Rationale is an excellent argument mapping software offered by Critical Thinking Skills BV (https://www.rationaleonline.com)

How to Construct Clear Logical Argument Maps Every Time with Rationale™ Software (Part 1):

*a simple universal foolproof logical template**

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The Rationale® Method Weakness

Rationale argument mapping software is an excellent program. It uses, like many other mapping programs, boxes, lines, colors, and position to visually depict the structure of an argument.

Those elements are combined, following the publisher's prescribed method, based on a specific visual language or visual conventions that attach specific meaning to certain colors, shapes, and positions (e.g., green means a reason and red means an objection).

Unfortunately, the publisher only provides two very rough rules of thumb (heuristics) to help the user correctly structure the content of the premises within the boxes so that an argument is logical.

These two rules of thumb are not based on an underlying theoretical argument model. As a result, even if these rules of thumb are followed, illogical arguments can still be constructed inadvertently.

The two rough heuristics (rules of thumb) for the structure of the Rationale premises to achieve logical structural correctness are called the "Rabbit Rule" and the "Holding Hands Rule" (Rider & Thomason, 2008). (When applied together they form the "No Danglers Rule."
http://austhink.com/reason/tutorials/Tutorial_2/9_No_Danglers/no_danglers.htm).

The vagueness of these two heuristics may partially account for why "Lots" of Argument Mapping Practice (i.e., L.A.M.P.) (Rider & Thomason, 2008) is needed when using these heuristics as guides.
http://www.criticalthinking.eu/images/stories/extra_kd_bestanden/riderthomason_cognitive_pedagical_benefits_of_am_2008.pdf

And it also may account for the documented difficulties students experience in mapping logical structurally correct arguments. (Twardy, 2004)
http://assets.rationale.austhink.com/pdf/TwardyReasonpaper.pdf

The "Rabbit Rule" heuristic states "that any **significant term** or **concept** which appears in the contention must also appear in one of the premises."

http://austhink.com/reason/tutorials/Tutorial_2/6_Rabbit_Rule/rabbit_rule.htm

Figures 6, 7, and 8 are examples used to illustrate its application in the authorized Rationale Method tutorial.

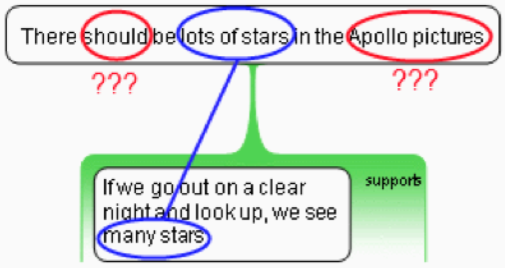


Figure 6

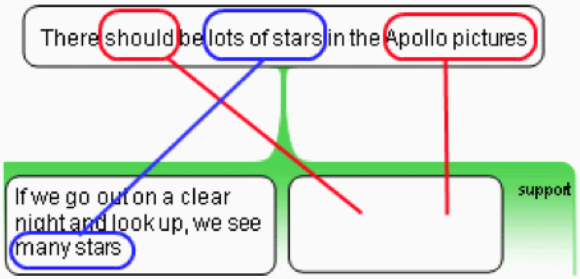


Figure 7

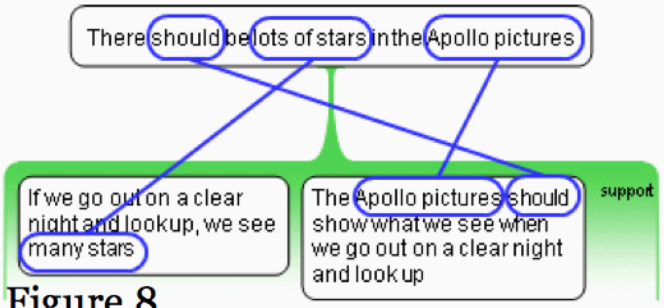


Figure 8

This official tutorial example of the "Rabbit Rule" circles in red and blue those **terms** or **concepts** considered **significant** by the reviewer. This example illustrates one of the weaknesses of that rule. The user must first decide what is meant by the words "**term**" or "**concept**." For example, is the word "**term**" meant to be limited to a single word Aristotelian term as used in deductive logic? And what is a "**concept**"?

Next the user needs to decide whether the **term** or **concept** is "significant." Oddly, for example, the verb "to be" was not considered **significant** in the contention within the example below. Such vagueness within a rule of thumb is a "significant" obstacle to a determination of logical structural correctness.

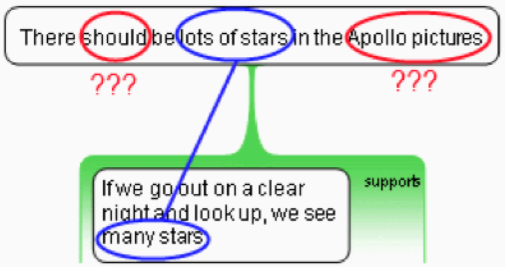


Figure 6

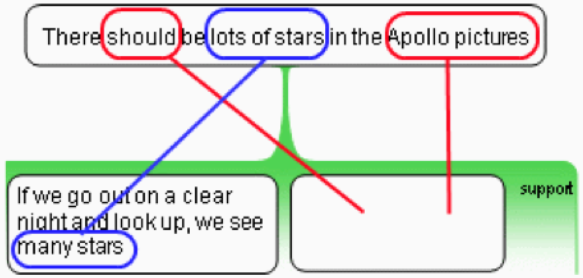


Figure 7

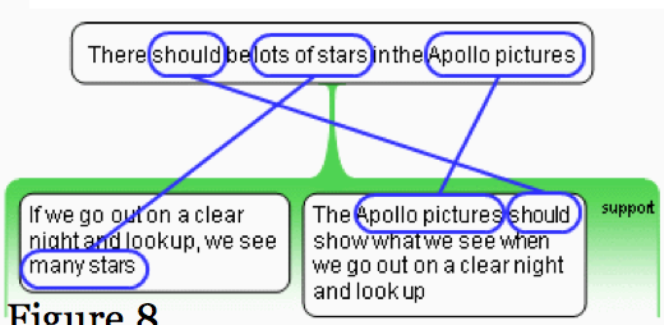


Figure 8

The remaining rough heuristic recommended by the publisher is called the "Holding Hands Rule." It states that every **significant term** or **concept** within one premise that is not contained within the contention must have a match within another premise within the line of reasoning.
http://austhink.com/reason/tutorials/Tutorial_2/8_Holding_Hands/holding_hands.htm.

