

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

Part I

Selmer Bringsjord

Intro to (Formal) Logic (and AI) = IFLAI I

I/13/22



Economists Pin More Blame on Tech for Rising Inequality

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Mr. Acemoglu, like some other economists, has altered his view of technology over time. In economic theory, technology is almost a magic ingredient that both increases the size of the economic pie and makes nations richer. He recalled working on a textbook more than a decade ago that included the standard theory. Shortly after, while doing further research, he had second thoughts.

“It’s too restrictive a way of thinking,” he said. “I should have been more open-minded.”

Mr. Acemoglu is no enemy of technology. Its innovations, he notes, are needed to address society’s biggest challenges, like climate change, and to deliver economic growth and rising living standards. His wife, Asuman Ozdaglar, is the head of the electrical engineering and computer science department at M.I.T.

Rage against the machine

forum/AI & economics

WHAT ARE OUR PROSPECTS AS ADVANCES
IN AI CHANGE THE LABOUR EQUATION?
SELMER BRINGSJORD AND JOE JOHNSON
SEE TROUBLE AHEAD

http://kryten.mm.rpi.edu/SB_JJ_Rage_Against_Machine_offprint.pdf

Logistics ...

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(Reading the syllabus is actually quite helpful :).)

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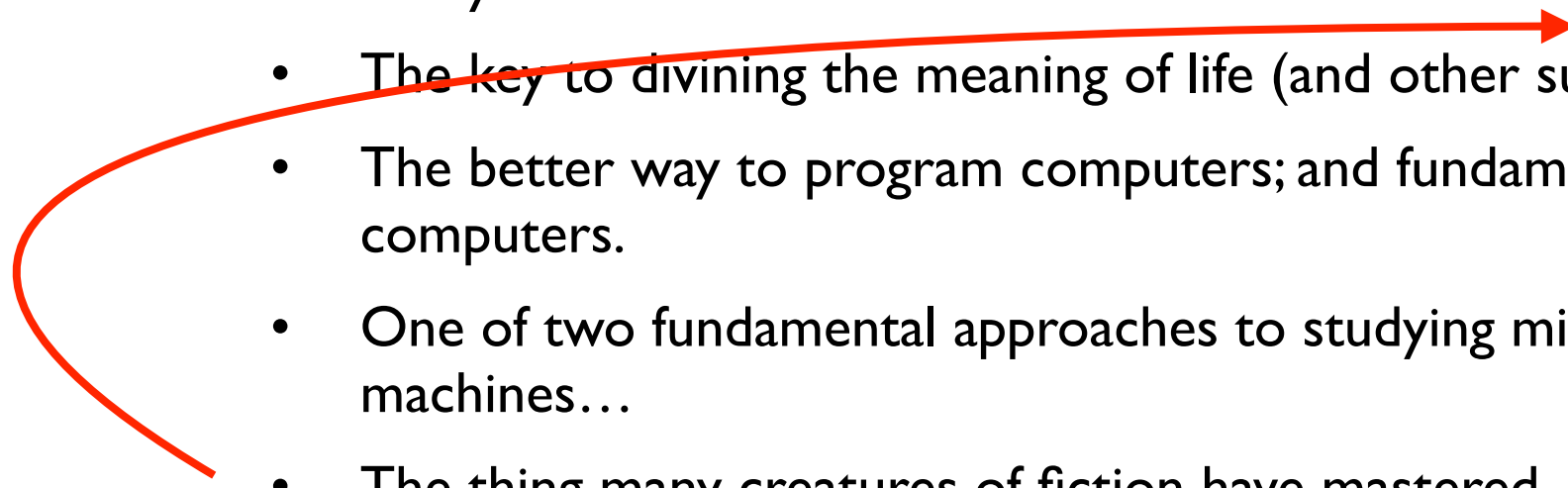
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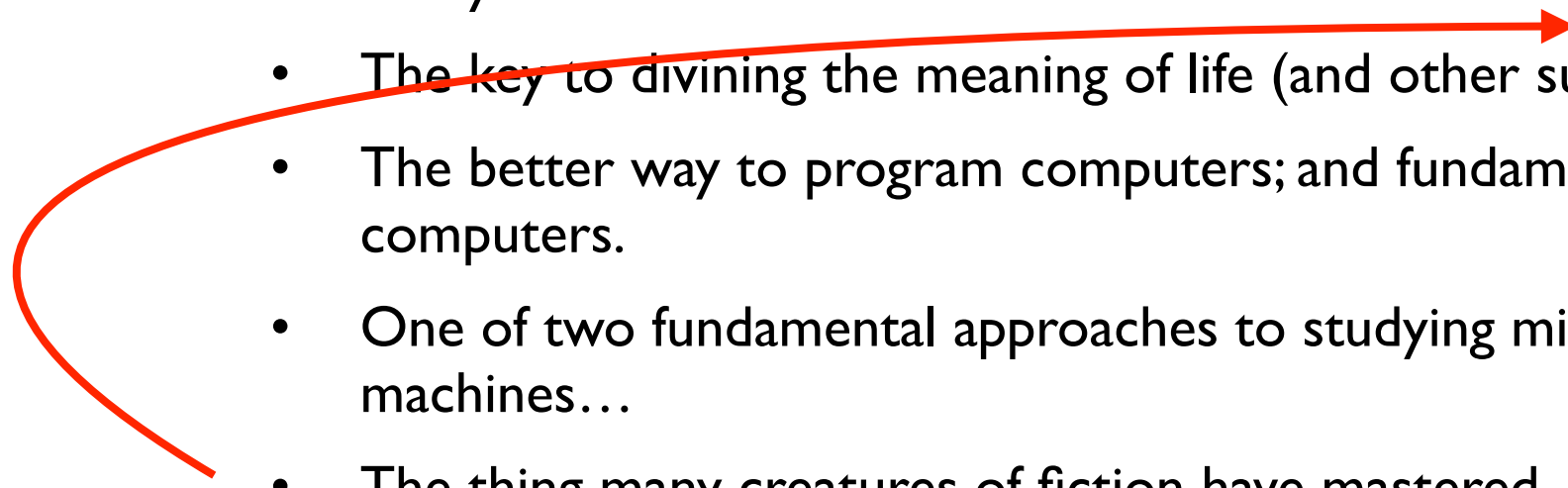
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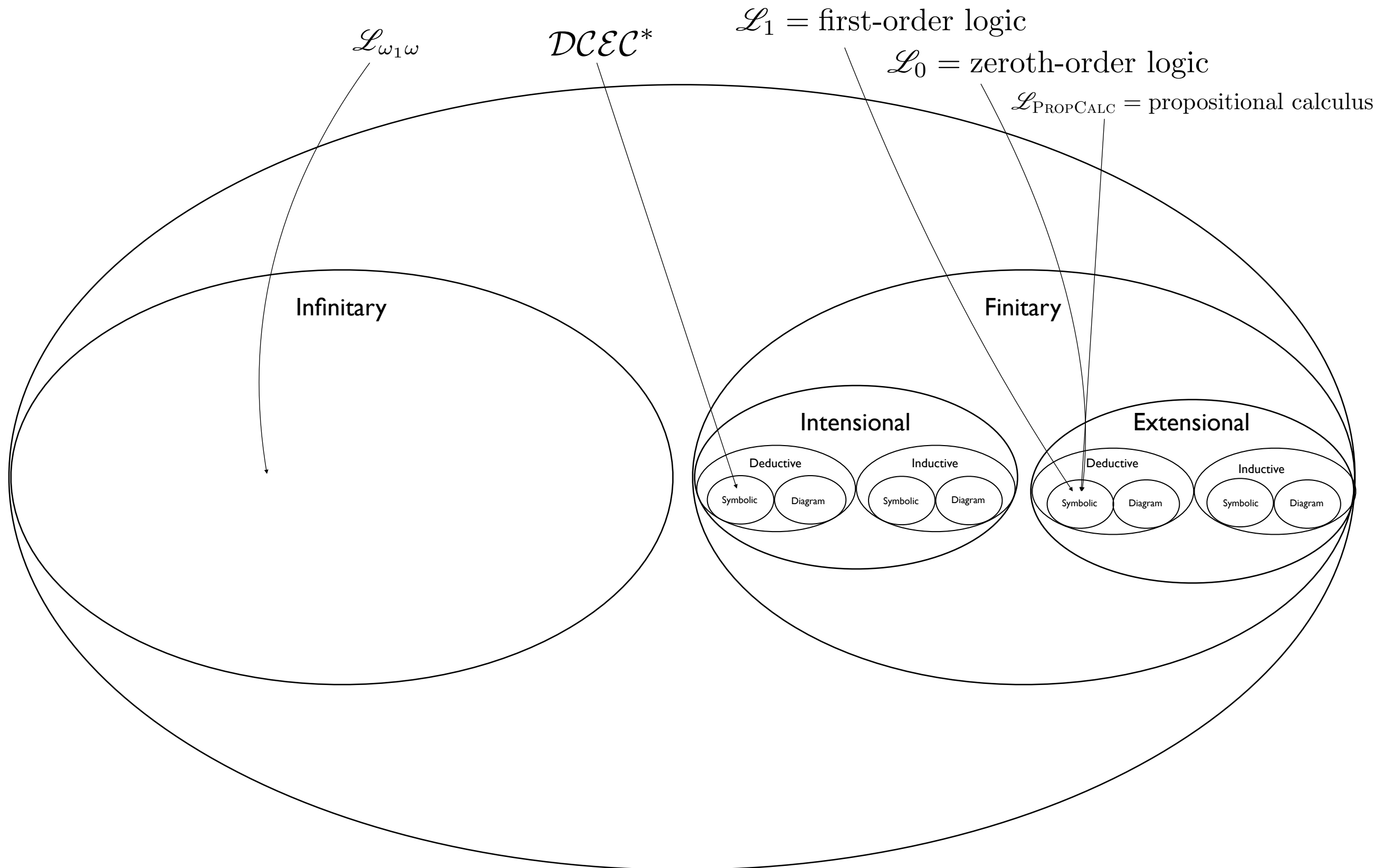


