# PHIL 222
# Philosophical Foundations of Computer Science
# Week 8, Tuesday

Oct. 15, 2024

# Midterm Paper

## Paper topic.

1. Critically evaluate Hume's argument that puts forward the so-called "problem of induction". Analyze and outline his argument, identify what you think is the least convincing premise, consider its strength and weakness, and judge whether it is tenable. Note that you need to justify your judgment. Therefore,
   a. If you think the premise is tenable, provide an argument that defends the premise.
   b. If you do not think the premise is tenable, provide an argument that the premise fails.

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The "consider its strength" part includes giving your best charitable interpretation to Hume's argument. If you go b, you need to seriously think and state how Hume would rebut your objection (and then you argue why in the end that rebuttal would not work).

You will write your paper using the following structure:

i. Analyze Hume's argument and outline its logical structure. What are his premises and what are his conclusion and sub-conclusions? What follows from what?
ii. Identify the least convincing premise Hume uses and explain a potential reason why the premise may not hold.
iii. Give your best charitable presentation of how Hume would or could respond and defend the premise.
iv. Give your best argument that Hume's defense would be / would not be successful.

# Epistemology (1):
# The Problem of Induction:
# Hume on What the Foundation of Induction Cannot Be

Thus, Hume's question is: How do we transition from Ⓐ to Ⓑ?

Ⓐ *I have found that such an object has always been attended with such an effect,*

Ⓑ *I foresee, that other objects, which are, in appearance, similar, will be attended with similar effects.*

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> [. . .] the next question is, whether experience produces the idea by means of the understanding or imagination; whether we are determin'd by reason to make the transition, or by a certain association and relation of perceptions? If reason determin'd us, it wou'd proceed upon that principle, *that instances, of which we have had no experience, must resemble those, of which we have had experience, and that the course of nature continues always uniformly the same*.
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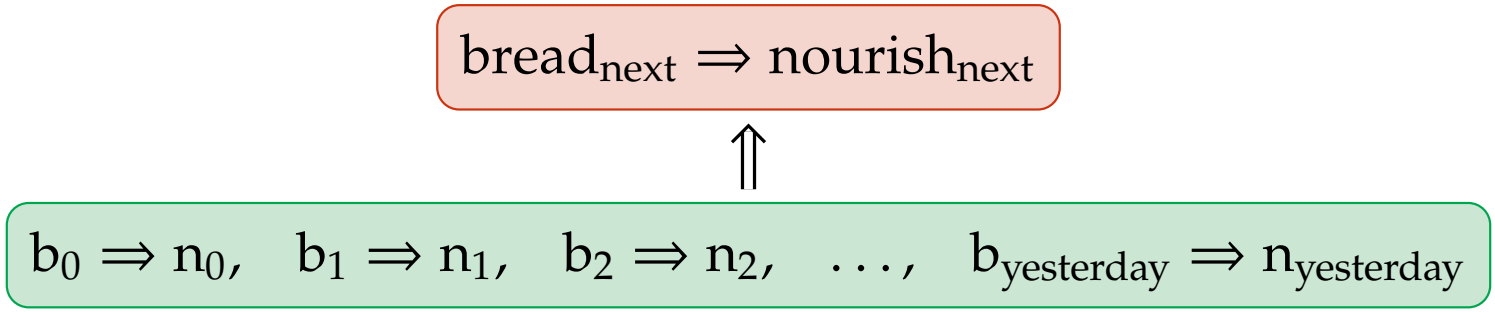
Let's call this principle the "Uniformity Principle" (UP).