Figure 10 illustrates its application in the Rationale Method tutorial. Figure 10 treats the "**term**" as single word Aristotelian term. For example, the rule ignores the verbs in this example. Such a limited definition of "terms" limits the applicability of this rule.

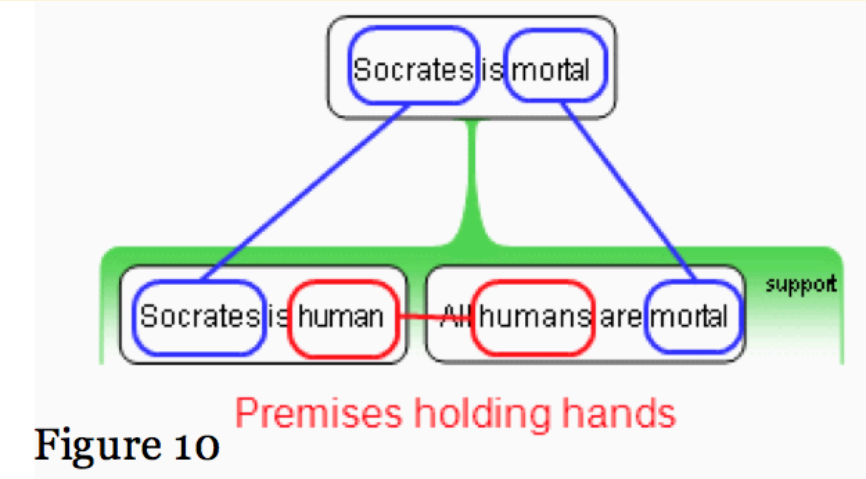
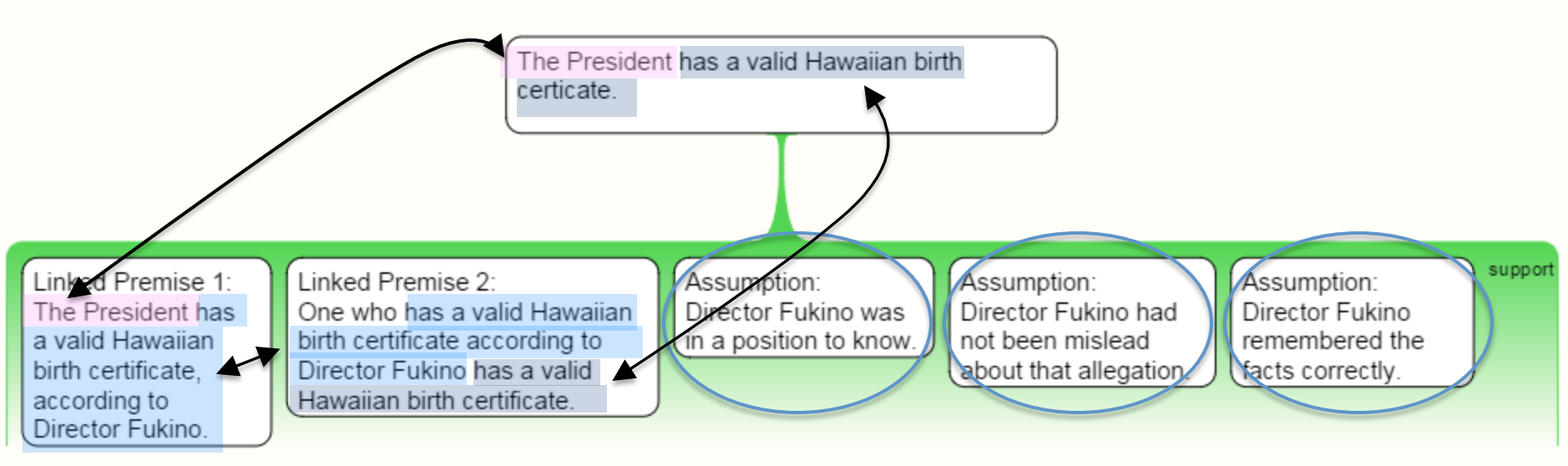


Figure 10

Besides such vagueness, the two heuristics do not account for the difference between linked premises and supporting assumptions. While the heuristics have some limited applicability for linked premises (see the three double arrows), they have no application whatsoever for supporting assumptions which are also contained within the green box following the publisher's visual conventions. The user needs to know how to distinguish between linked premises and supporting assumptions so that these heuristics are not misapplied.



While these two heuristics are a step in the right direction to guide students, they don't go far enough in defining the premise structure. They still permit creating faulty argument. More precise and rigorous scaffolding of the premise content solves the Rationale Method structural vagueness. With the application of the Logic-Bridge* scaffolding described in this presentation, Rationale can be transformed into a precise and rigorous tool that always produces a clear and logical argument regardless of the type of inference or subject matter domain.

So just for a little while, please set aside for the moment any familiarity that you have with Rationale and logic and bring your beginner's mind.

(Note: Even the typical visual language or conventions of Rationale are adjusted to be more effective.)

*The Logic-Bridge (aka Defeasible Class-Inclusion Transitivity – DCIT) argument structure is discussed in the following peer-reviewed Oxford Journal articles:

http://lpr.oxfordjournals.org/cgi/reprint/mgs005?ijkey=BdvkTIOCaGhMjG2&keytype=ref

http://logcom.oxfordjournals.org/cgi/reprint/exp066?ijkey=NBFhGLqyDdPMcnX&keytype=ref

Logic-Bridge Argument Terminology

*Toulmin, S. The Uses of Argument. (1958). Updated ed. Cambridge: Cambridge UP, 2003.