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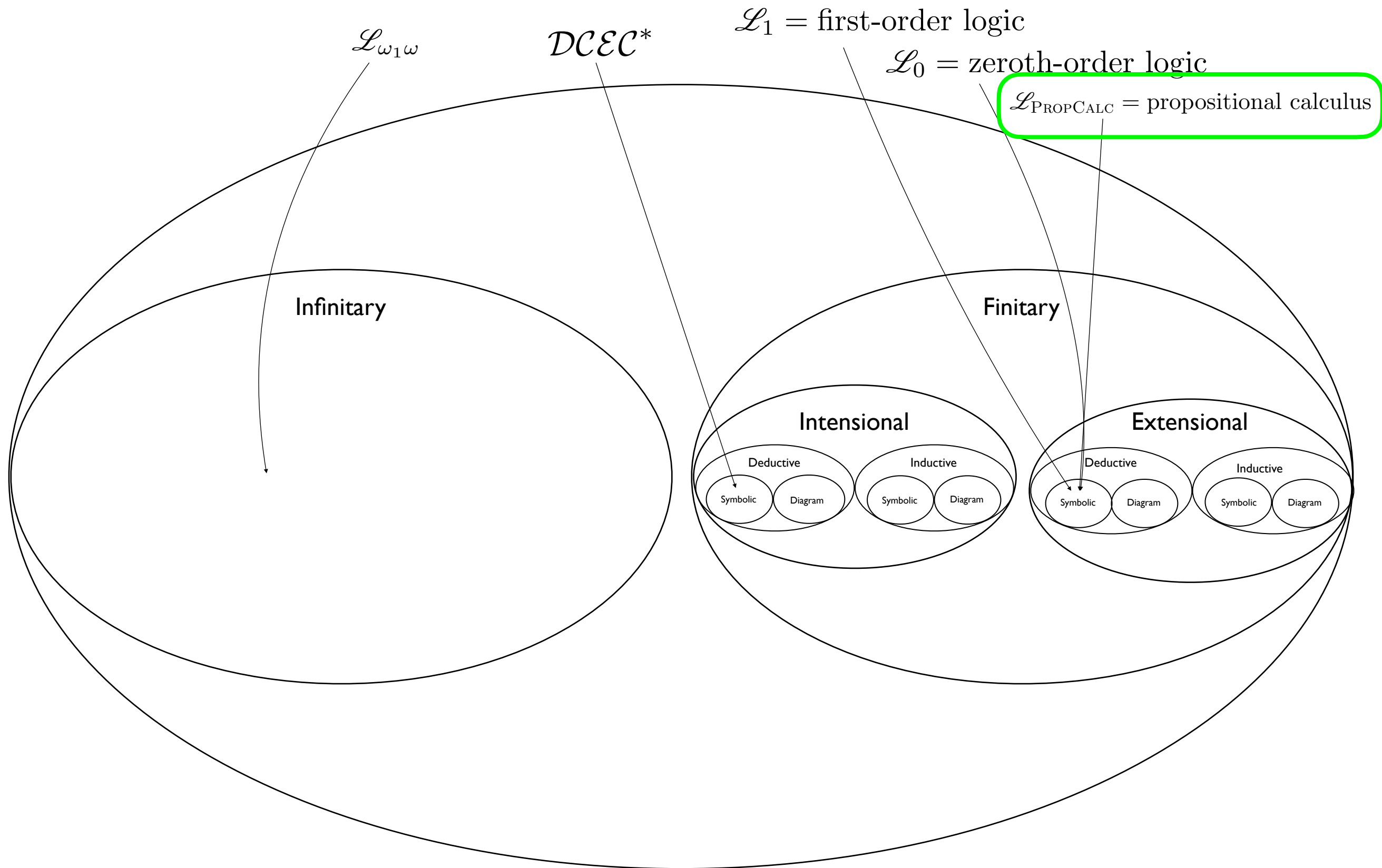
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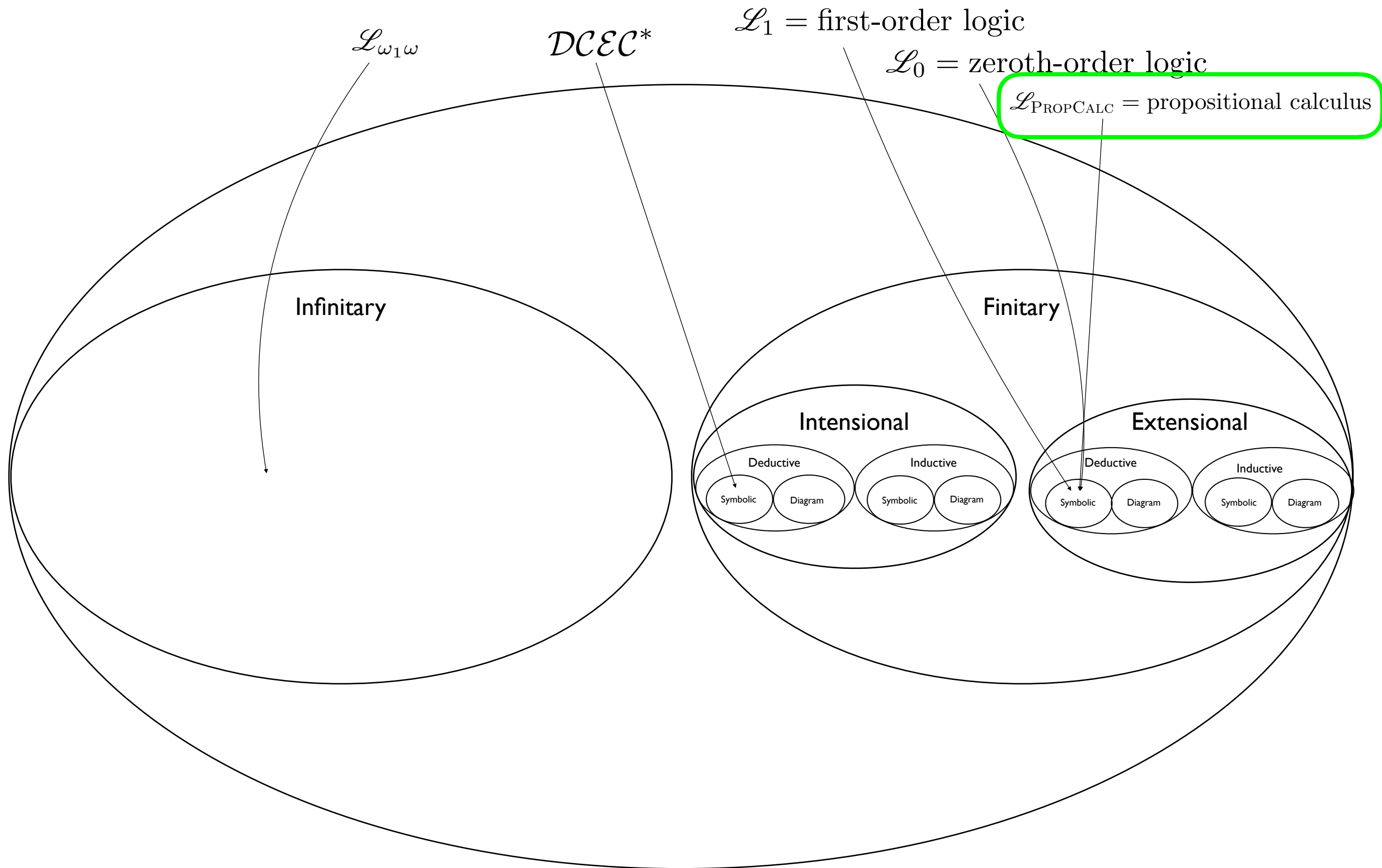
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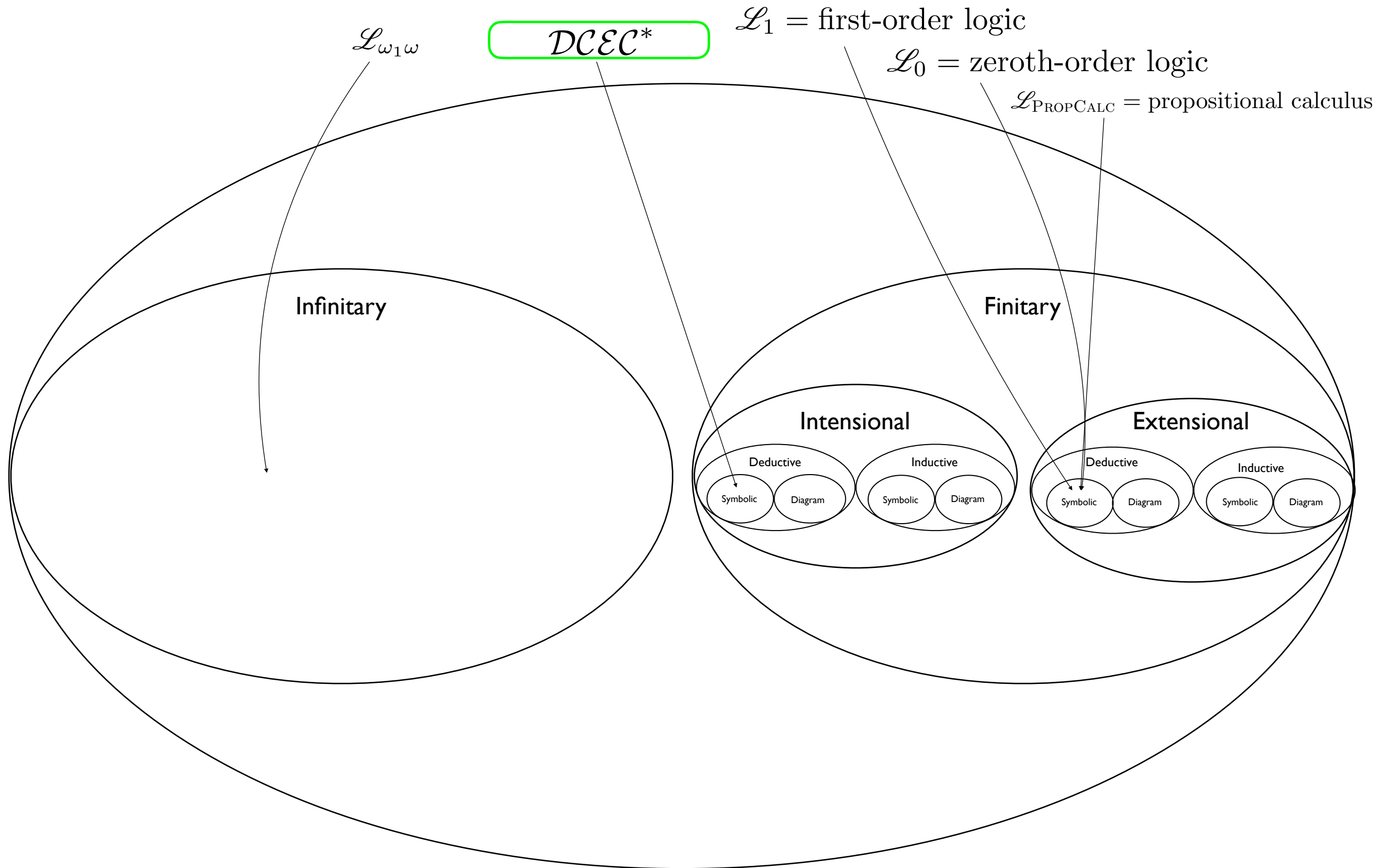
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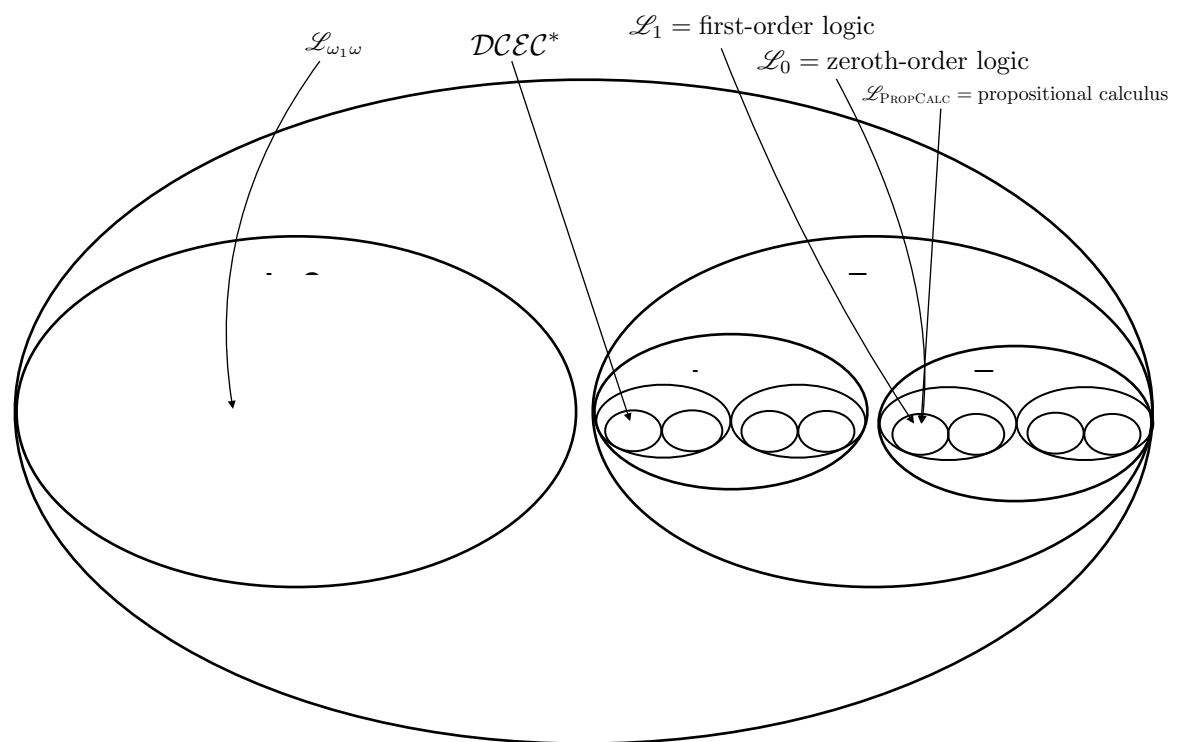
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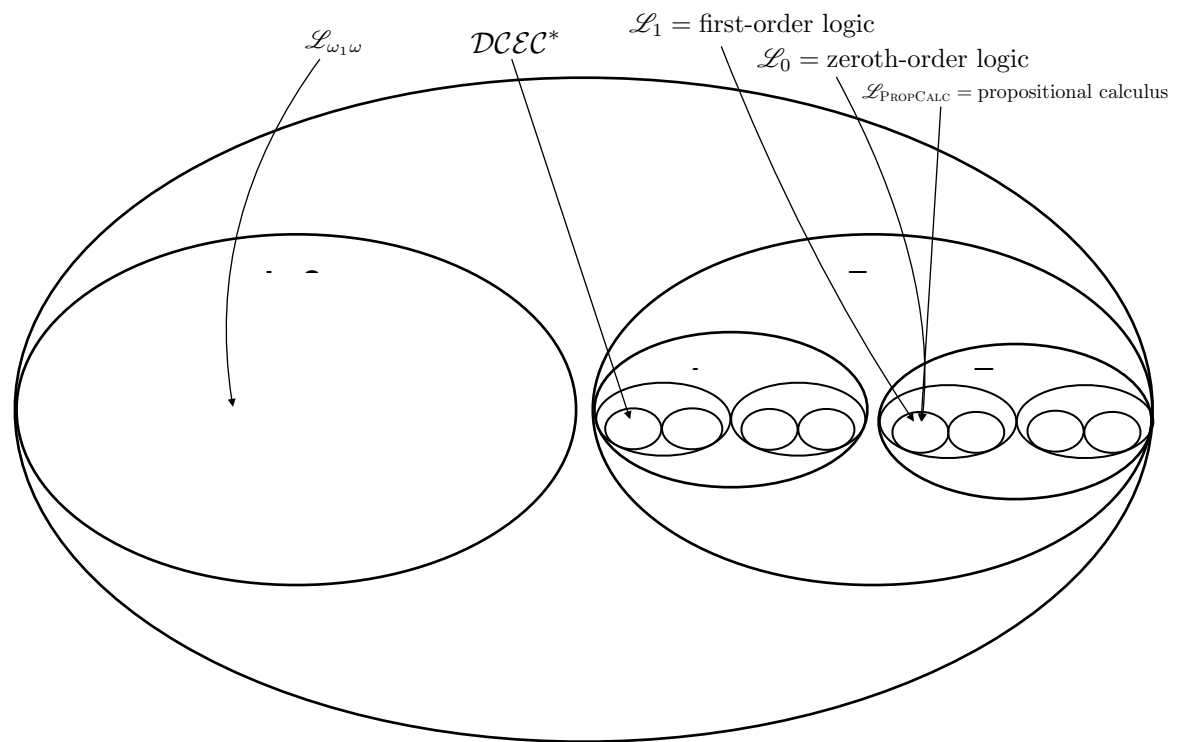