$$\text{bread}_{\text{next}} \Rightarrow \text{nourish}_{\text{next}}$$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$\Uparrow$
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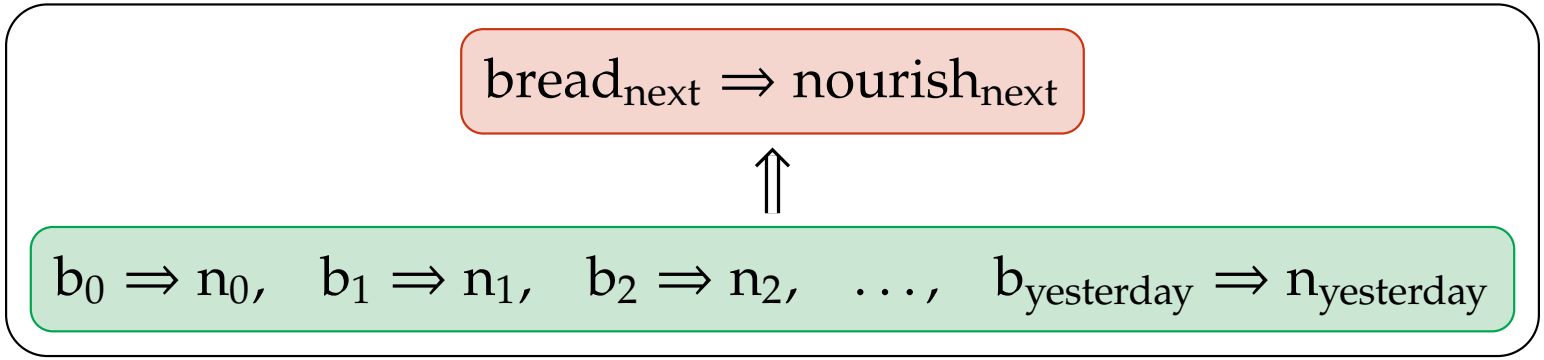
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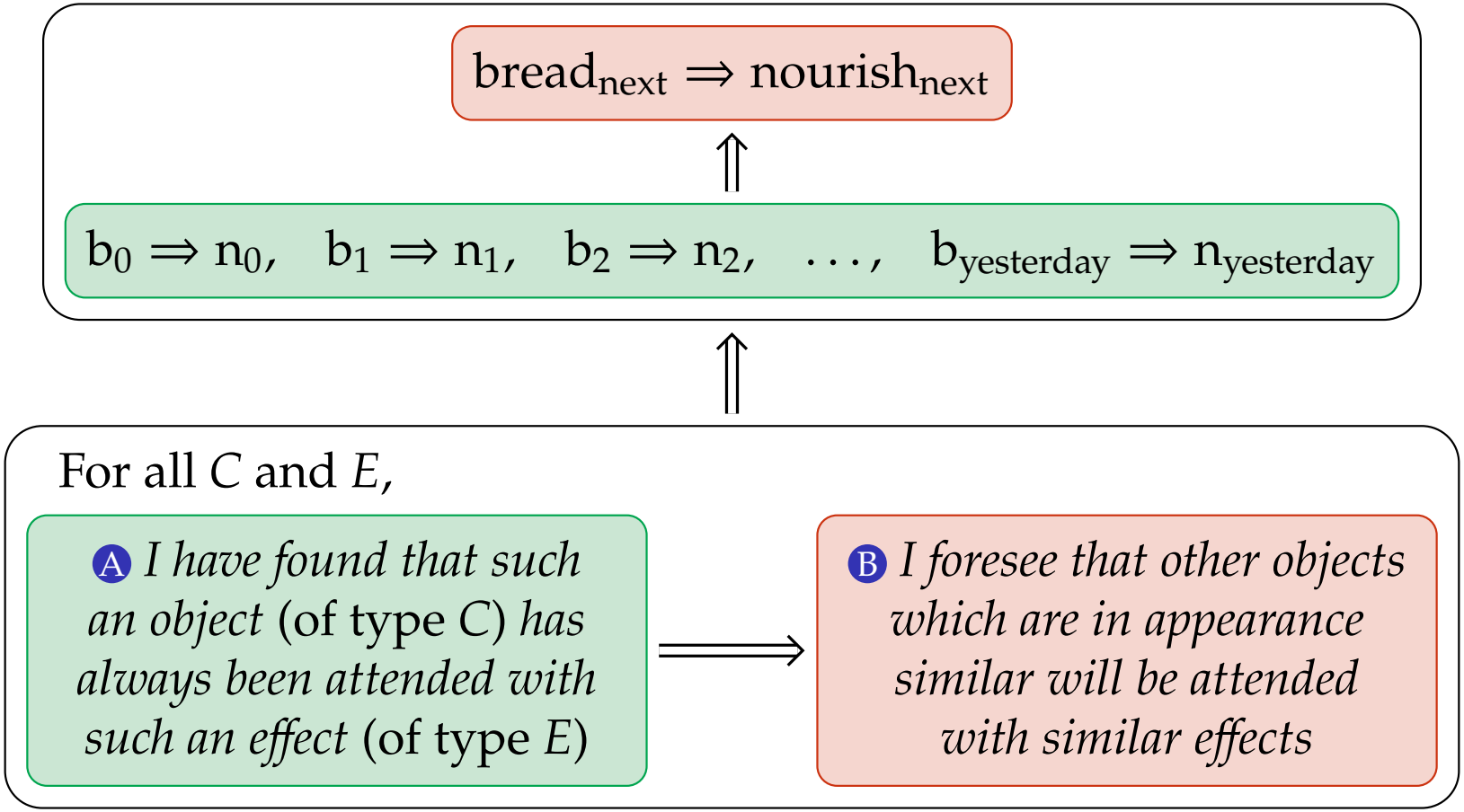
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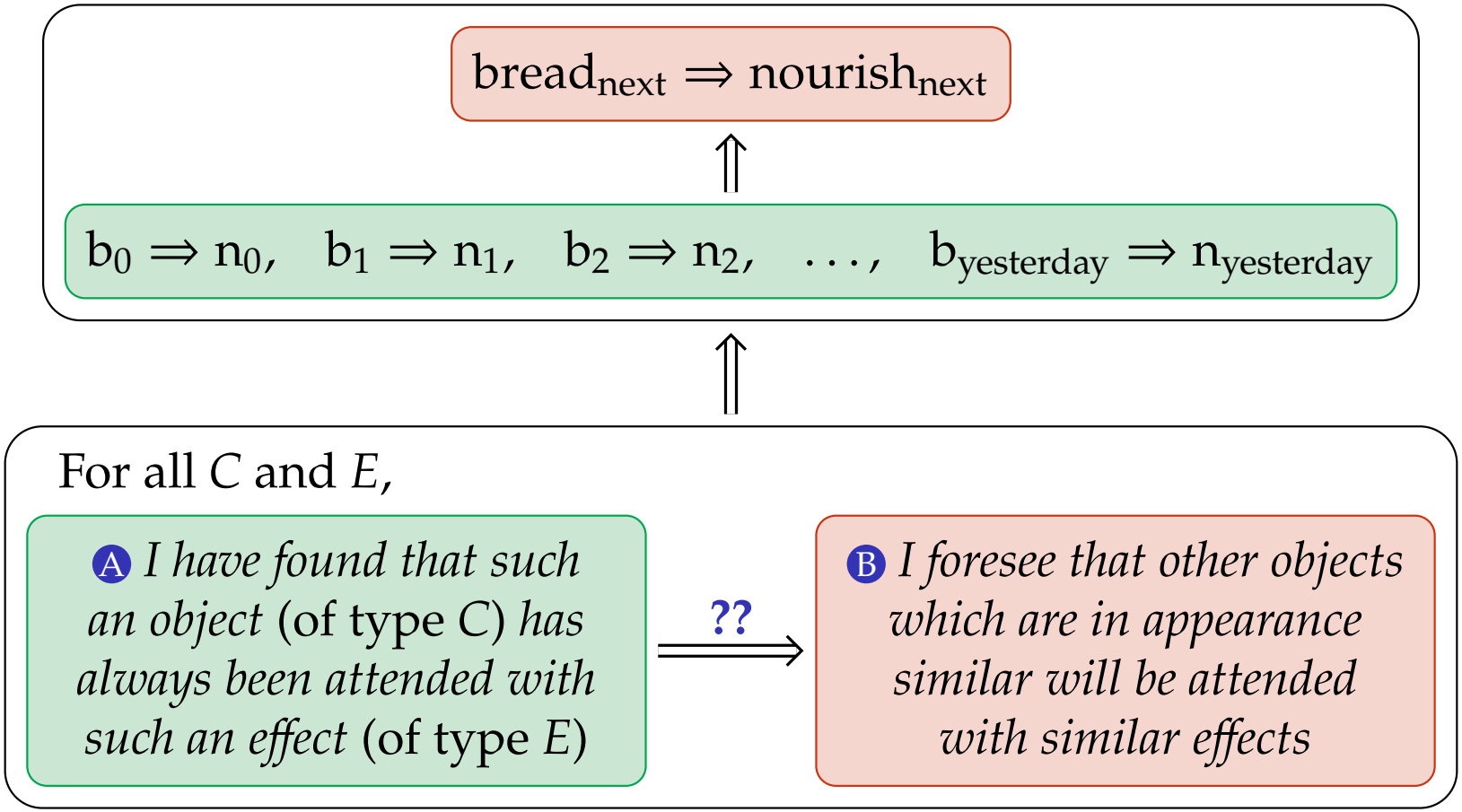
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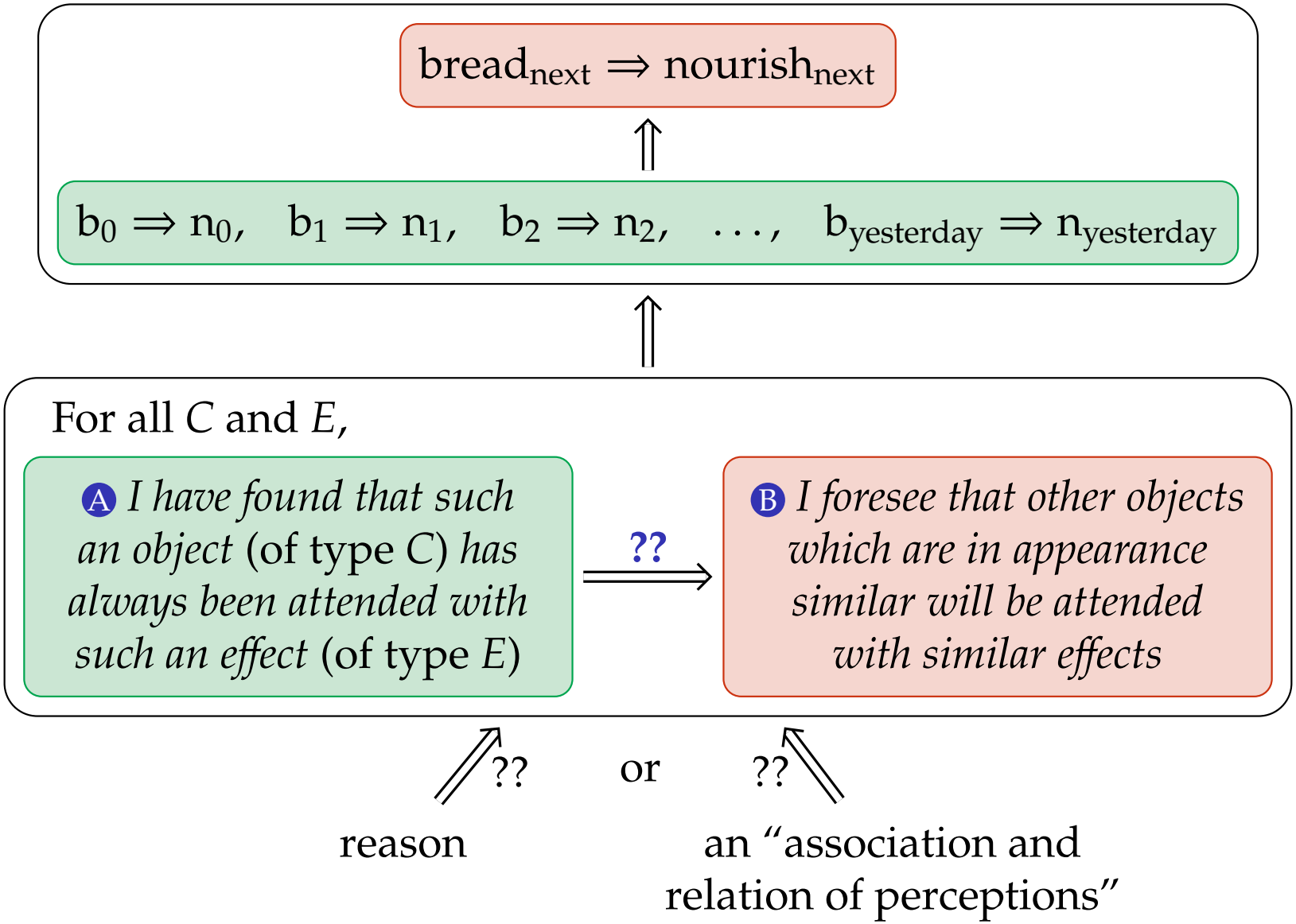
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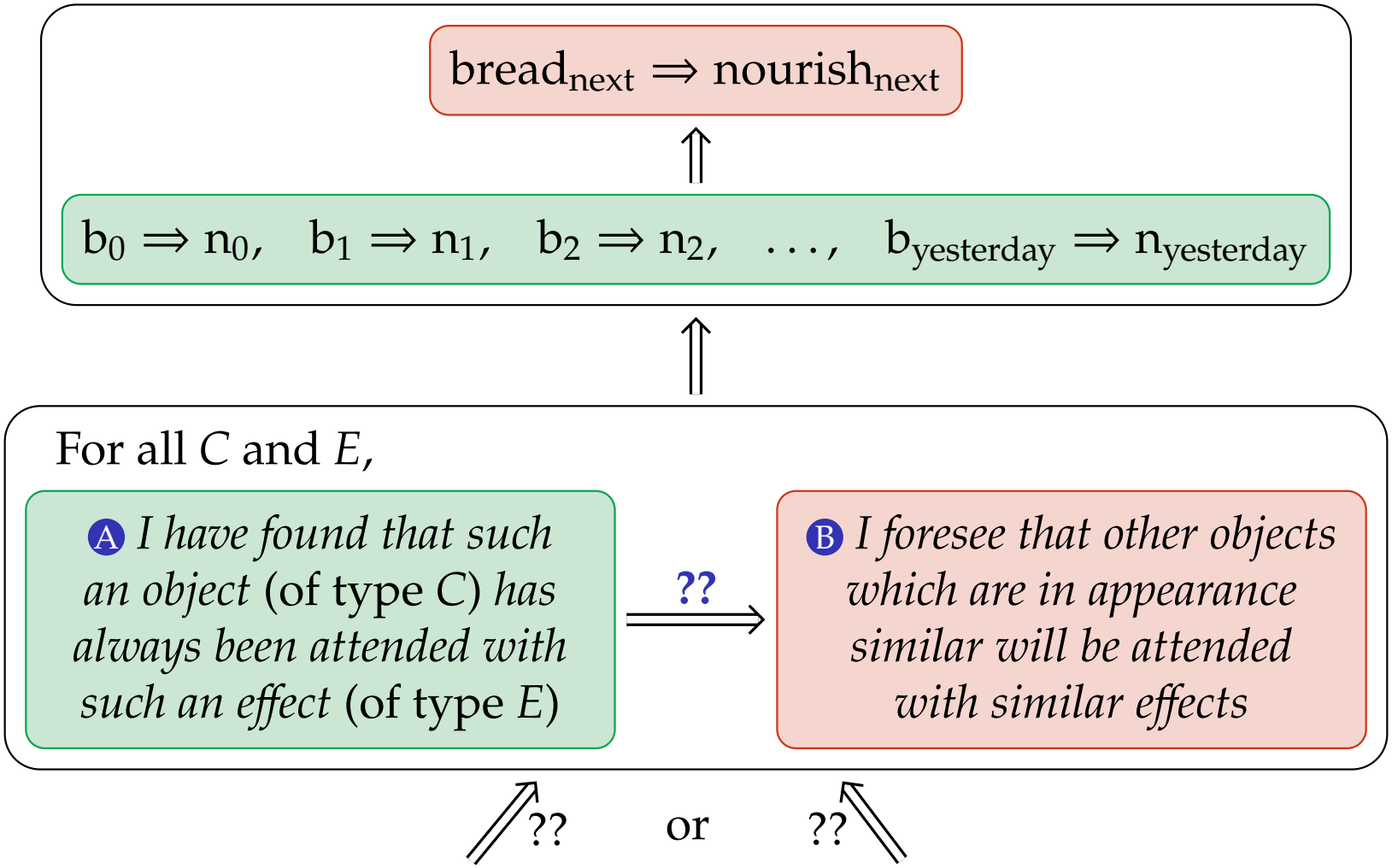
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# Foundation of Induction?