There are actually very few words (terms) that need to be mentioned first when beginning to discuss guaranteed practical logical reasoning with Rationale software:

CONTENTION: A contention is the statement that you want the audience to accept as true. Sometimes it is called a claim, conclusion, or thesis. It's the perspective of reality that you want to prove to an audience is a "fact." For example:
"Henry is a British subject."*

REASON: A reason is the structure (inferential network) of connected sentences (linked premises and supporting assumptions) that is intended to persuade the audience to accept that the contention is true with some degree of certainty or probability. For example consider the following two linked premises:
"Henry was born in Bermuda." "Anyone born in Bermuda is a British subject."

PREMISE: A premise is a sentence that when joined back to front to other sentences form a transitive line of reasoning for the contention.

ASSUMPTION: An assumption is a sentence that provides support (necessary or ancillary) to a premise. It describes a state of affairs that can increase the probability of the truth of the premise.

ARGUMENT: An argument is the combination of the contention and the reason.

An Argument Structure Metaphor

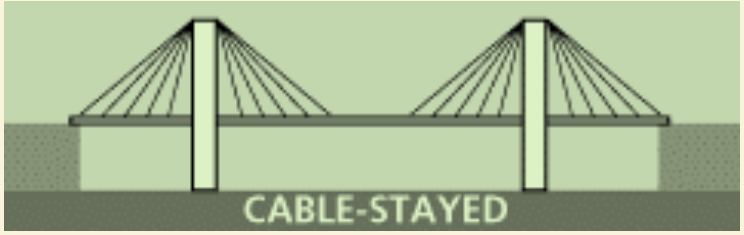
A "good" argument depends on the believability of it premises and a structurally correct logical form.

The degree to which the audience accepts your contention (e.g., conclusion, claim, or thesis) as true or as a fact—such as "it's possibly true; it's probably true; it's certain"—largely depends on the audience's opinion of the strength (e.g., goodness, quality, or probative weight) of the reasoning that leads to that contention.

That reasoning strength, like the strength of a *bridge,* depends largely on two primary characteristics:

1. The degree to which the sentences (premises) that comprise the line of reasoning are subjectively perceived to be true or a fact.

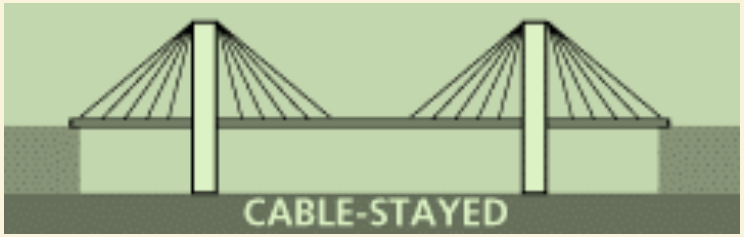
2. Whether the audience perceives the structure (e.g., form or pattern) of the argument to be logical (structurally correct) (e.g. yes or no).



The logic of reasoning depends on the correctness of the underlying structural form of its sentences (premises and conclusion).

To guarantee that an argument is logical, the meaning of the sentences (**premises and assumptions**) that together form the line of reasoning and that of the **contention** being asserted (conclusion, claim, or thesis) must be capable of being expressed or regimented into words that can combine together into a standardized defined **structure**, form, or pattern (e.g., deductive, inductive, abductive, or other argument scheme).

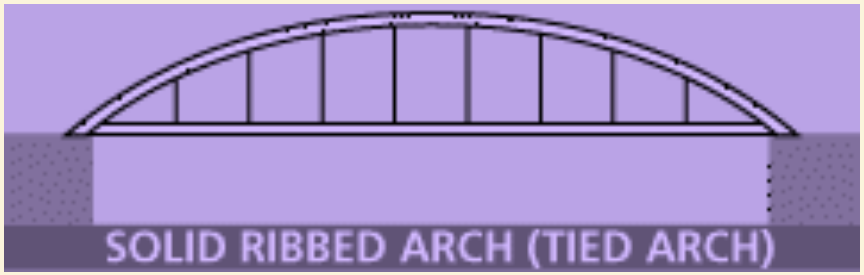
And just like for any bridge that holds together, there are different strictly defined structurally correct designs required for arguments to hold together (i.e., to be logical).

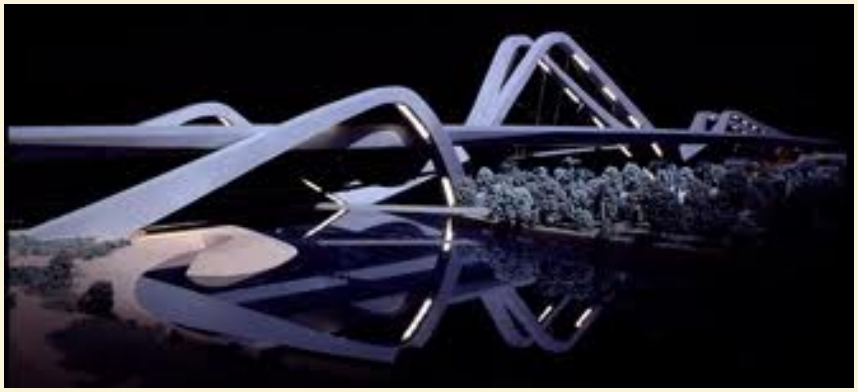


The underlying structure of a good line of reasoning may not always be readily apparent.

Just as the necessary structurally correct design of a sound bridge may not always be readily apparent to the observer, the underlying logical structure of a good line of reasoning may not always be readily apparent in the arrangement of its sentences and words as first presented.

But unlike a bridge, it is essential that the logical structure of the argument be made self-evident to the audience for them to be persuaded.