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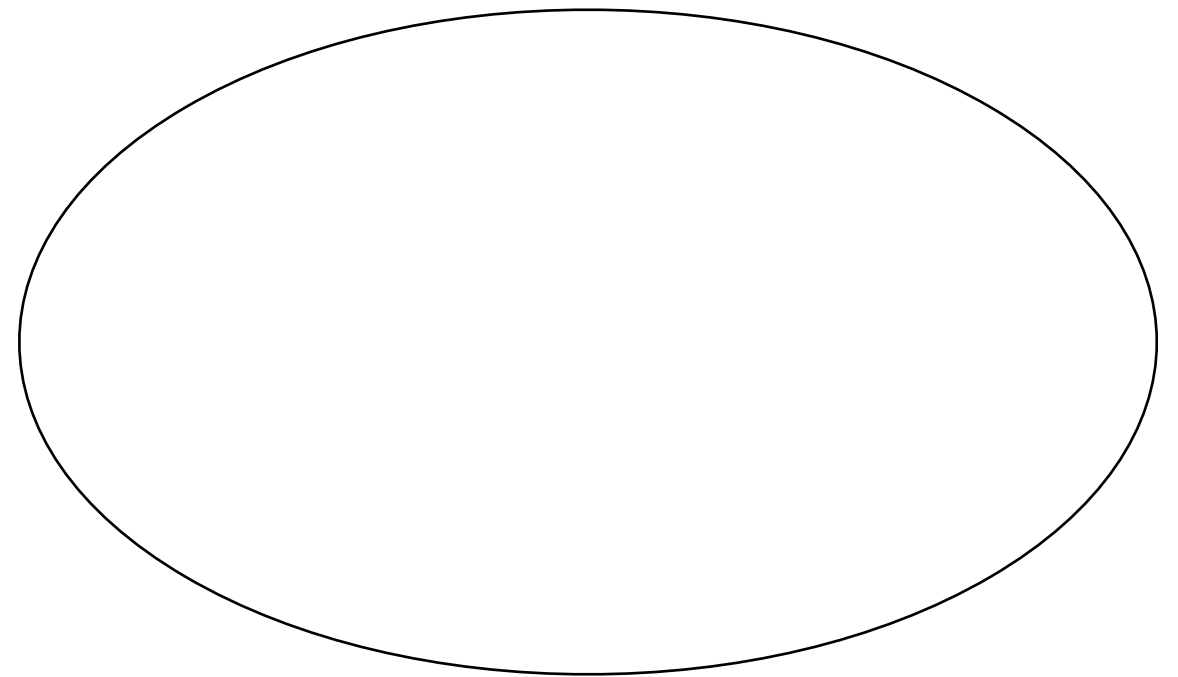
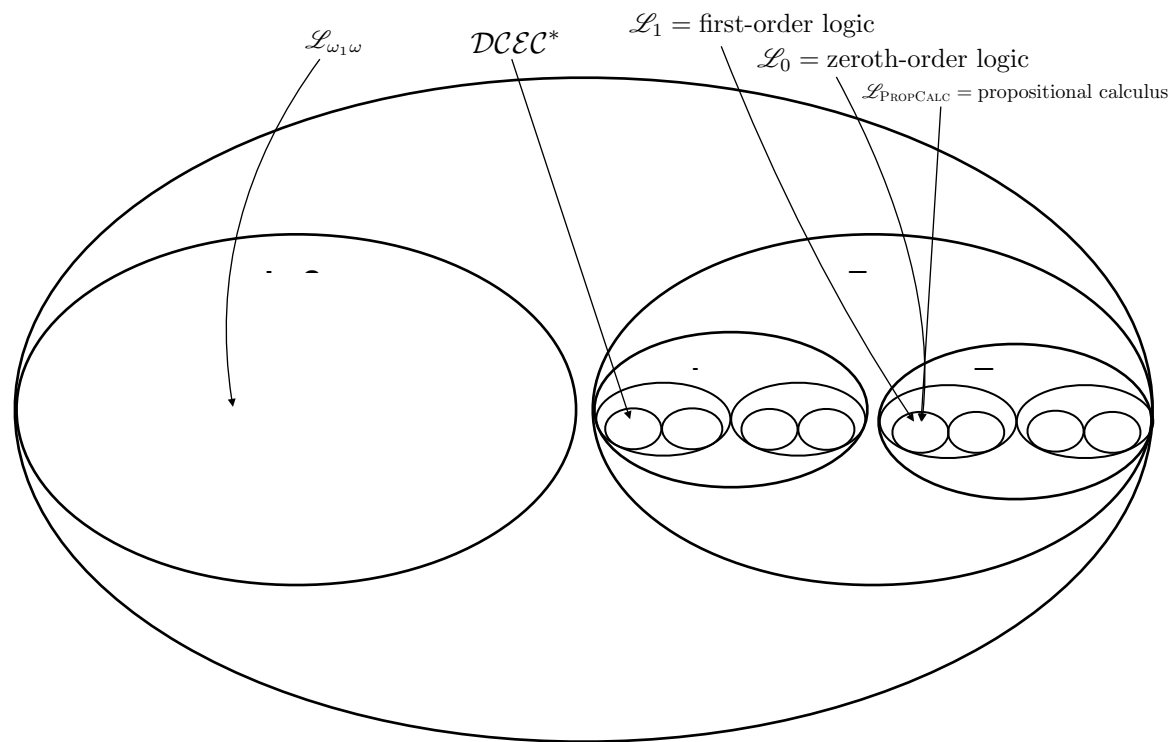
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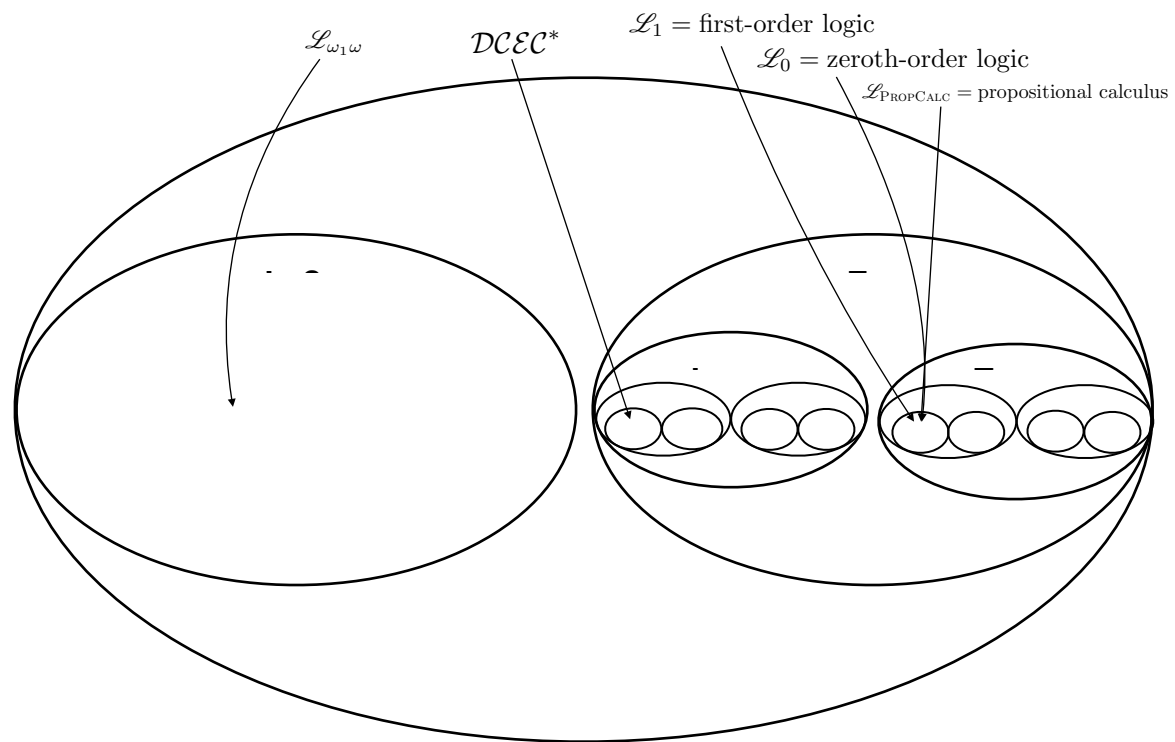
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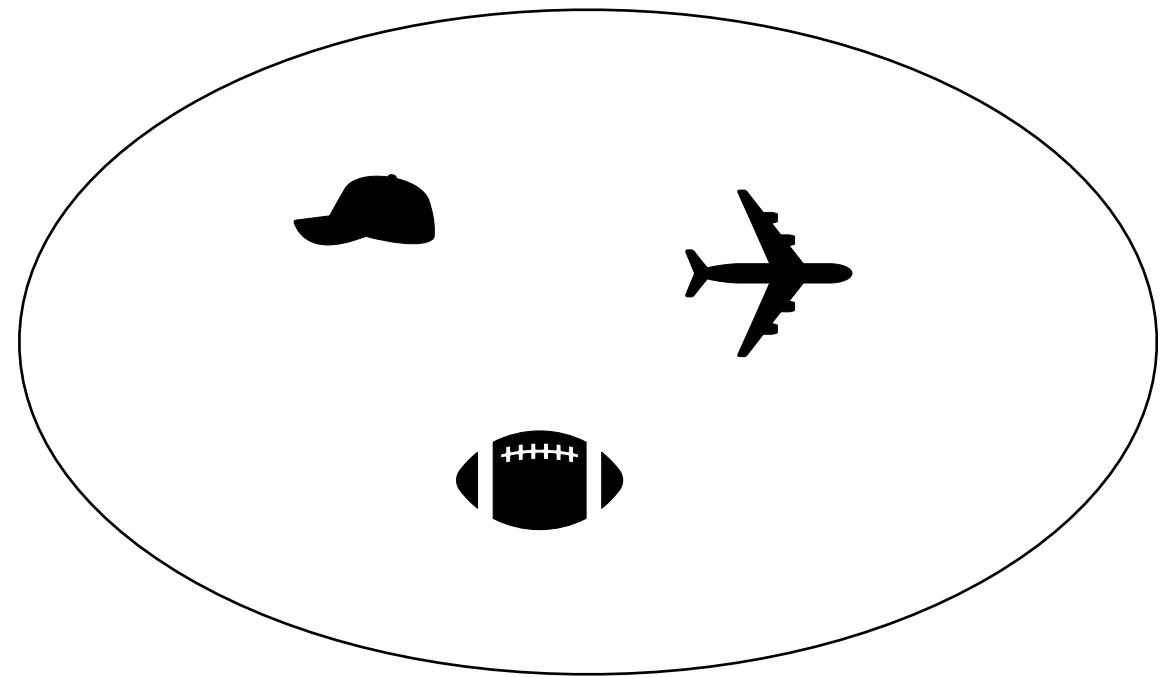


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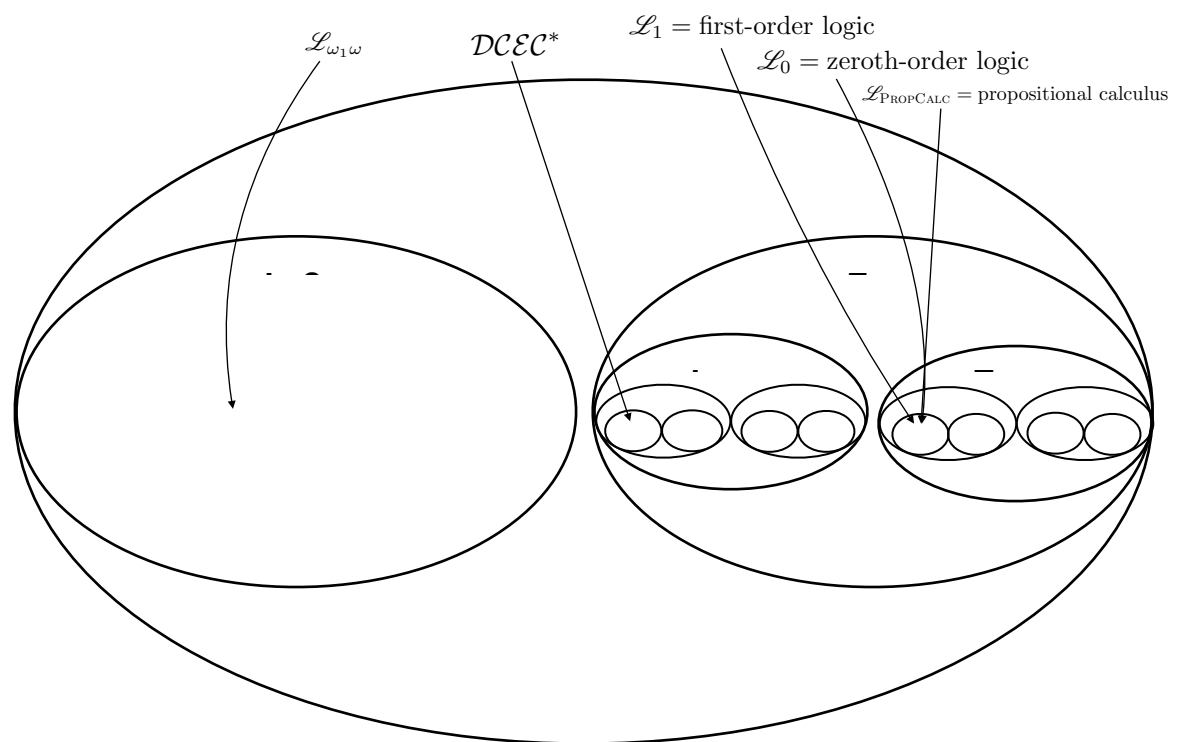