Valiant and Hume seem to agree that people / machines can do induction if they accept . . .

Valiant's assumptions:

> The first assumption is the Invariance Assumption: The context in which the generalization is to be applied cannot be fundamentally different from that in which it was made. [. . .]
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> The second assumption is the Learnable Regularity Assumption.

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Hume's Uniformity Principle:

> If reason determin'd us, it wou'd proceed upon that principle, *that instances, of which we have had no experience, must resemble those, of which we have had experience, and that the course of nature continues always uniformly the same*. In order therefore to clear up this matter, let us consider all the arguments, upon which such a proposition may be suppos'd to be founded; [. . .] [T. 1.3.6.4]

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Can there be arguments for the UP of type a or type b? First, a:

> That there are no demonstrative arguments in the case, seems evident; since it implies no contradiction, that the course of nature may change, and that an object, seemingly like those which we have experienced, may be attended with different or contrary effects. May I not clearly and distinctly conceive, that a body, falling from the clouds, and which, in all other respects, resembles snow, has yet the taste of salt or feeling of fire? Is there any more intelligible proposition than to affirm, that all the trees will flourish in December and January, and decay in May and June? Now whatever is intelligible, and can be distinctly conceived, implies no contradiction, and can never be proved false by any demonstrative argument or abstract reasoning *à priori*. [E. 4.2.18]

“Does bread always nourish us?”