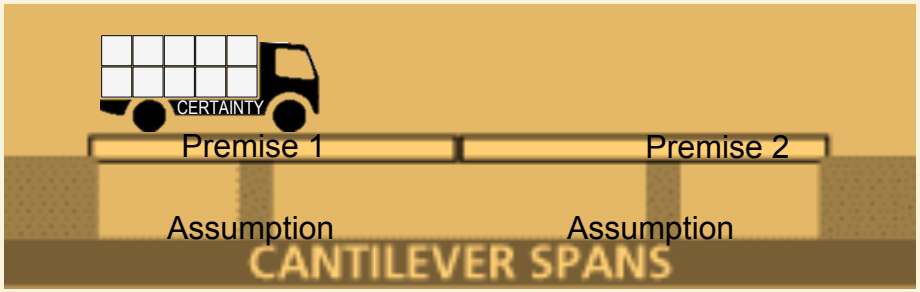
Infinity Loop Bridge, Zhuhai, China

Infinity Loop Bridge, Zhuhai, China

LOGICAL STRUCTURE OBSCURED

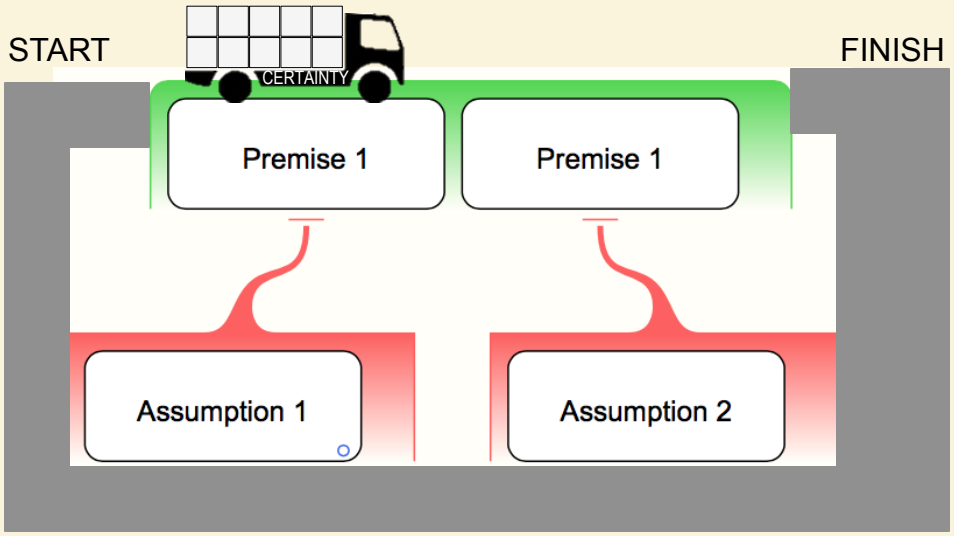
The Logic-Bridge Design

*The formal name of this universal logical form is Defeasible Class-Inclusion Transitivity (DCIT, dee•kit).[1]



There is an all-purpose argument structure called the Logic-Bridge.* The design is universal, rigorous, robust, and foolproof. And only logical arguments can fit within it.

Any type of logical argument (e.g., deductive, inductive, abductive, or other argument schemes) can be built using the identical Logic-Bridge argument structure.



Metaphorically, it resembles a cantilever style bridge. Each horizontal *span* represents each of the two or more sentences (premises) that link together to form the logical line of reasoning that leads to the conclusion. (Any number of spans is possible.)

And the vertical *piers* beneath each *span* represent the supporting assumptions for each linked premise in the line of reasoning.

*Phillips S, Wilson WH, Halford GS (2009) What do Transitive Inference and Class Inclusion have in common? Categorical (co)products and cognitive development. PLoS Comput Biol 5: e1000599.

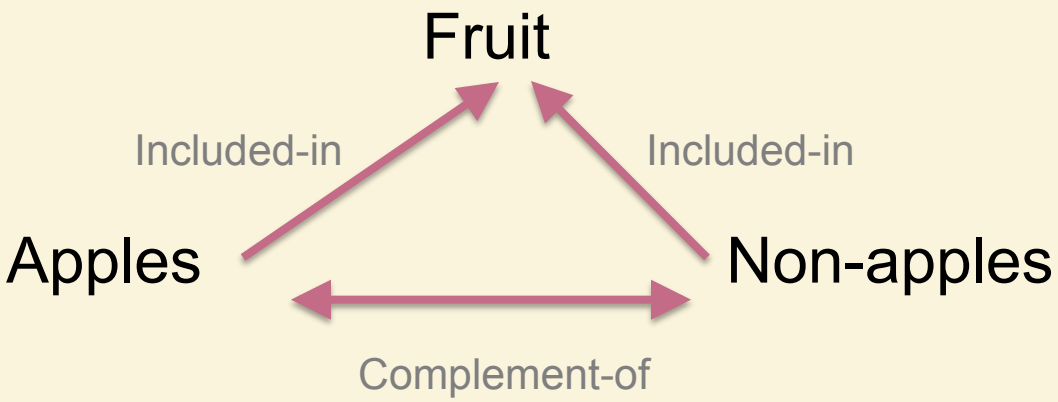
The Logic-Bridge relies on two inferential abilities for its reasoning power:

> "Children acquire various reasoning skills over remarkably similar periods of development. [1] **Transitive Inference** and [2] **Class Inclusion** are two behaviours among a suite of inferential abilities that have strikingly similar developmental profiles—all are acquired around the age of five years.*

*Phillips S, Wilson WH, Halford GS (2009) What do Transitive Inference and Class Inclusion have in common? Categorical (co)products and cognitive development. PLoS Comput Biol 5: e1000599.