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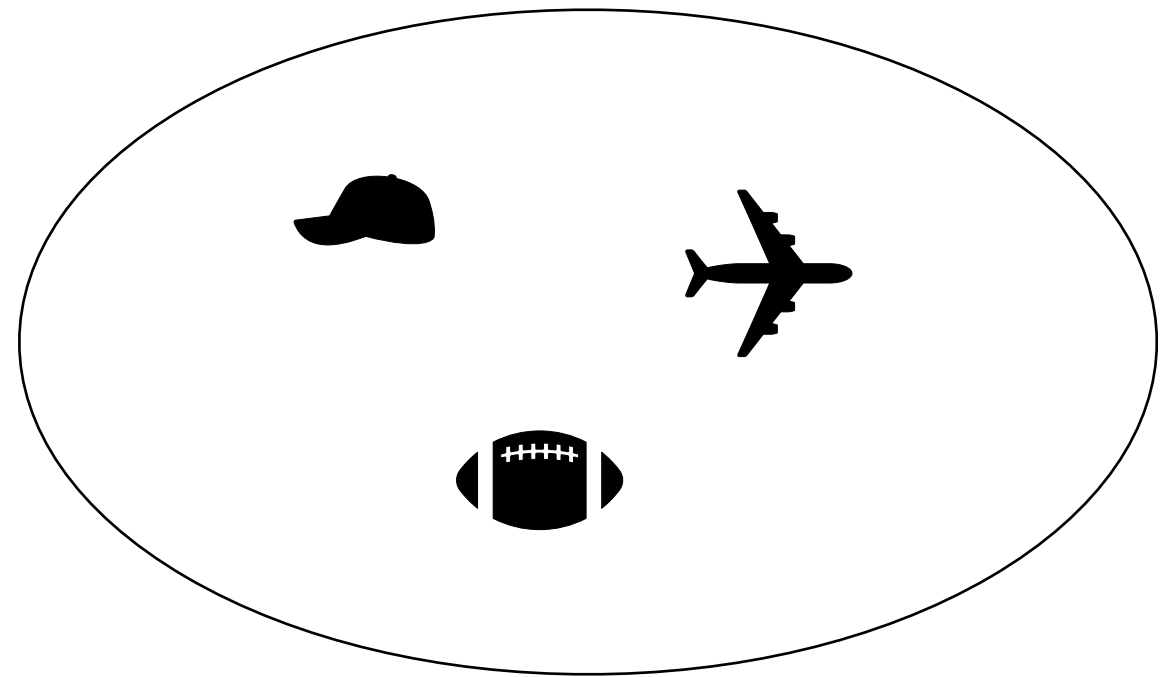


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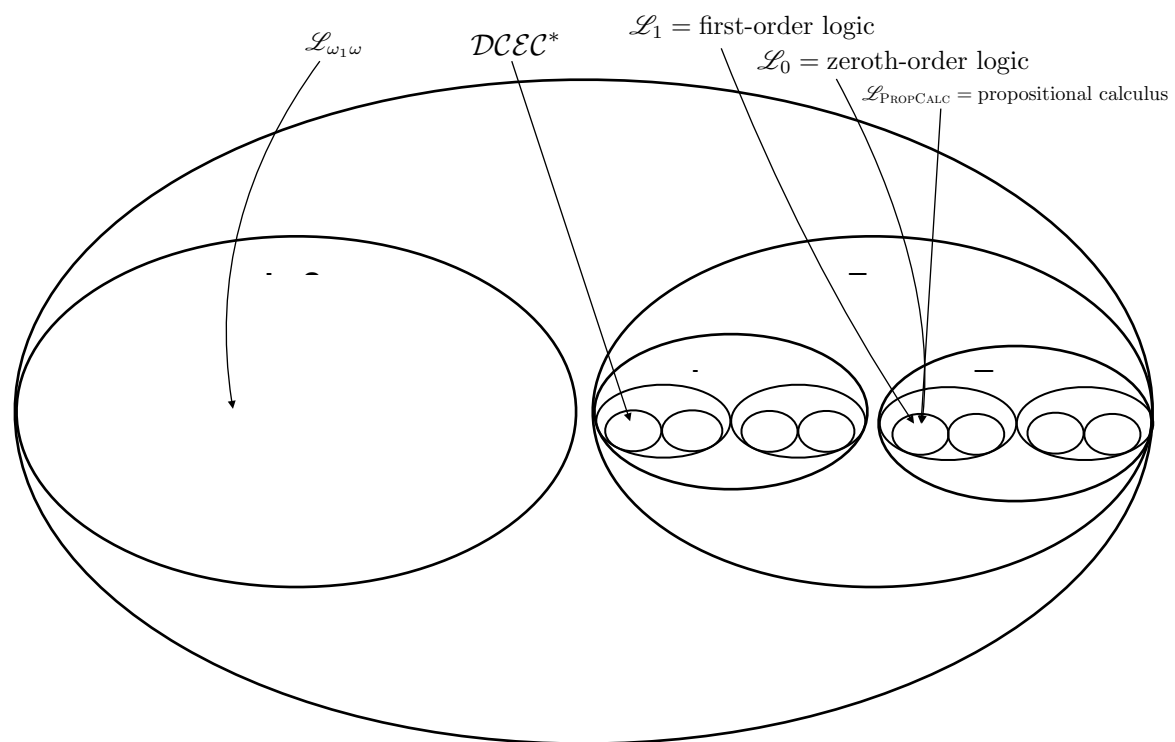


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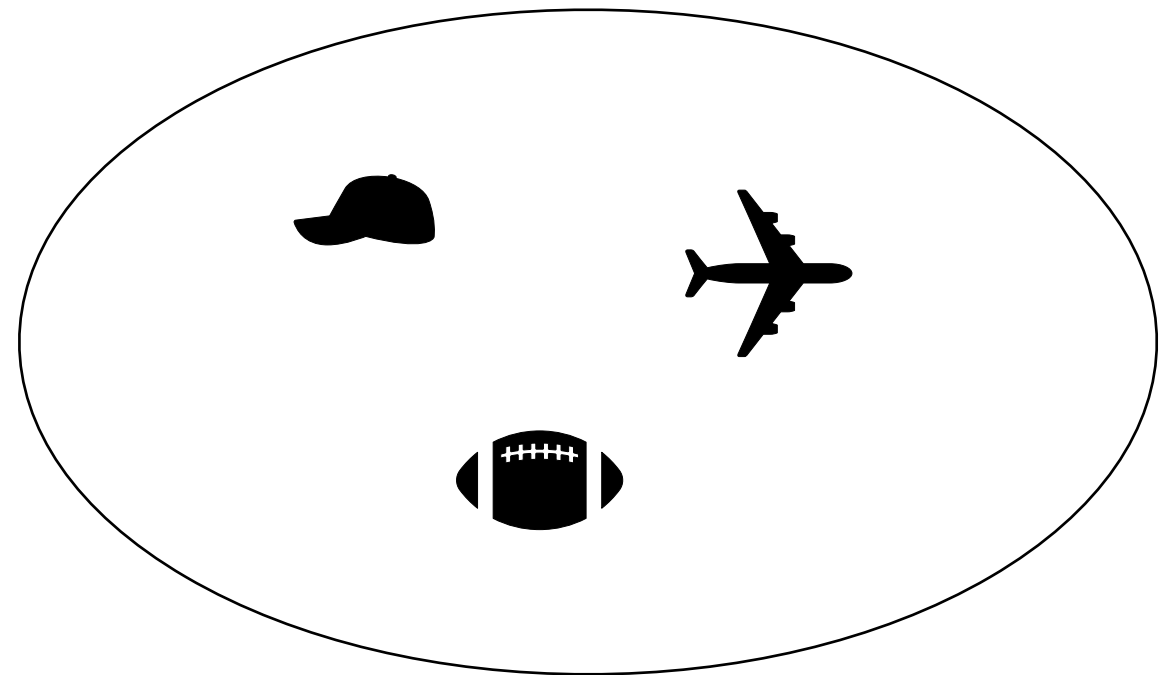


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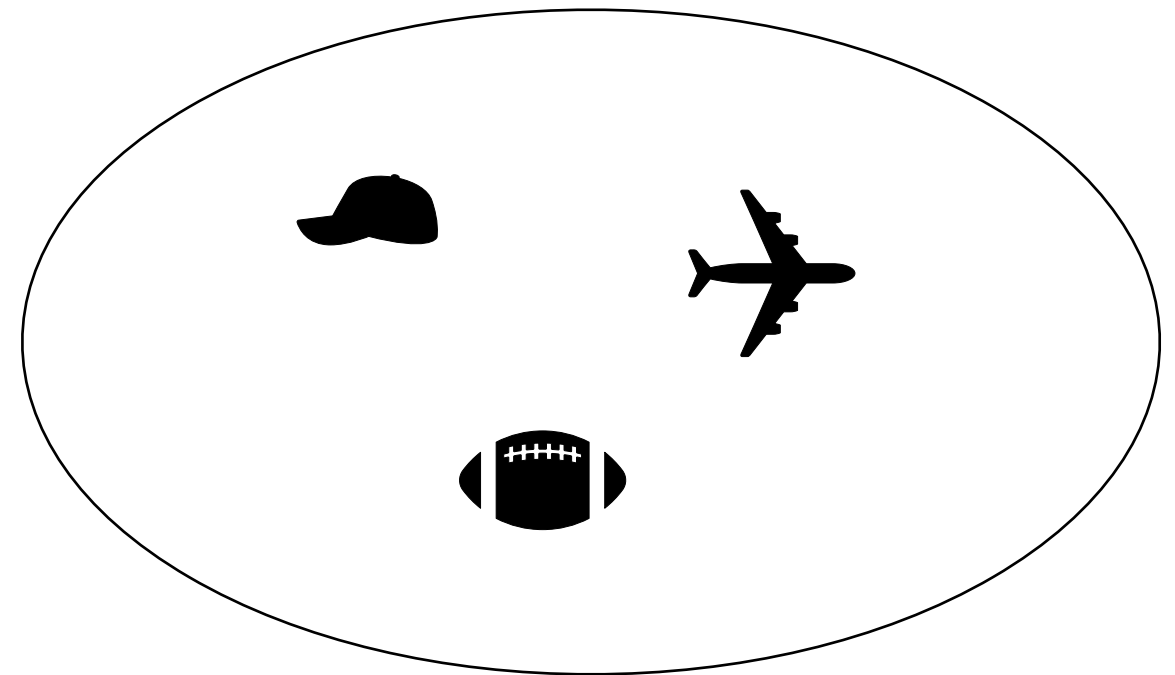
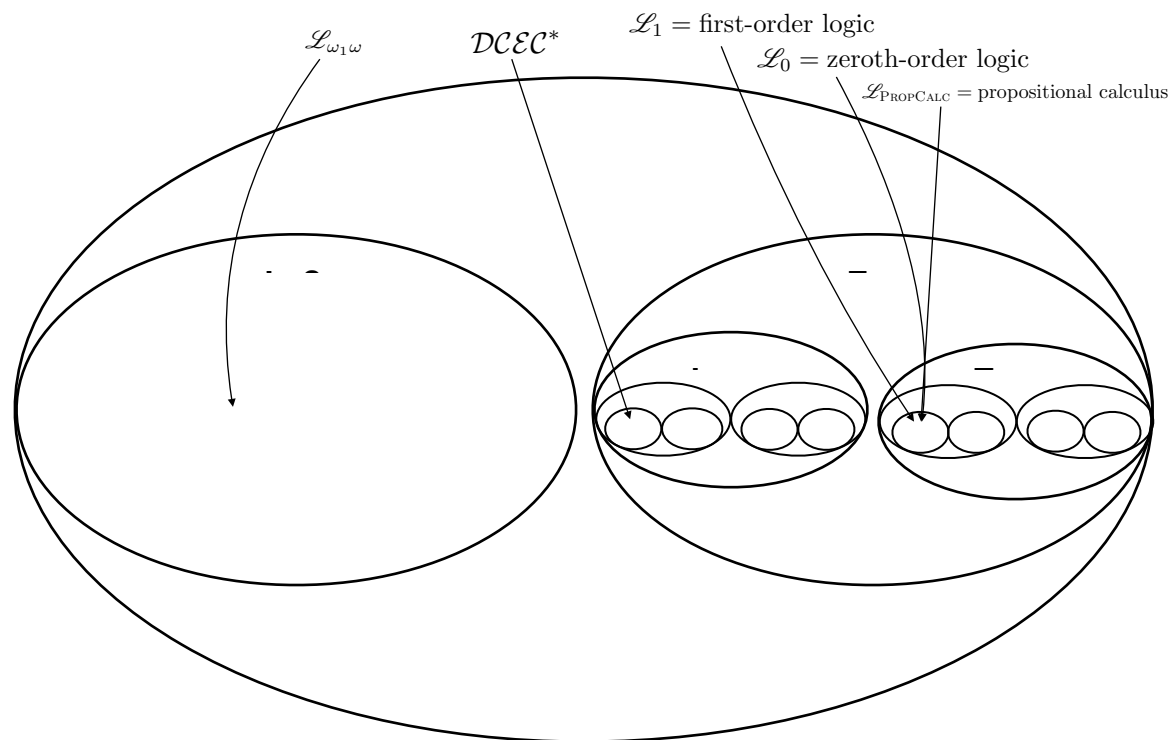
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modus ponens

