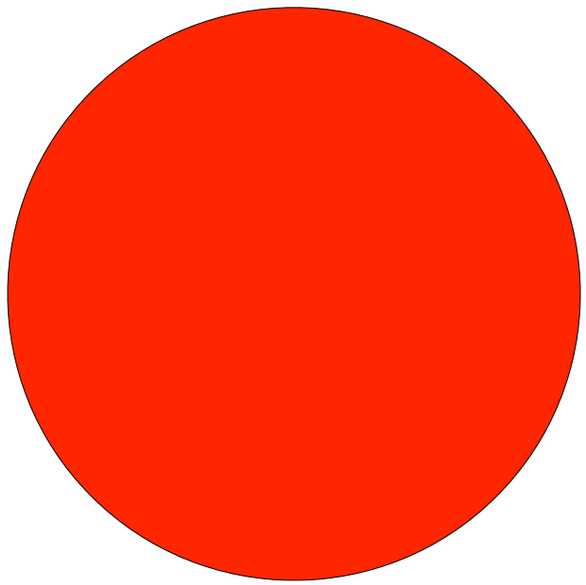
King-Ace Solved

(informal proof)

Proposition: There is *not* an ace in the hand.

Proof: We know that at least one of the if-thens (i.e., at least one of the **conditionals**) is false. So we have two cases to consider, viz., that *K* => *A* is false, and that ¬*K* => *A* is false. Take first the first case; accordingly, suppose that *K* => *A* is false. Then it follows that *K* is true (since when a conditional is false, its antecedent holds but its consequent doesn't), and *A* is false. Now consider the second case, which consists in ¬*K* => *A* being false. Here, in a direct parallel, we know ¬*K* and, once again, ¬*A*. In both of our two cases, which are exhaustive, there is no ace in the hand. The proposition is established. **QED**

End of Part I



Logikk kan redde menneskehten!