The first inferential ability is Class Inclusion:

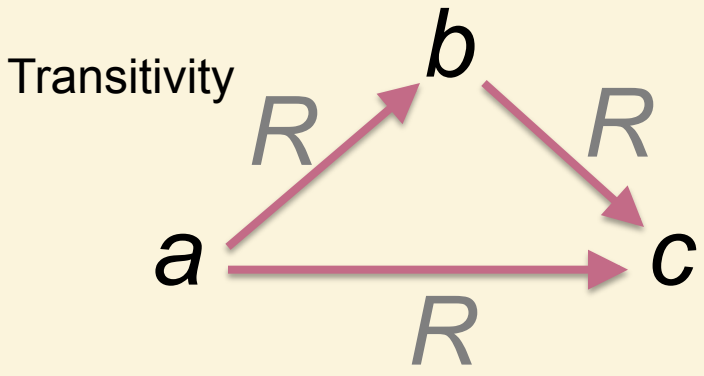
> Older children also understand that a grocery store will contain more fruit than apples. That is, the number of items belonging to the superclass is greater than the number of items in any one of its subclasses. This form of reasoning is called **Class Inclusion.***



*Phillips S, Wilson WH, Halford GS (2009) What do Transitive Inference and Class Inclusion have in common? Categorical (co)products and cognitive development. PLoS Comput Biol 5: e1000599.

The second inferential ability is Transitivity:

> A transitive inference has the general form that given *aRb* and *bRc*, then one can infer *aRc*, where R is some binary relation that has the transitivity property.
>
> For example, older children can infer that if *John is taller than Mary*, and *Mary is taller than Sue*, then *John is taller than Sue*. This form of reasoning is called Transitive Inference.*



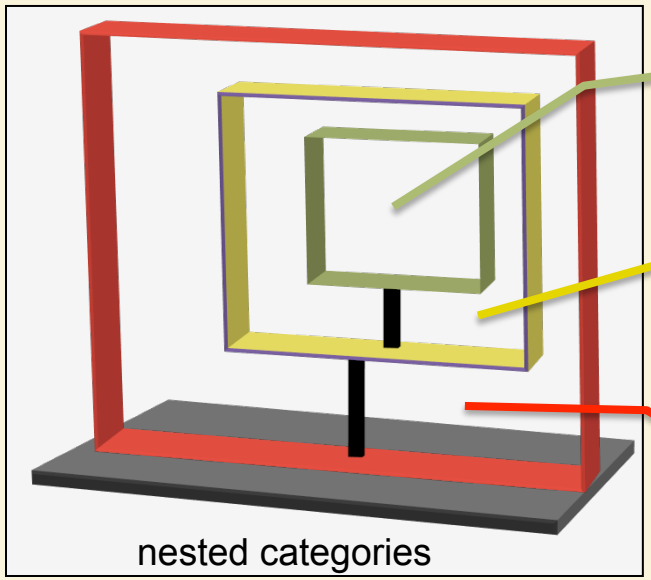
Walton, Douglas, Defeasible Reasoning and Informal Fallacies (March 3, 2011).
Available at SSRN: http://ssrn.com/abstract=1775825 or http://dx.doi.org/10.2139/ssrn.1775825

Finally the Logic-Bridge structure accounts for the Defeasible nature of many arguments:

> "a claim being at first acceptable because it is supported by reasoning, but that is later defeated because circumstances are present that bring the case under an exception.

"Claims can usually be challenged or opposed in two ways. First, by a denial of the facts upon which they are based and secondly by something quite different, namely a plea that although all the circumstances on which a claim could succeed are present, yet in the particular case, the claim ... should not succeed because other circumstances are present which brings the case under some recognized head of exception, the effect of which is either to defeat the claim ... altogether, or to "reduce" it ...' (1951, 147-148).

Judging from this quotation, it would appear that Hart had the idea of a claim being at first acceptable because it is supported by reasoning, but that is later defeated because circumstances are present that bring the case under an exception. Thus we recognize the idea of a defeasible argument, of a kind so common in law."*



The President **A**

has a valid Hawaiian birth certificate **B**

was born in Hawaii **C**

SUBJECT COLUMN	PREDICATE COLUMN
1 The President...	...has a valid Hawaiian birth certificate.
2 One who has a valid Hawaiian birth certificate...	...was born in Hawaii.
Therefore, CONCLUSION	
The President...	...was born in Hawaii.

The Defeasible Class-Inclusion Transitivity structure (Logic-Bridge) is illustrated with categorical diagrams as follows:

A belongs to (fits within) category **B**.

B belongs to (fits within) category **C**.

Therefore (through transitivity)...

A belongs to (fits within) category **C**.

The Four Design Requirements for the Logic-Bridge Structure

(Don't worry. It is much easier than it sounds at first glance...really!)

1. Premise Structure: Each individual sentence of the argument is regimented into a categorical form consisting of a Subject (phrase) and Predicate (phrase).

2. Start and Finish: The Subject phrase of the first linked premise must be the Subject phrase of the main conclusion and the Predicate phrase of the last linked premise in the line of reasoning must be the Predicate phrase of the main conclusion.

3. Transitive Linkage: The remaining Predicate phrases of each linked premise must be the Subject phrase of the following linked premise prefaced by a universal quantifier [e.g., One, (Any, All, etc. [*like the First Subject*]) who (or that)] creating a transitively-linked chain of premises back-to-front in that distinct order.

4. Assumption Support: For each linked premise, any associated supporting assumptions that provide some degree of support (necessary or ancillary) to the truth of the linked premise are appropriately added.