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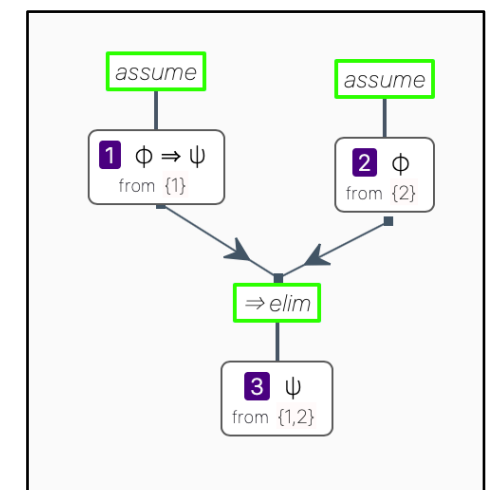
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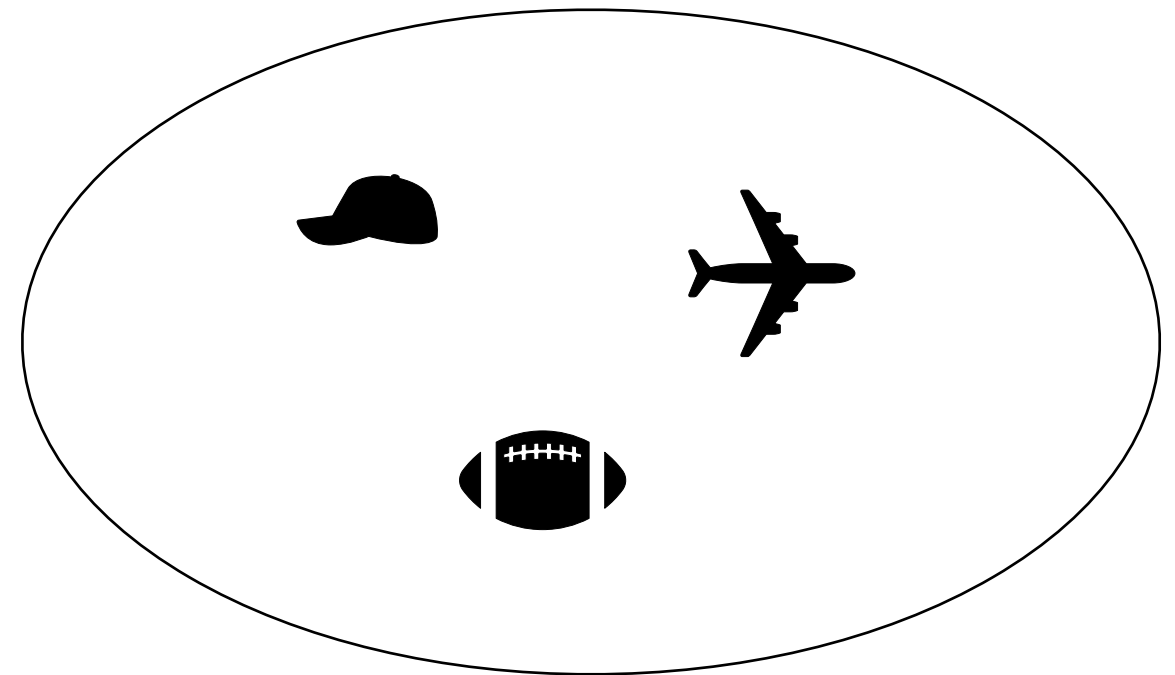
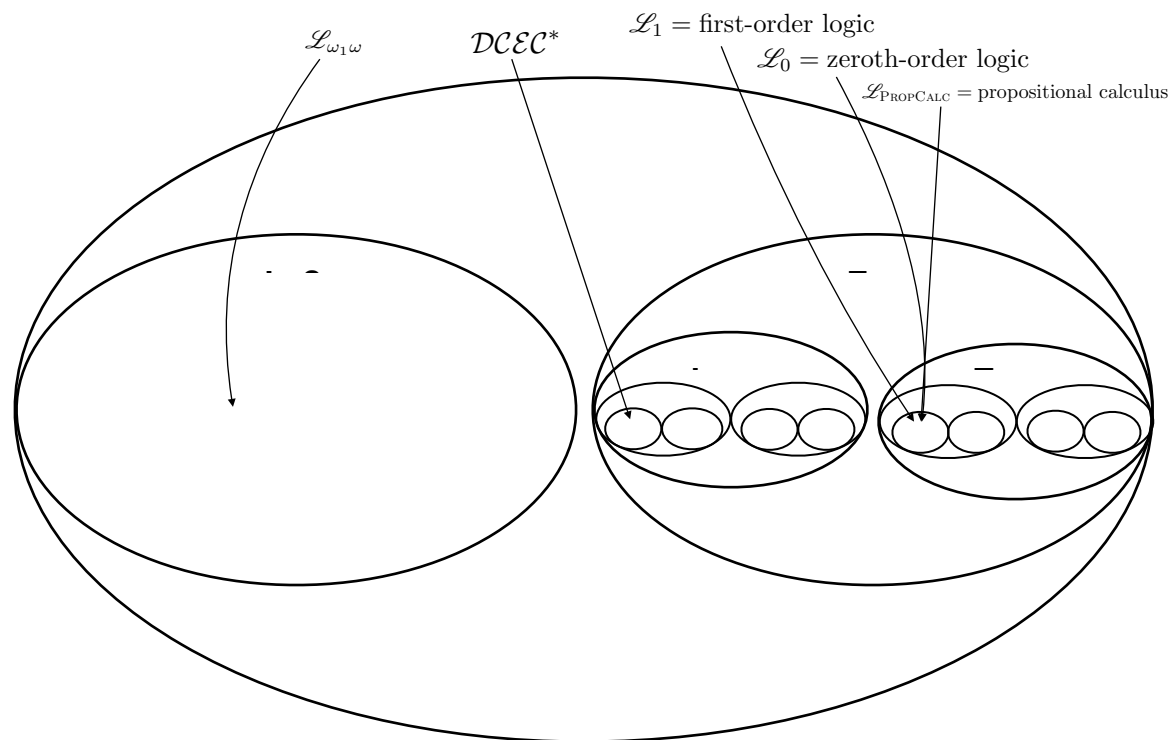
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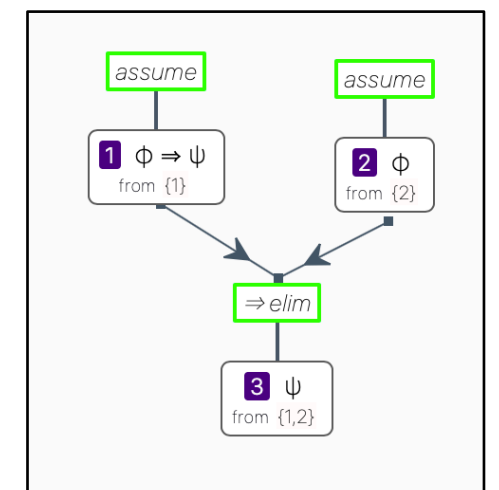
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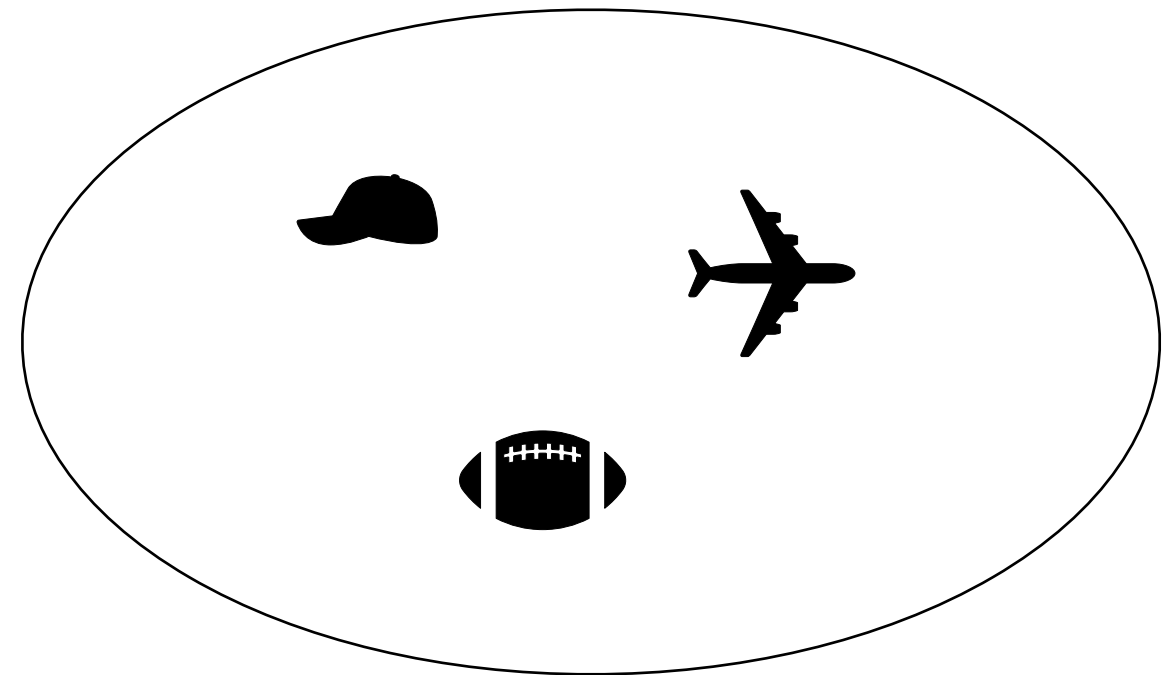
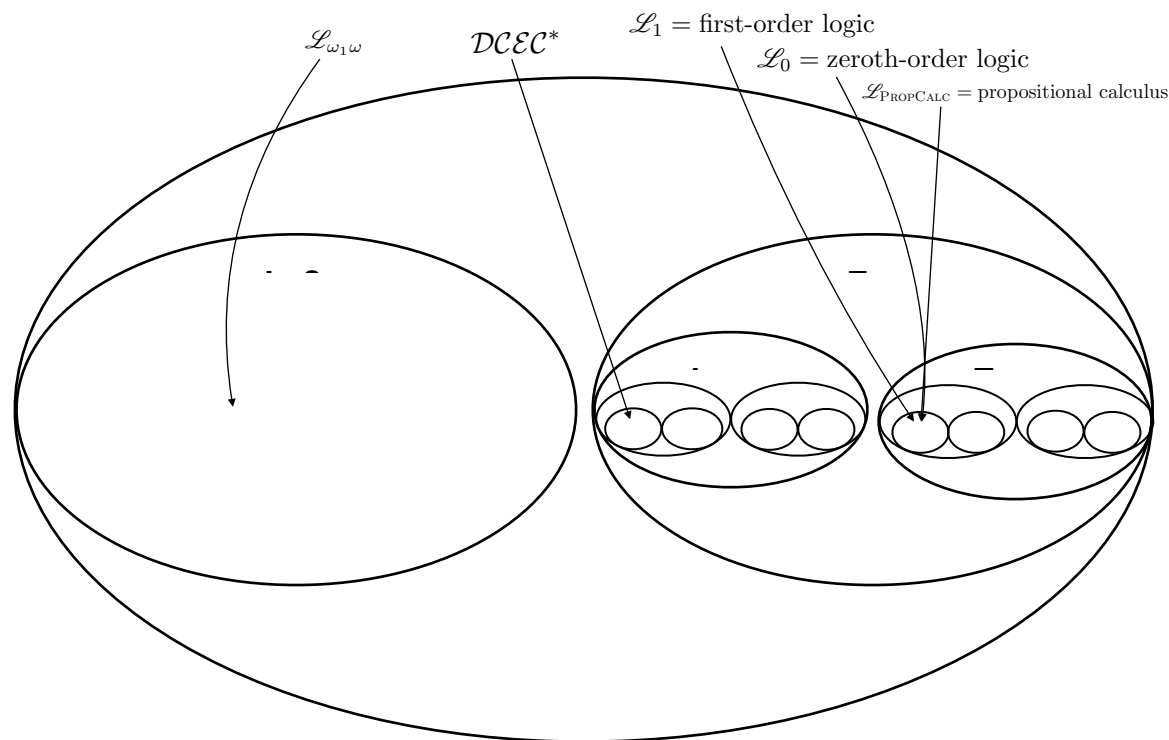