Yes or No

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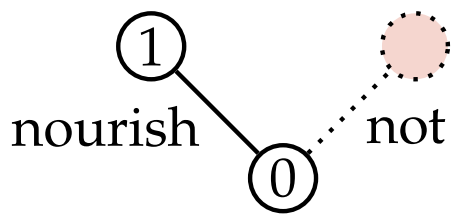

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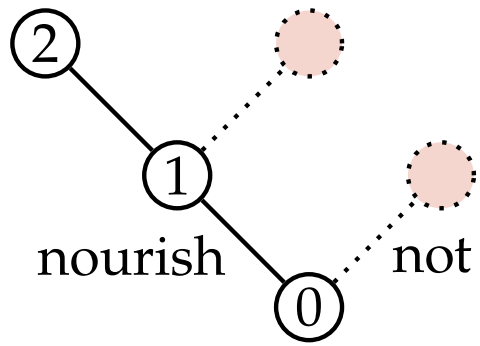

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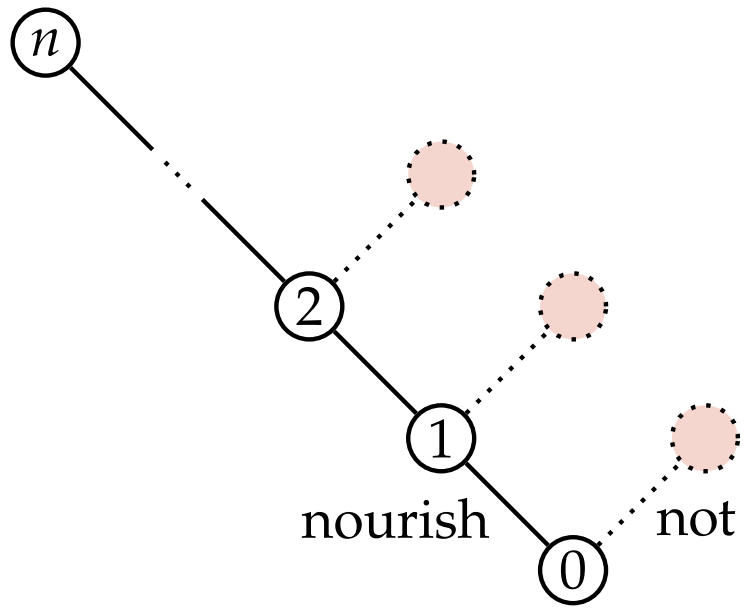

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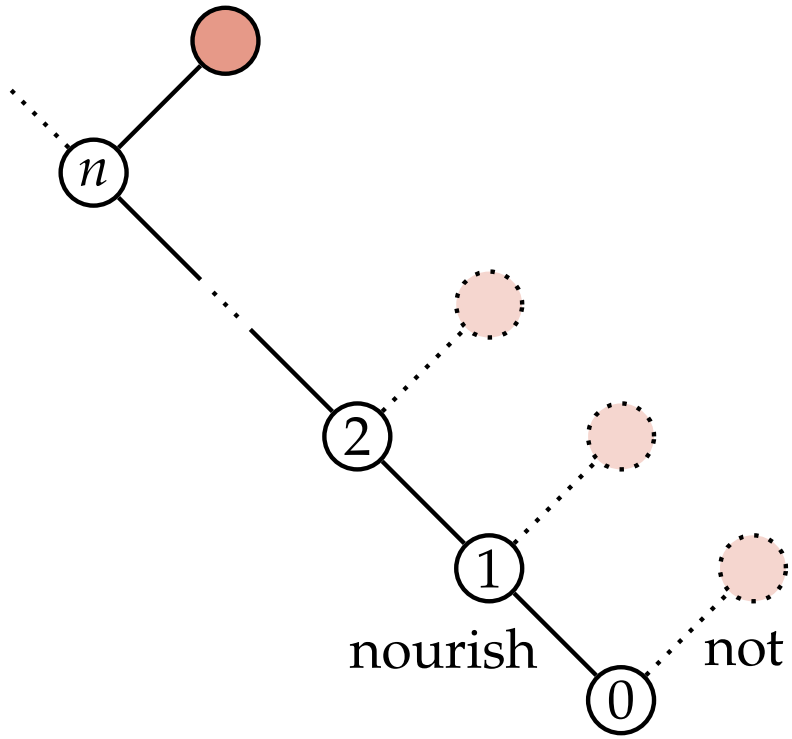

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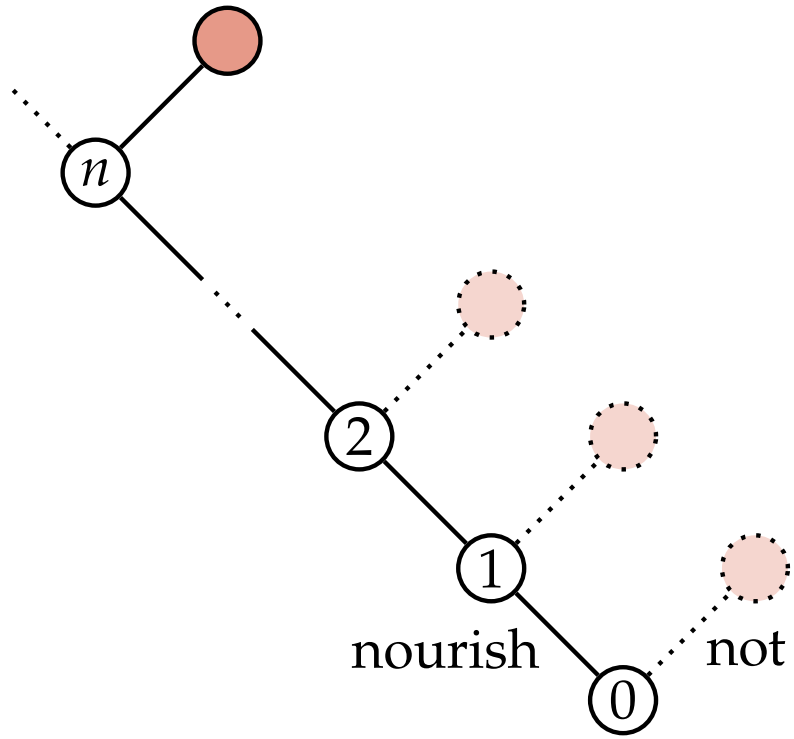


This is a counterexample to the UP, i.e., the failure of the UP implies no contradiction.

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Cf. Valiant:

> On the one hand, if no assumptions are made about the world, then clearly induction cannot be justified, because the world could conceivably be adversarial enough to ensure that the future is exactly the opposite of whatever prediction has just been made.
>
> [pp. 59f.]

Therefore no arguments for the UP can be of type (a). If any, they must be of type (b), i.e.,

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>
> [E. 4.2.19]

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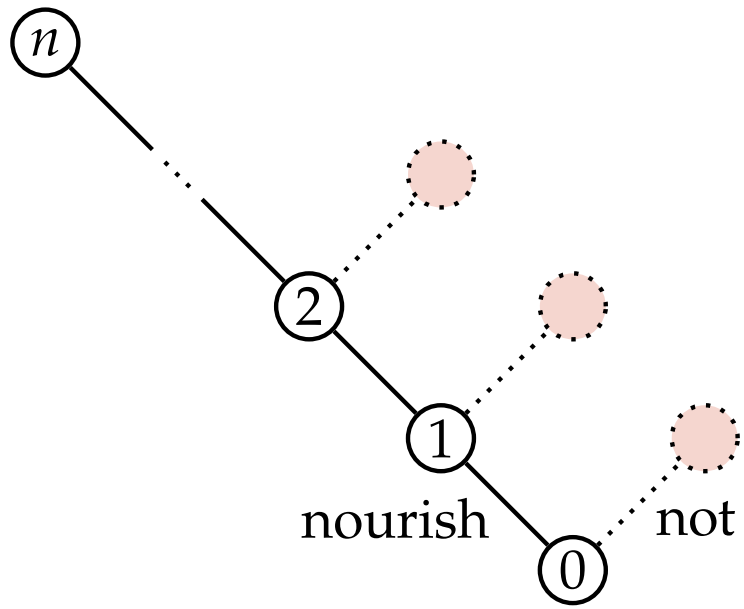