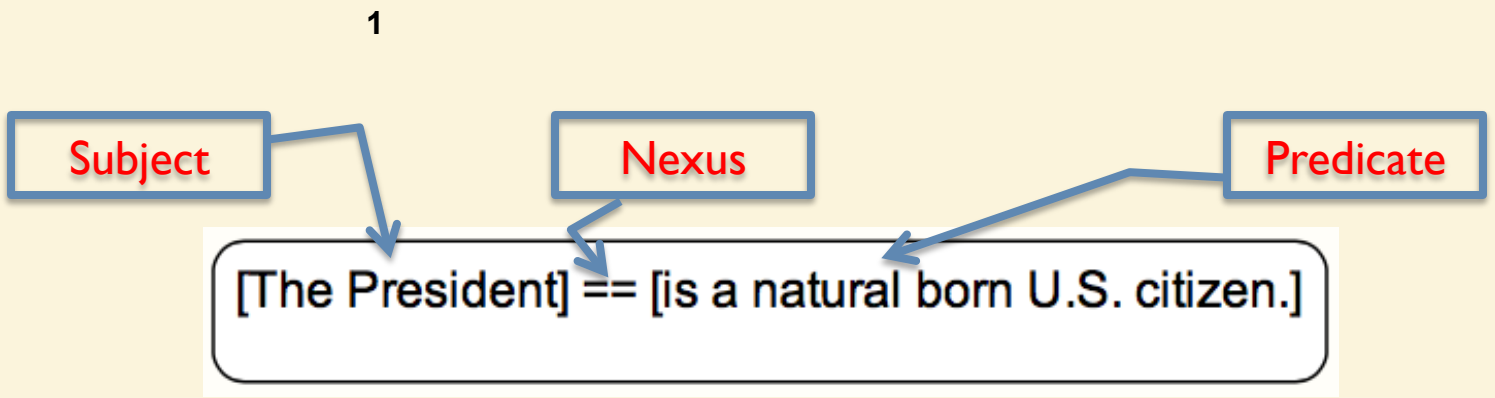
1. Premise Structure

**nexus of predication*

Each sentence (i.e., premise or assumption) of the Logic-Bridge line of reasoning is structured or regimented into a categorical sentence consisting of three parts:

1. SUBJECT [phrase] of the sentence;
2. PREDICATE [phrase] of the same sentence; and,
3. NEXUS* that joins them.
   (This is the unseen intangible space where the subject and the predicate of the sentence meet together.)

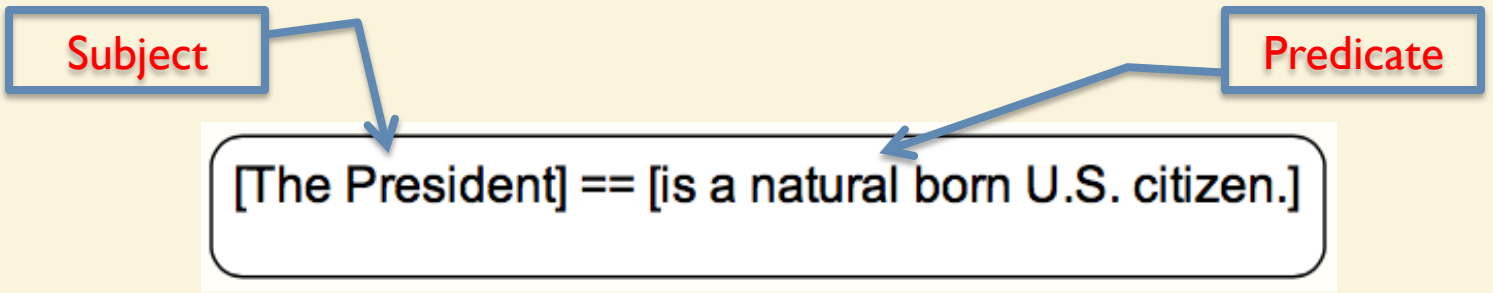
While it sometimes takes a little extra work, any sentence can be structured or regimented into this "categorical" form.



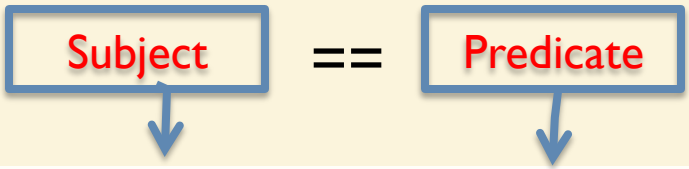
** Any sentence can be structured in this categorical form.*[1]

"The SUBJECT is a noun [phrase].
That's a person, place or thing.
It's who or what the sentence is about.
And the PREDICATE is the verb [phrase].
That's the action word.
That gets the subject up and out."

The Tale of Mr. Morton
Schoolhouse Rock



These are examples of parsing or regimenting sentences into their SUBJECT [phrase] and PREDICATE [phrase] halves.



[The President] == [is a natural born U.S. citizen.]

The President is a natural born U.S. citizen.

[The newspaper] == [published a false birth announcement.]

The newspaper published a false birth announcement.

[The Governor] == [had personal knowledge of the birth.]

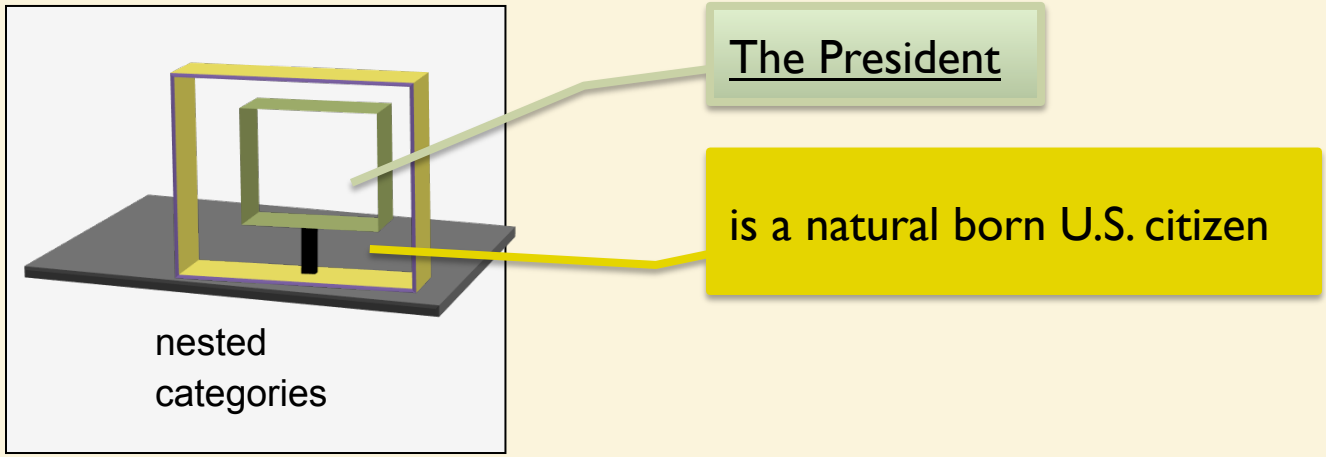
The Governor had personal knowledge of the birth

[The birth certificate] == [was authentic.]