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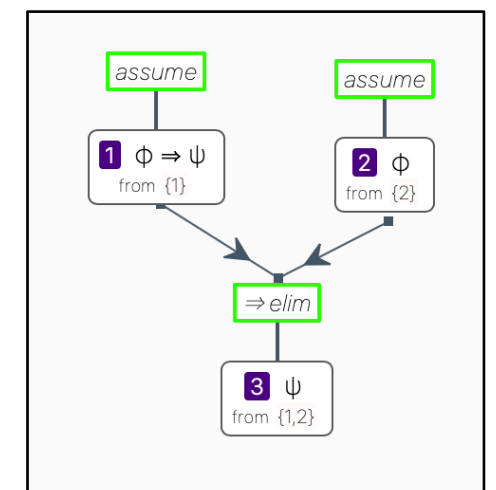
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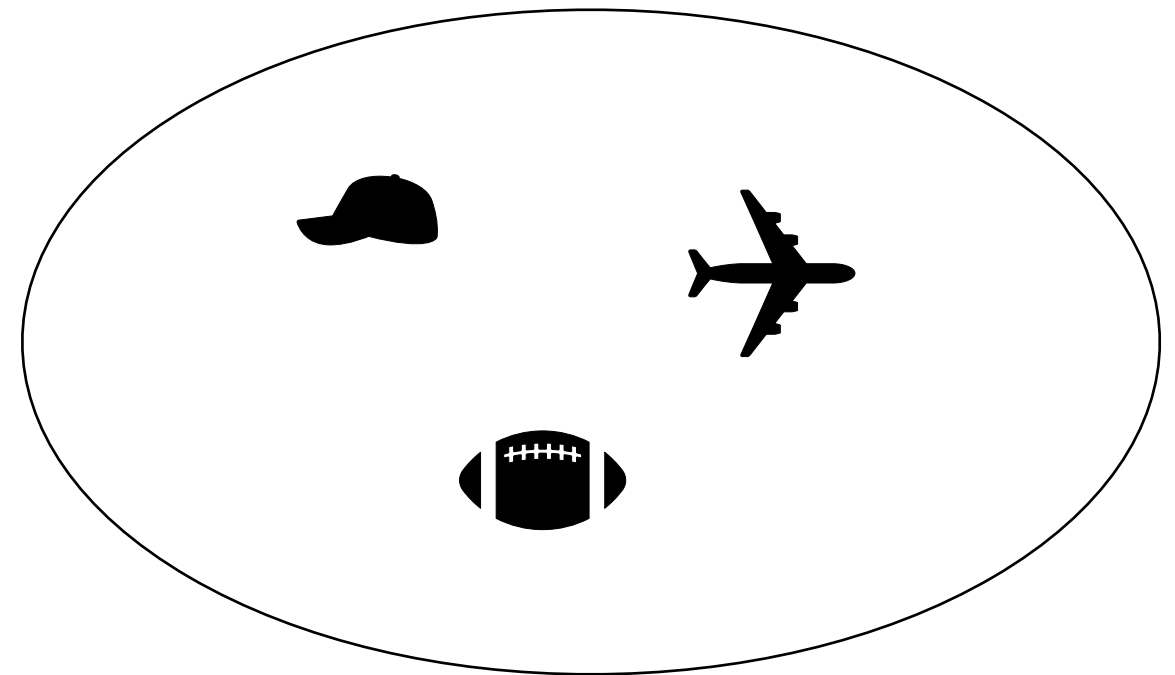
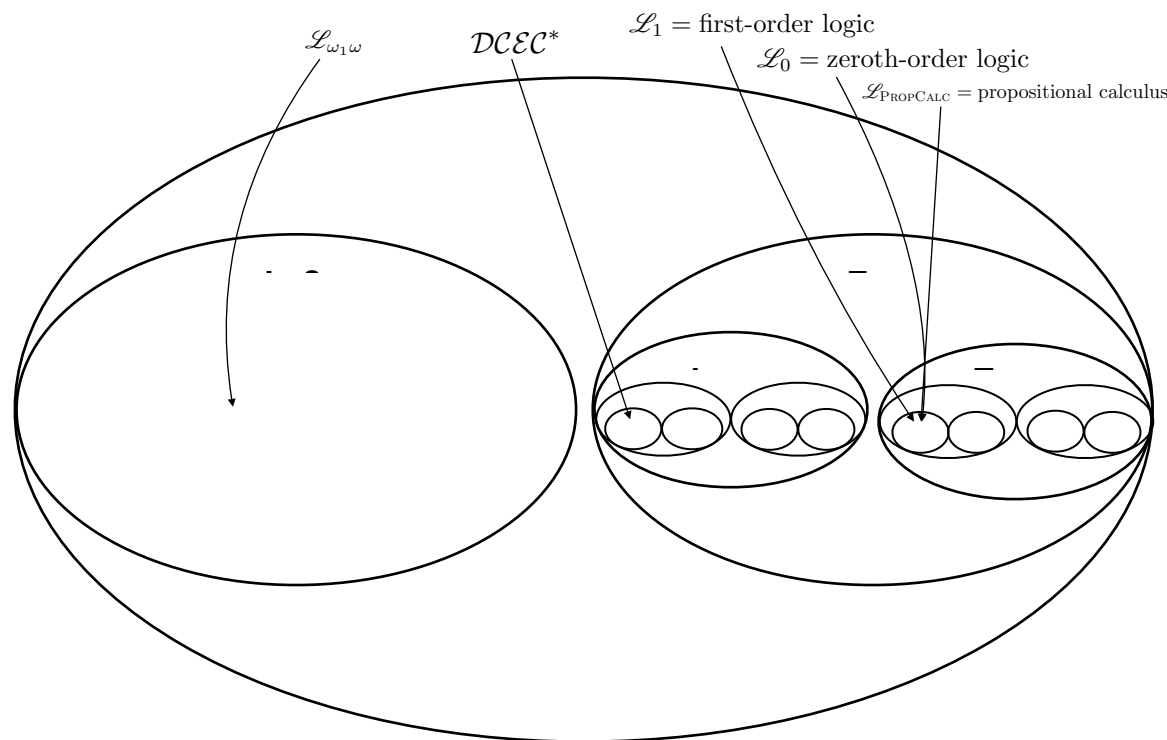


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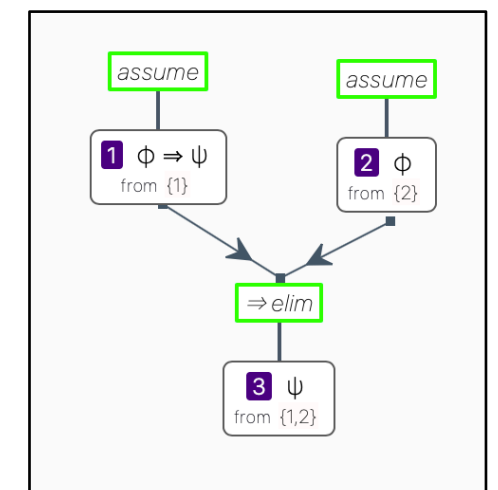
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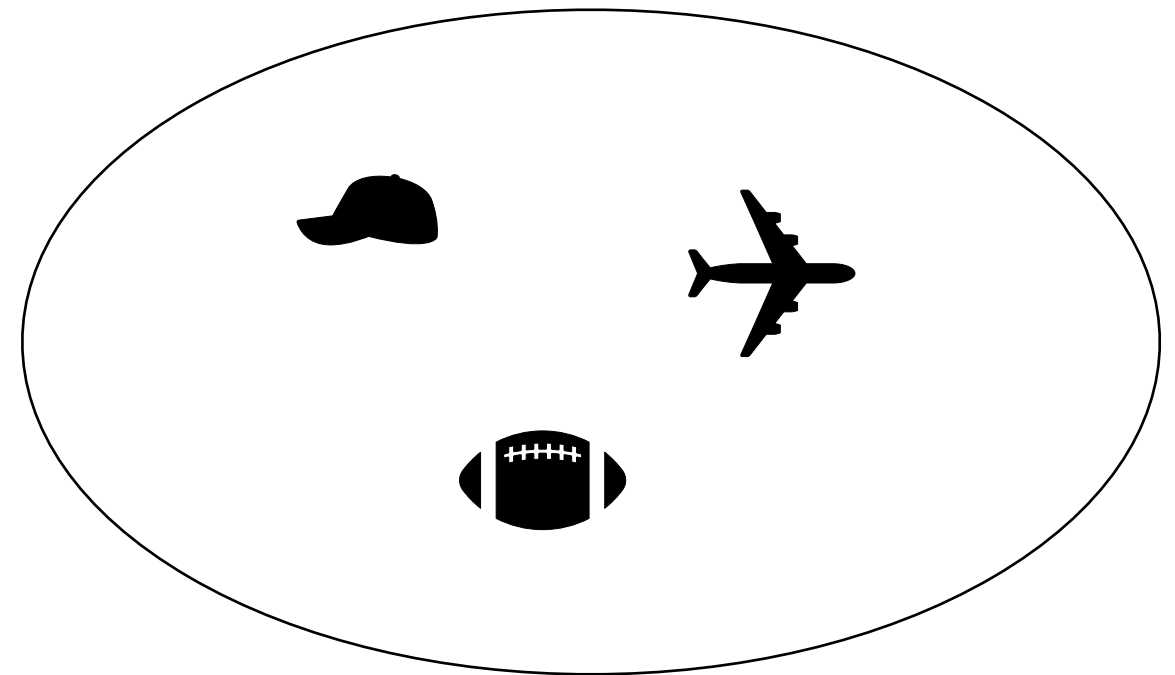
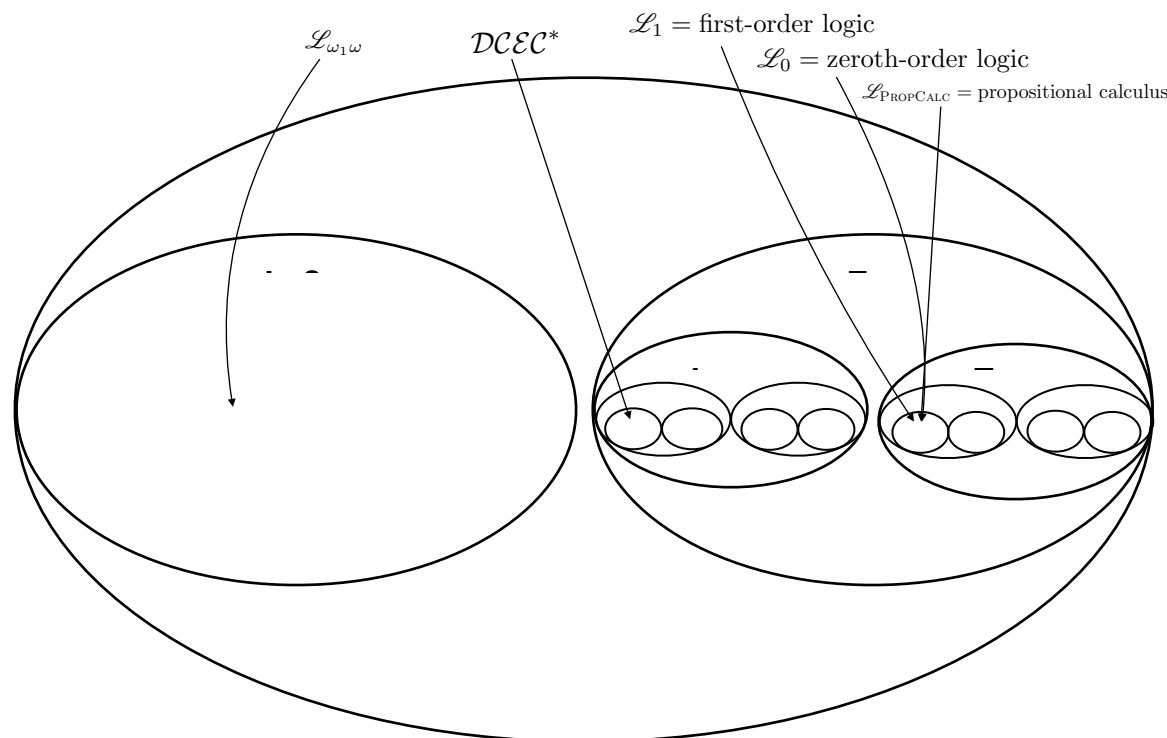


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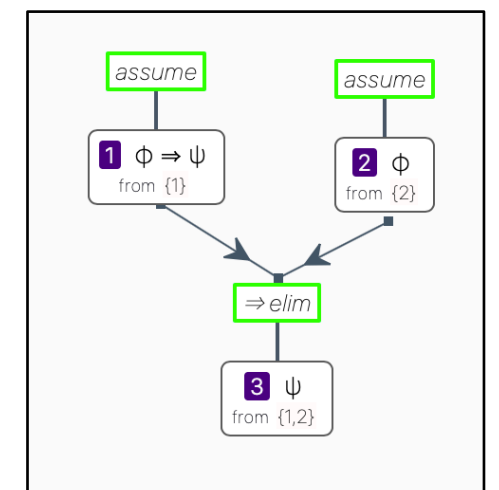