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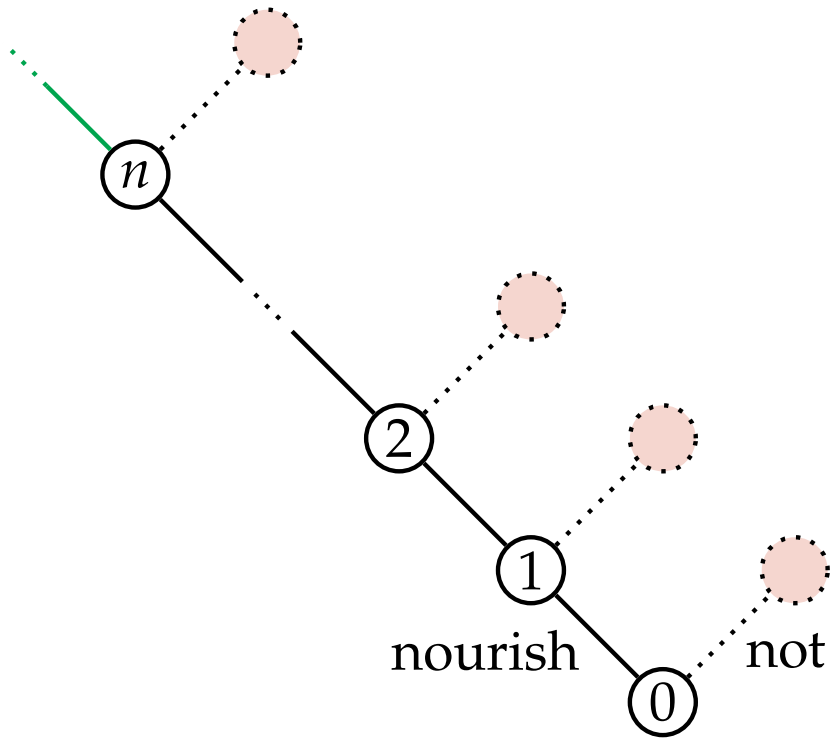
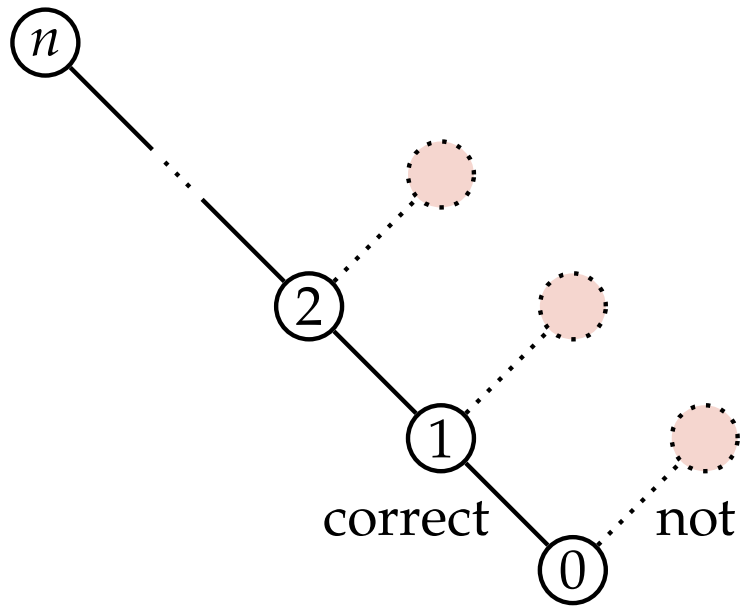



People may say “Yes, by the UP!”

“Is the UP correct?”

Yes or No



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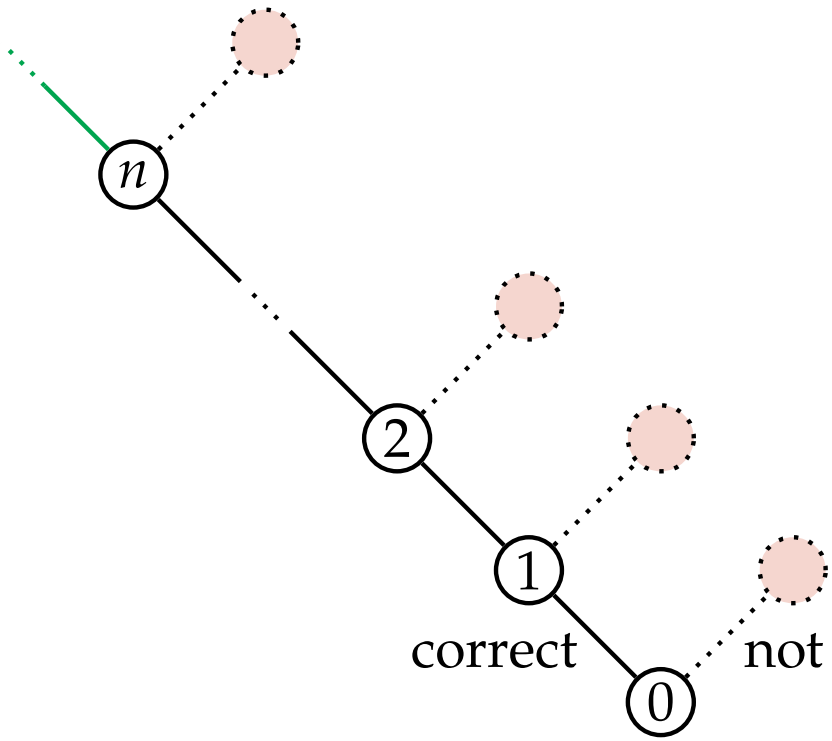