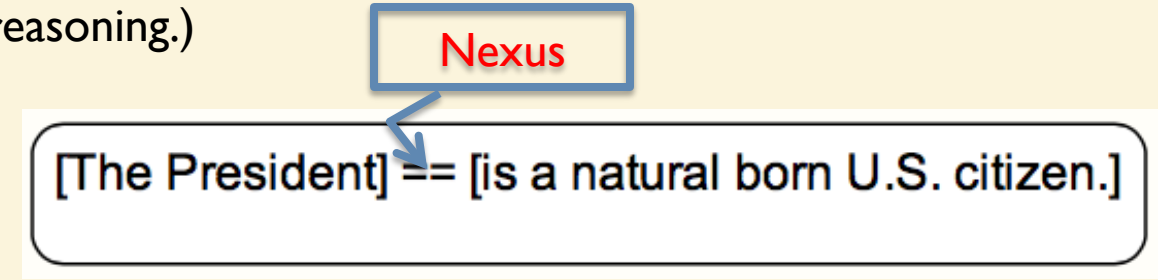
The birth certificate was authentic.

[The Constitutional requirement] == [was fulfilled.]

The Constitutional requirement was fulfilled.

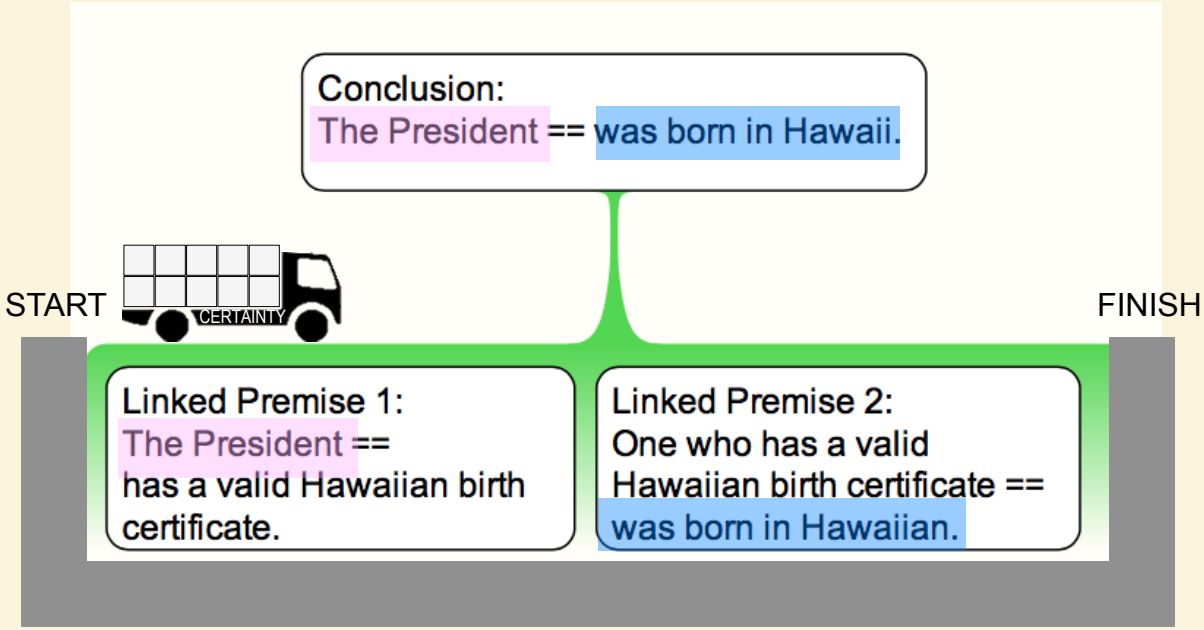


The NEXUS (==) between the SUBJECT and PREDICATE of the sentence represents the categorical or membership relationship between the two parts of the sentence. (The smaller green rectangle belongs within (is a member of) the larger yellow rectangle category." So such a sentence is really an assertion that the subject category ("The President") belongs to or is a member of the predicate category ("is a natural born U.S. citizen"). Since membership is a transitive quality, the category "The President" would belong to any larger nested categories as well. (Note the category includes the entire phrase unlike deductive reasoning.)