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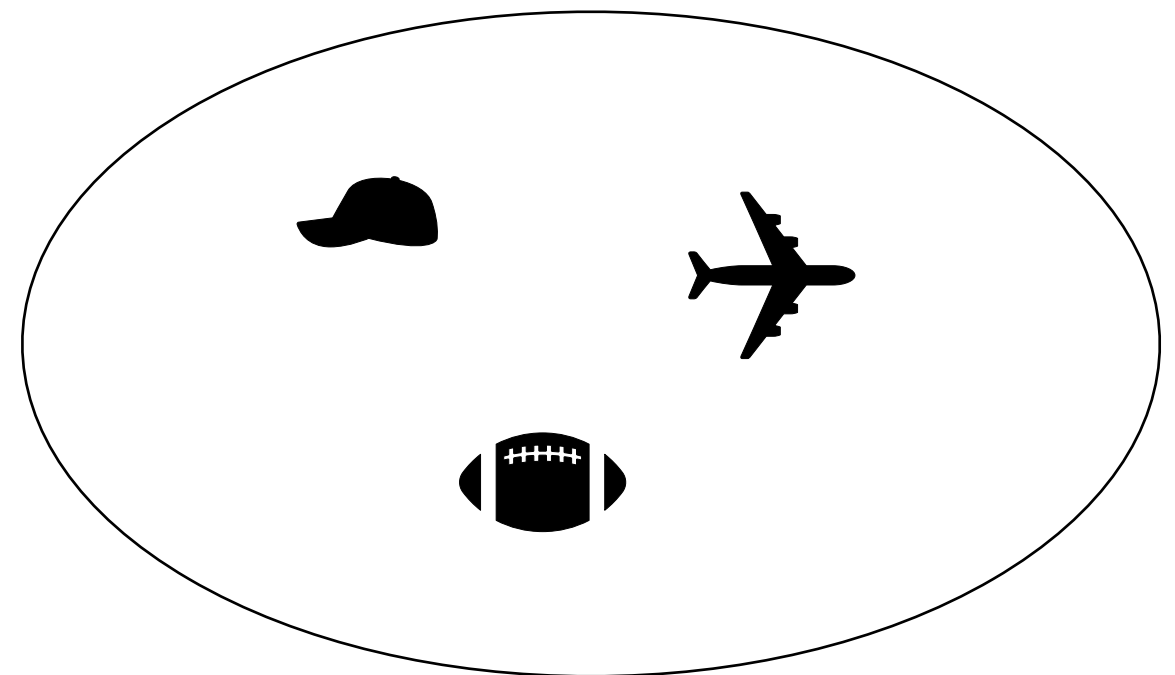
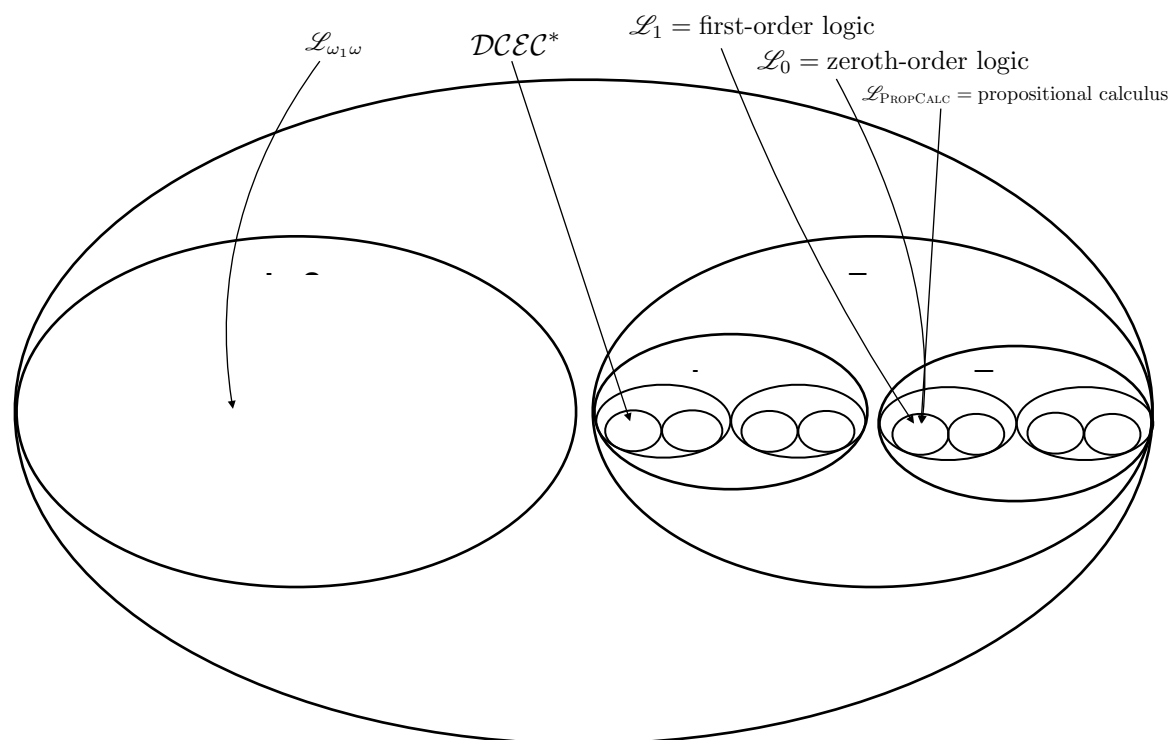


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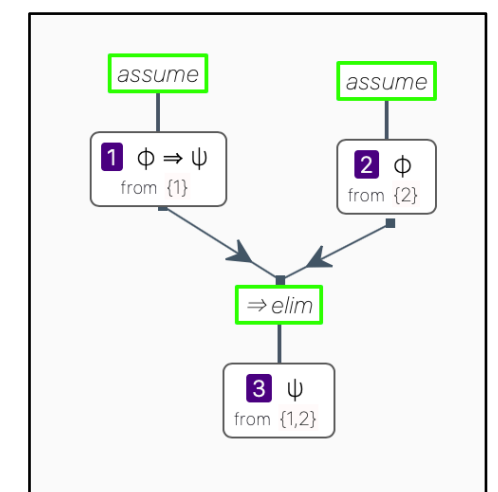


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abstract-and-valid inference schemata

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abstract-and-valid inference schemata

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recursion

self-reference

To infinity and beyond! — routinely

abstract-and-valid inference schemata

quantification

Background Claim

intensional reasoning

HS[®]

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HS®

ℜ Humans, at least neurobiologically normal ones, are fundamentally rational, where rationality is constituted by certain logico-mathematically based reasoning and decision-making in response to real-world stimuli, including stimuli given in the form of focused tests; but mere animals are not fundamentally rational, since, *contra* Darwin, their minds are fundamentally qualitatively inferior to the human mind. As to whether computing machines/robots are fundamentally rational, the answer is “No.” For starters, if x can read nor write nor create, x can’t be rational; computing machines/robots can neither read nor write nor create; ergo, they aren’t fundamentally rational.

abstract-and-valid inference schemata

quantification

Background Claim

intensional reasoning

recursion

self-reference

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The diagram features a central white box with a grey drop shadow containing the text 'HS®'. Five curved arrows point towards this box from different directions: one from the top-left, one from the top-right, one from the middle-right, one from the bottom-right, and one from the bottom-left. Each arrow originates from a text label: 'abstract-and-valid inference schemata' (top-left), 'quantification' (top-right), 'Background Claim' (middle-right), 'intensional reasoning' (middle-right, below 'Background Claim'), 'recursion' (bottom-right), and 'self-reference' (bottom-left). At the very bottom, the text 'To infinity and beyond! — routinely' is displayed.

abstract-and-valid inference schemata

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HS[®]

To infinity and beyond! — routinely

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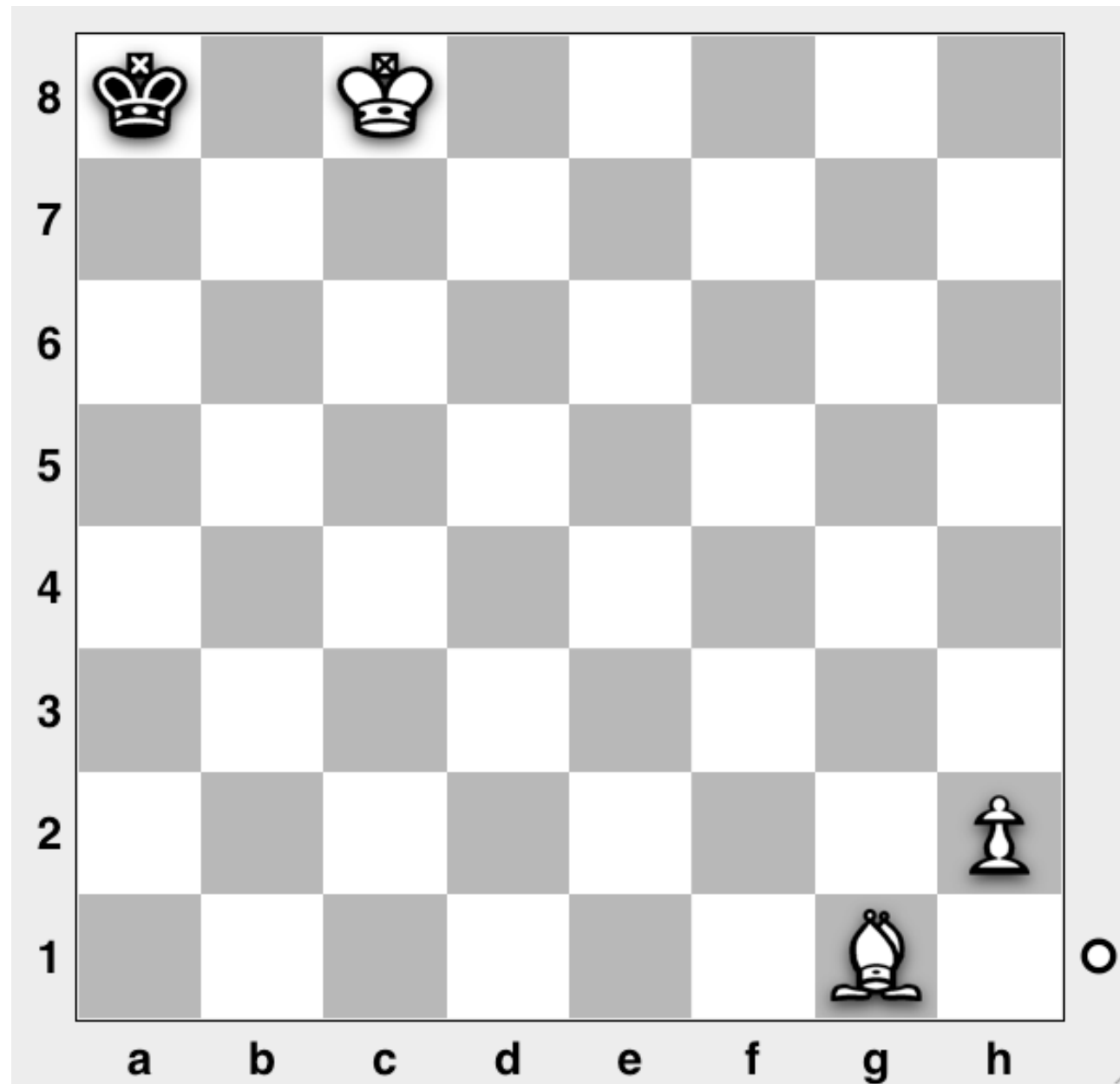
What is Logic?

- The key to becoming rational.
- “The science 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).
- 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)?...
- ...

What is Logic?

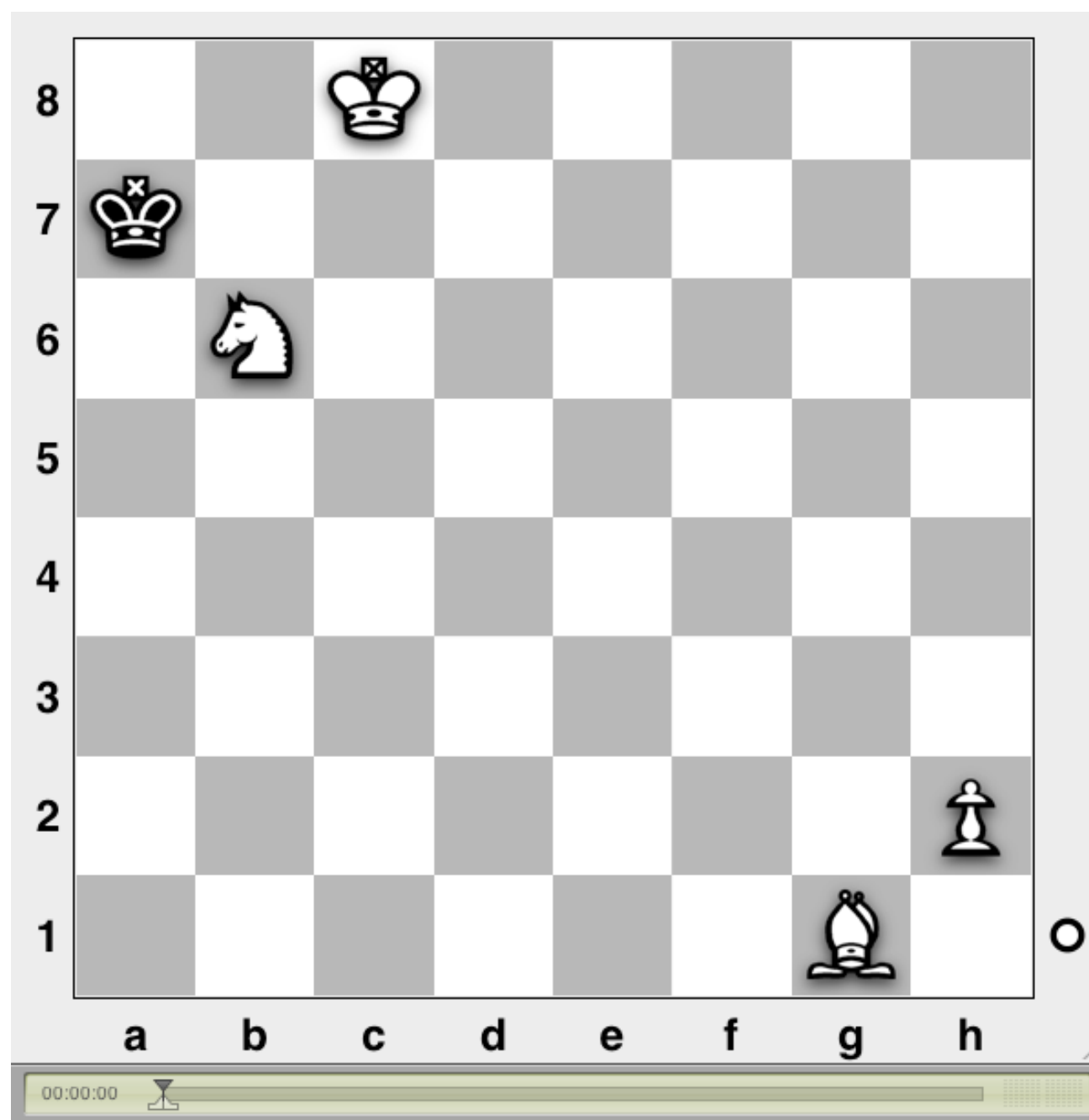
- The key to becoming rational. Or are you *already* rational? ...
- “The science of reasoning.” — so the not-unreasonable slogan goes.
- The only invincible subject there is.
- The basis for the formal sciences (from mathematics to game theory to decision theory to probability calculi to axiomatic physics) — and hence the basis for disciplines based on the formal sciences (e.g., engineering, computer science).
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It's White's turn. What move did Black just make?