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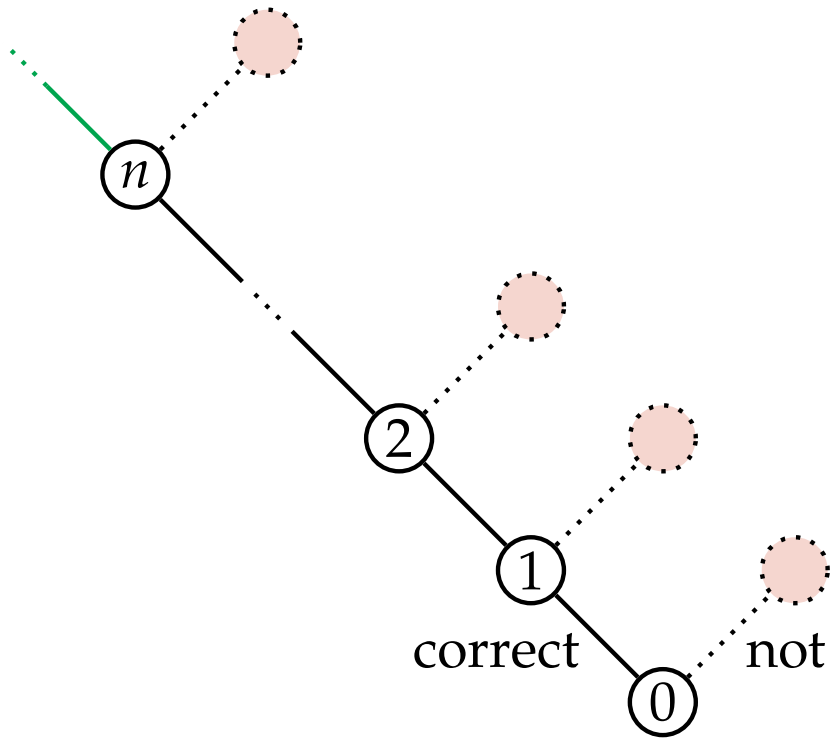
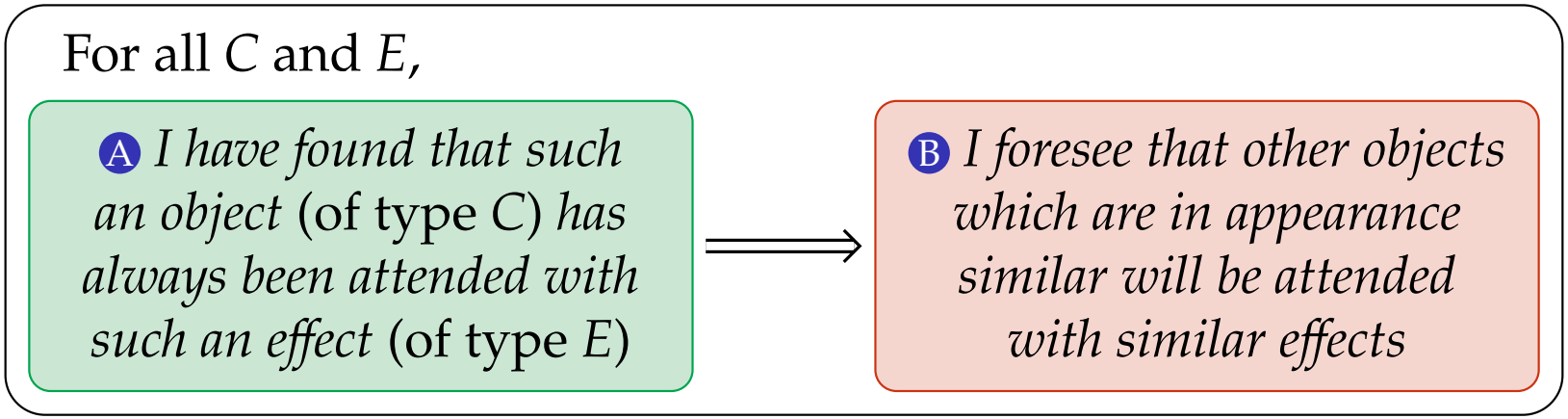



People may say "Yes, by the UP!" — Um, that's circular.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$\overset{??}{\Longrightarrow}$

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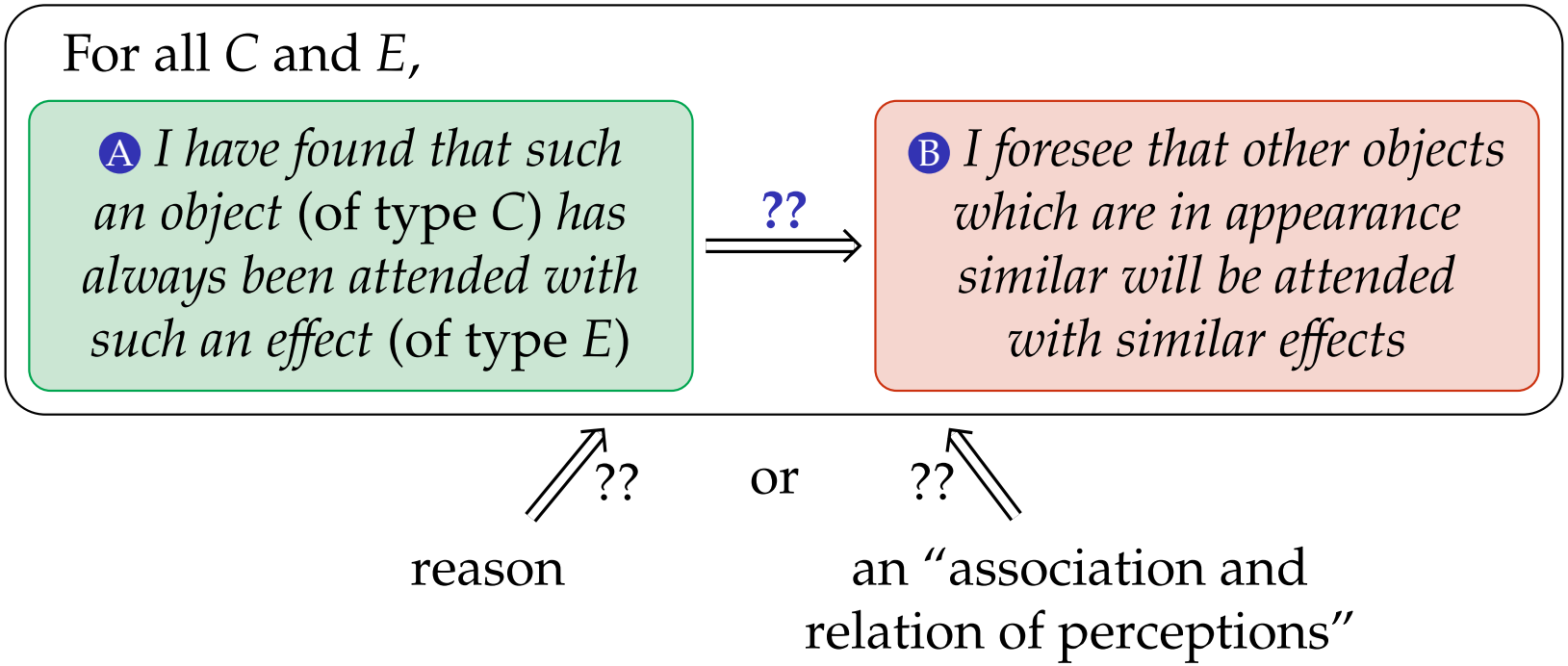
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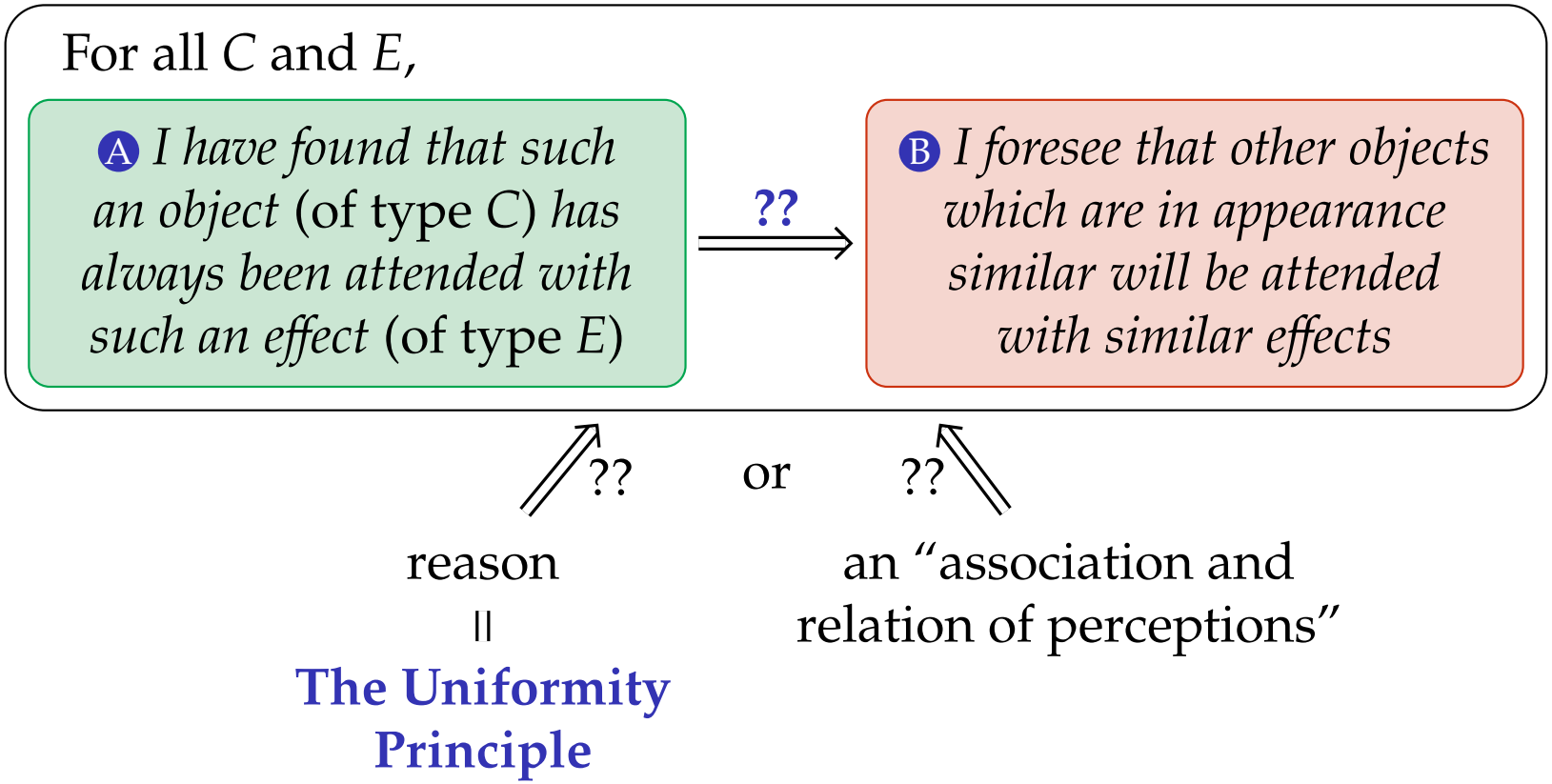
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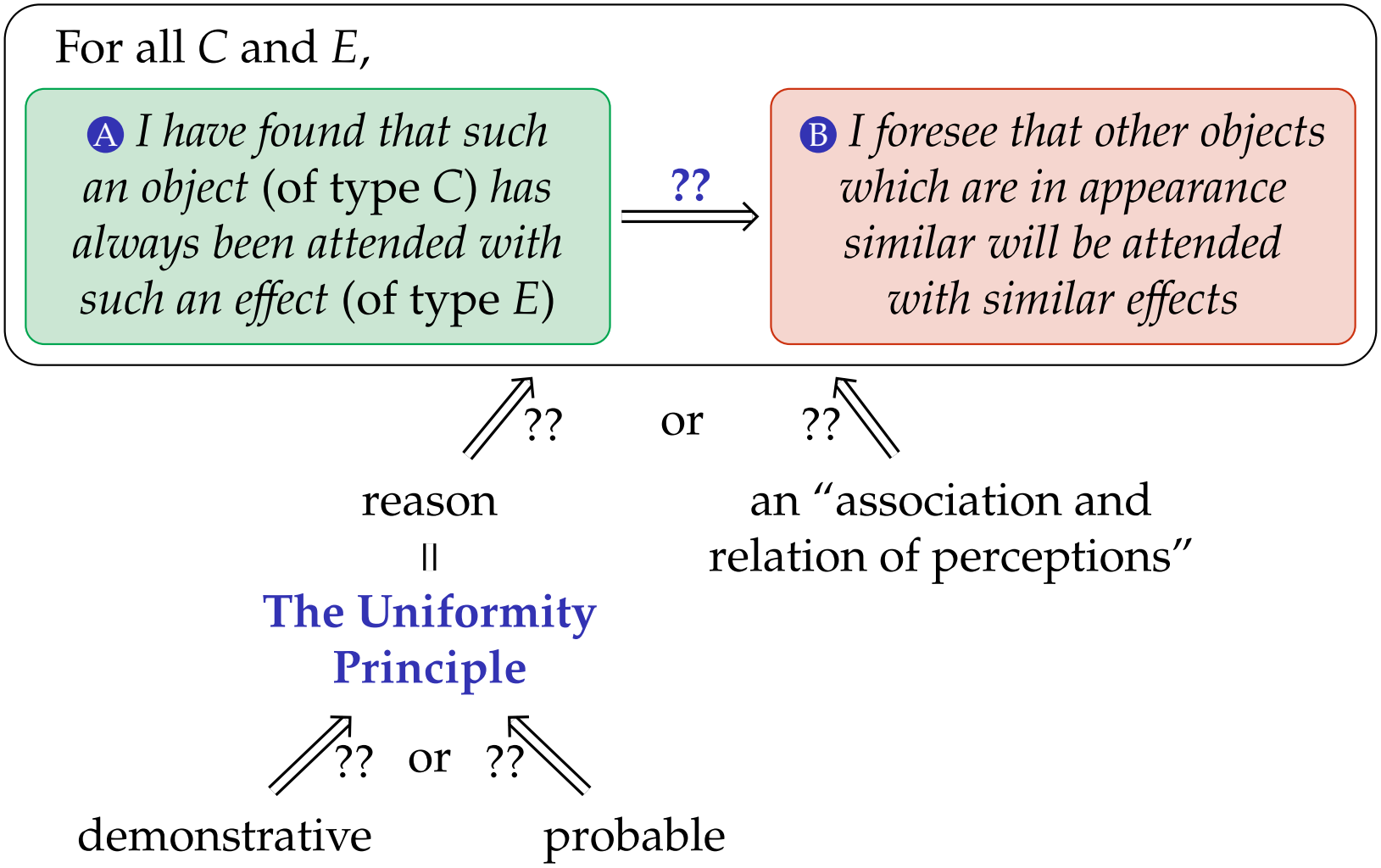
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or
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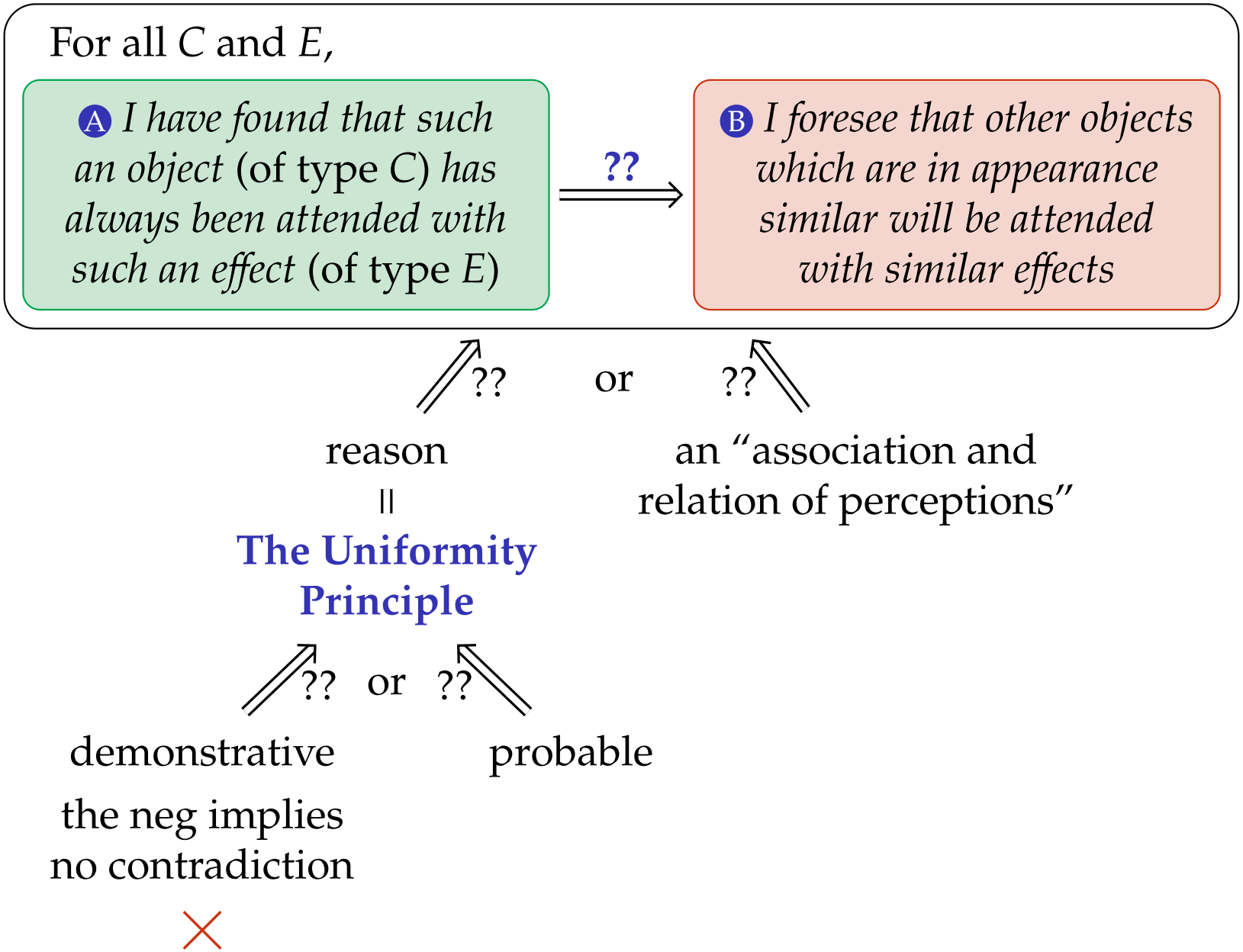
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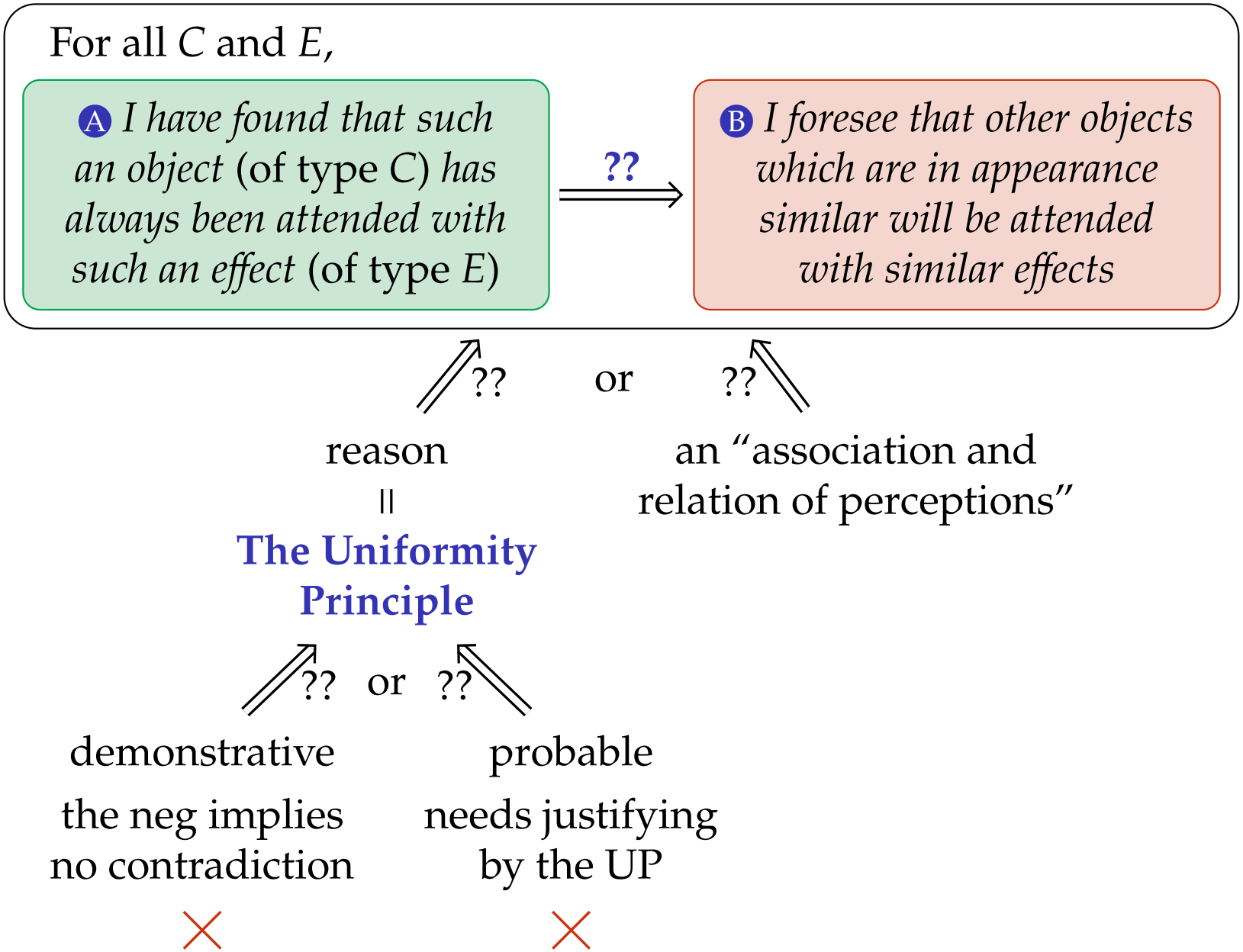
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The Uniformity Principle (UP): *that instances, of which we have had no experience, must resemble those, of which we have had experience, and that the course of nature continues always uniformly the same.*