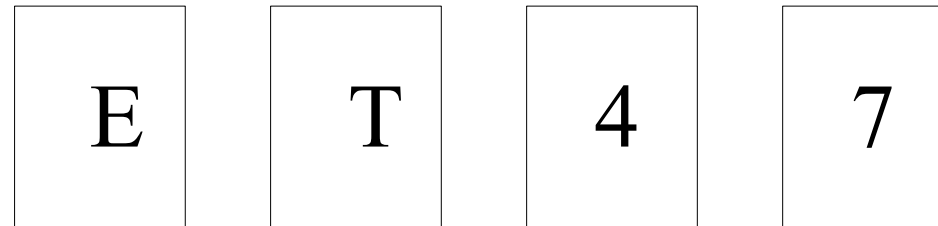
Aha! (Beyond Deep Blue?)

Aha! (Beyond Deep Blue?)



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



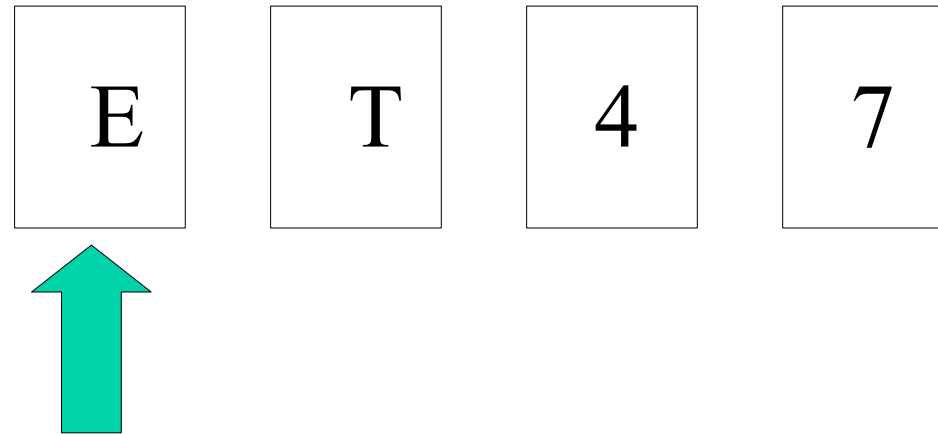
Suppose I claim that the following rule is true.

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.

Simple Selection Task



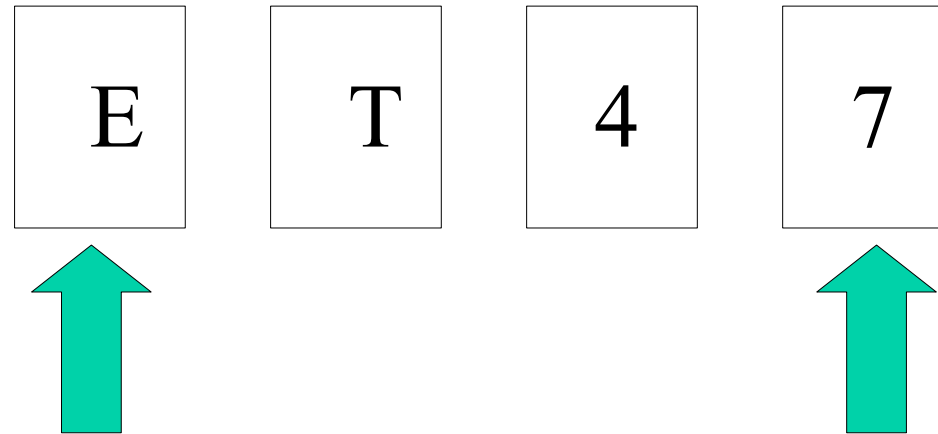
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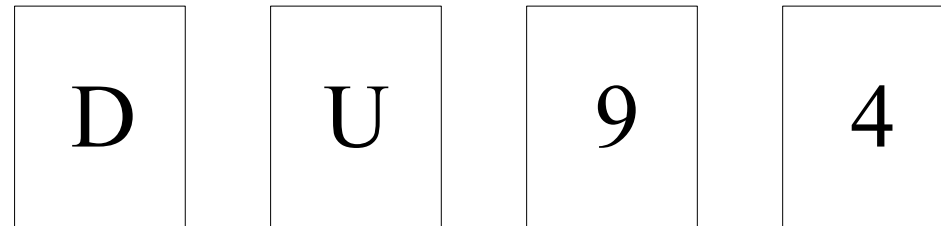


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Another Simple Selection Task

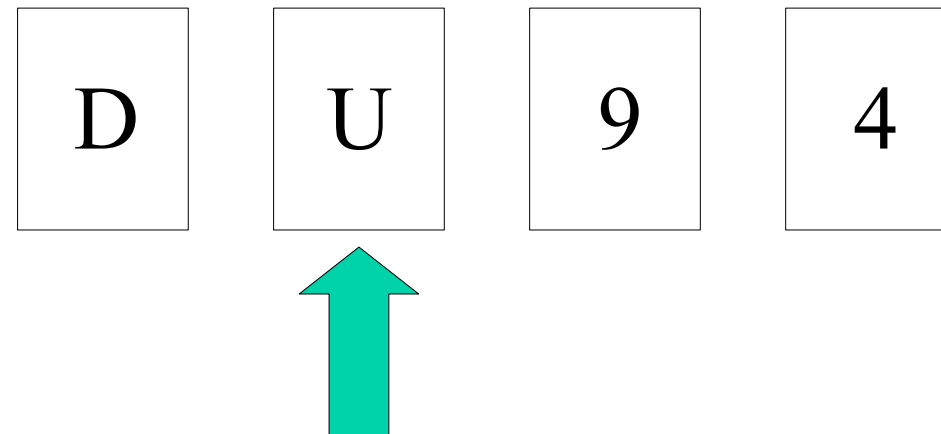


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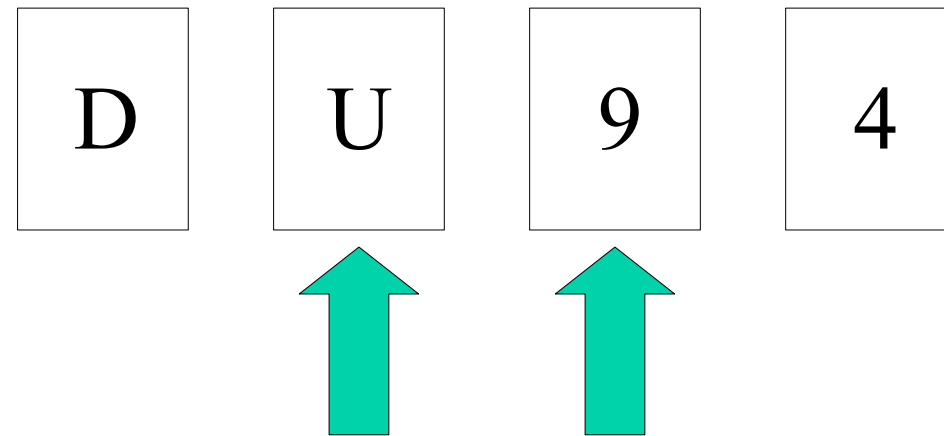


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POLL: Chat your answer now. To suggest flipping a card or cards, just type in the corresponding #/#s, e.g. '1' would be a suggestion to flip card #1.

Another Simple Selection Task

D	U	7	4
1	2	3	4

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?

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“NYS I”

Given the statements

$$\neg a \vee \neg b$$

$$b$$

$$c \rightarrow a$$

which one of the following statements can you prove?

$$c$$

$$\neg b$$

$$\neg c$$

$$h$$

$$a$$

none of the above

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which one of the following statements can you prove?

c

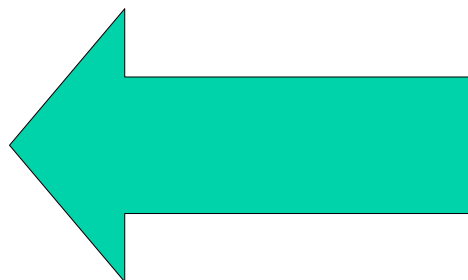
$\neg b$

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h

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“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.”

If you are part of the solution, then you are not part of the problem.

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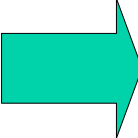
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“NYS 3”

Given the statements

$$\neg\neg c$$

$$c \rightarrow a$$

$$\neg a \vee b$$

$$b \rightarrow d$$

$$\neg(d \vee e)$$

which of the following statements are provable?

$$\neg c$$

e

h

$$\neg a$$

all of the above

“NYS 3”

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$$b \rightarrow d$$

$$\neg(d \vee e)$$

which of the following statements are provable?

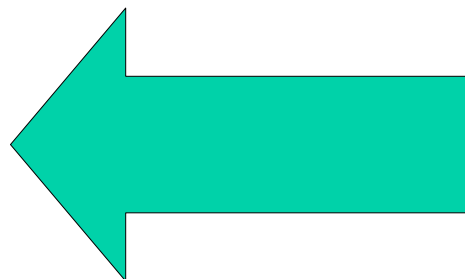
$$\neg c$$

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all of the above



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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There is an ace in the hand.

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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.

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vs.

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(e.g. English or Chinese)

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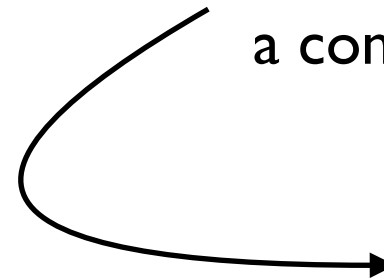
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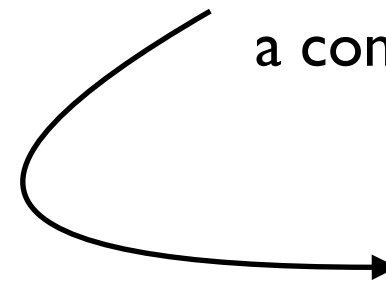
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HyperSlate®

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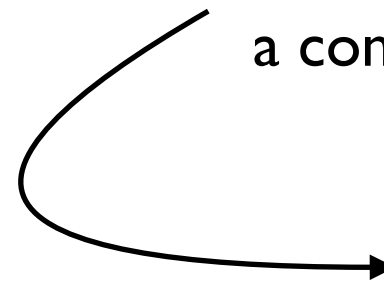
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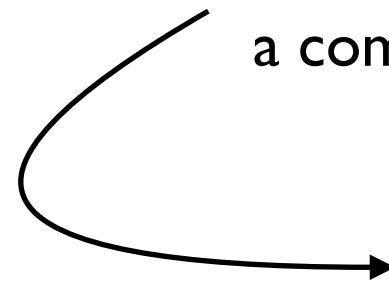
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HyperSlate®

have not learned how to
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TODAY

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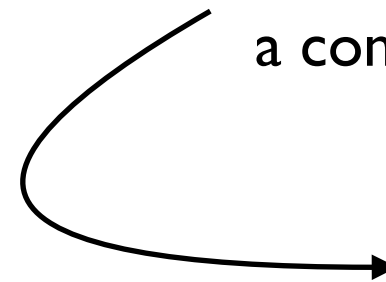
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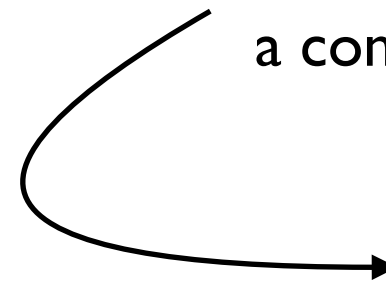
vs.

STARTING $\geq$ 1/27/22

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King-Ace Solved (v2)

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. We also know that by the rule of contrapositive, from a conditional $P \Rightarrow Q$ we can deduce $\neg Q \Rightarrow \neg P$. So we can consider two cases, viz., that $\neg A \Rightarrow \neg K$ is false, and that $\neg A \Rightarrow K$ is false. Take first the first case; accordingly, suppose that $\neg A \Rightarrow K$ is false. Then it follows that $\neg A$ is true. Now consider the second case, which consists in $\neg A \Rightarrow \neg K$ being false. Here, in a direct parallel, we know $\neg A$ is true. In both of our two cases, which are exhaustive, there is no ace in the hand. The proposition is established. **QED**

Bringsjord I

(1) The following three assertions are either all true or all false:

If Billy helped, Doreen helped.

If Doreen helped, Frank did as well.

If Frank helped, so did Emma.

(2) The following assertion is definitely true: Billy helped.

Can it be inferred from (1) and (2) that Emma helped?

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Can it be inferred from (1) and (2) that Emma helped?

YUP! — & now prove it!

Bringsjord I: Proof

Proof: We have two cases to work from: when the conditionals in (1) are all true, and when they are all false. (In both cases, (2) remains true, and available.) So assume Case 1 first. In this case, we can simply chain through the conditionals by repeated application of *modus ponens* to arrive at the conclusion that Emma helped. Now assume Case 2 holds. This immediately implies that the first two conditionals are false; i.e., we have $\sim(B \Rightarrow D)$ and $\sim(D \Rightarrow F)$. Recalling that a conditional fails to hold exactly when its antecedent is true while its consequent is false, we have, in turn: $B \ \& \ \sim D$, and $D \ \& \ \sim F$. But then we have a contradiction, viz. $\sim D \ \& \ D$. Since everything follows (“explosively”!) from a contradiction, we are done. **QED**

Logic kan redde menneskehten!