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Hume's premises and conclusions (as summarized by Henderson):

1. There are only two kinds of arguments: demonstrative and probable
3. A demonstrative argument establishes a conclusion whose negation is a contradiction.
4. The negation of the UP is not a contradiction.
5. Any probable argument for the UP presupposes the UP.
6. An argument for a principle may not presuppose the same principle (non-circularity).

I. There is no demonstrative argument for the UP (by 3 + 4).

II. There is no probable argument for the UP (by 5 + 6).

III. There is no argument for the UP (by 1 + I + II).

- There is no argument for the UP.

(III) There is no argument for the UP.

Let's call the following inference $I$:

$$C_0 \Rightarrow E_0,\ C_1 \Rightarrow E_1,\ \ldots,\ C_n \Rightarrow E_n,\ \textbf{therefore}\ C_{n+1} \Rightarrow E_{n+1}.$$

(2) Inference $I$ presupposes the UP.

(7) If (III), then for any inference that presupposes the UP, there is no chain of reasoning from its premises to its conclusion.

(IV) There is no chain of reasoning from the premises to the conclusion of inference $I$ (by (III) + (2) + (7)).

(III) There is no argument for the UP.

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(IV) There is no chain of reasoning from the premises to the conclusion of inference $I$ (by (III) + (2) + (7)).

Some interpreters think Hume also has:

(8) If (IV) then (V).

(V) Inference $I$ is not justified (by (IV) + (8)).