2. Start and Finish

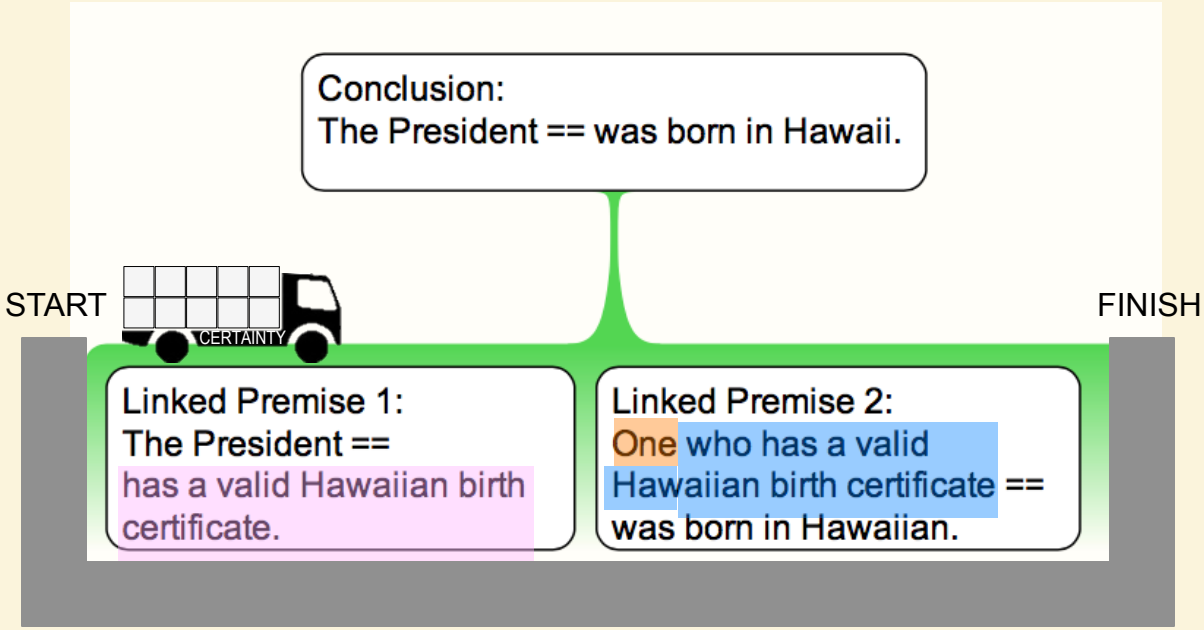
The Logic-Bridge requires that the SUBJECT of the first premise and the PREDICATE of the last premise in the line of reasoning form the CONTENTION (claim or thesis). This pattern creates the START and FINISH for the line of reasoning. Additional premises if needed must fit between these end caps.



3. Transitive Linkage

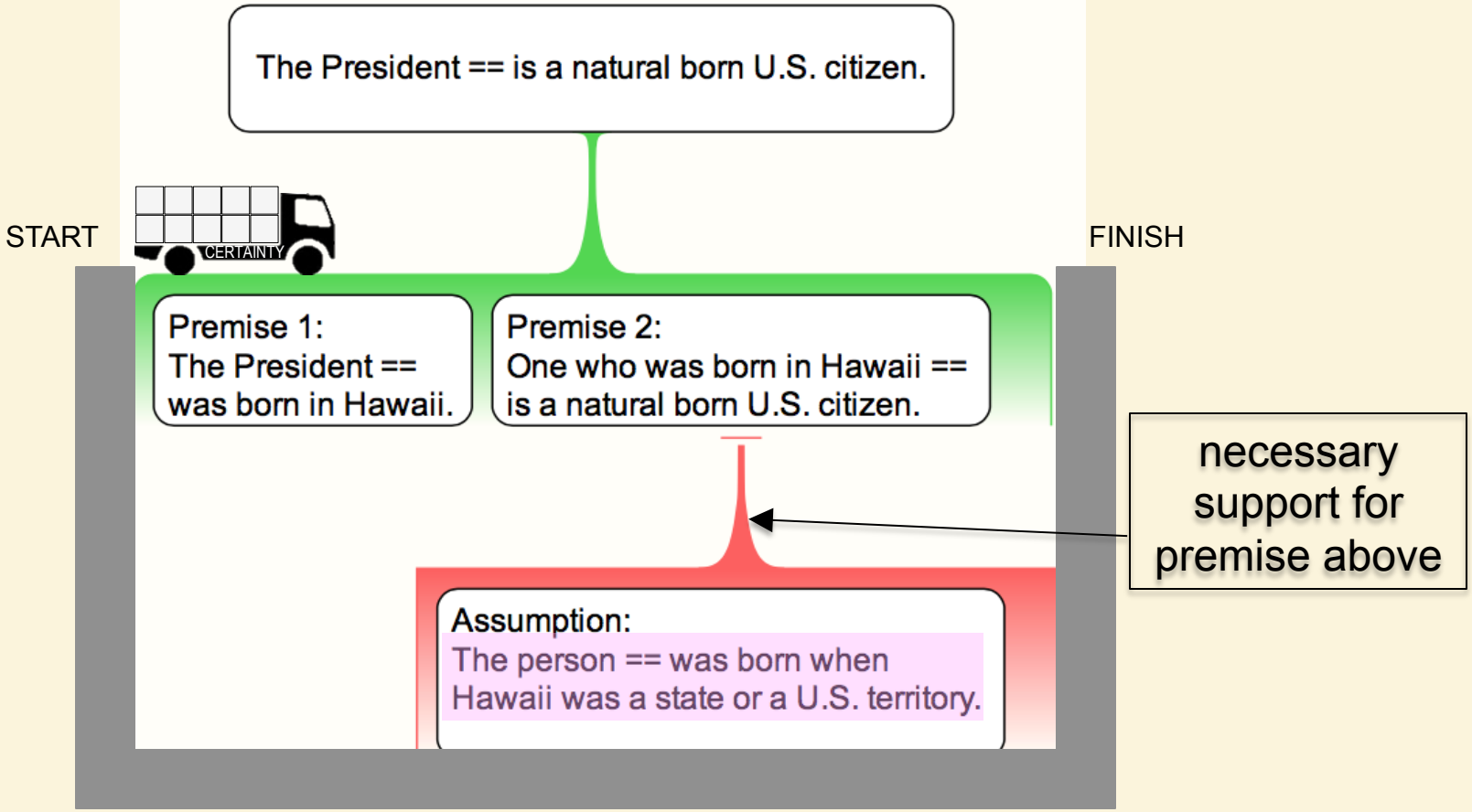
The premises of the Logic-Bridge line of reasoning are arranged in a specific order by linking each other back-to-front creating a transitive relationship.

This linkage is created by the PREDICATE of one premise matching the SUBJECT of the next premise in the line of reasoning with the addition of a universal quantifier in front of the SUBJECT [e.g., One (Any, All) who (that)].

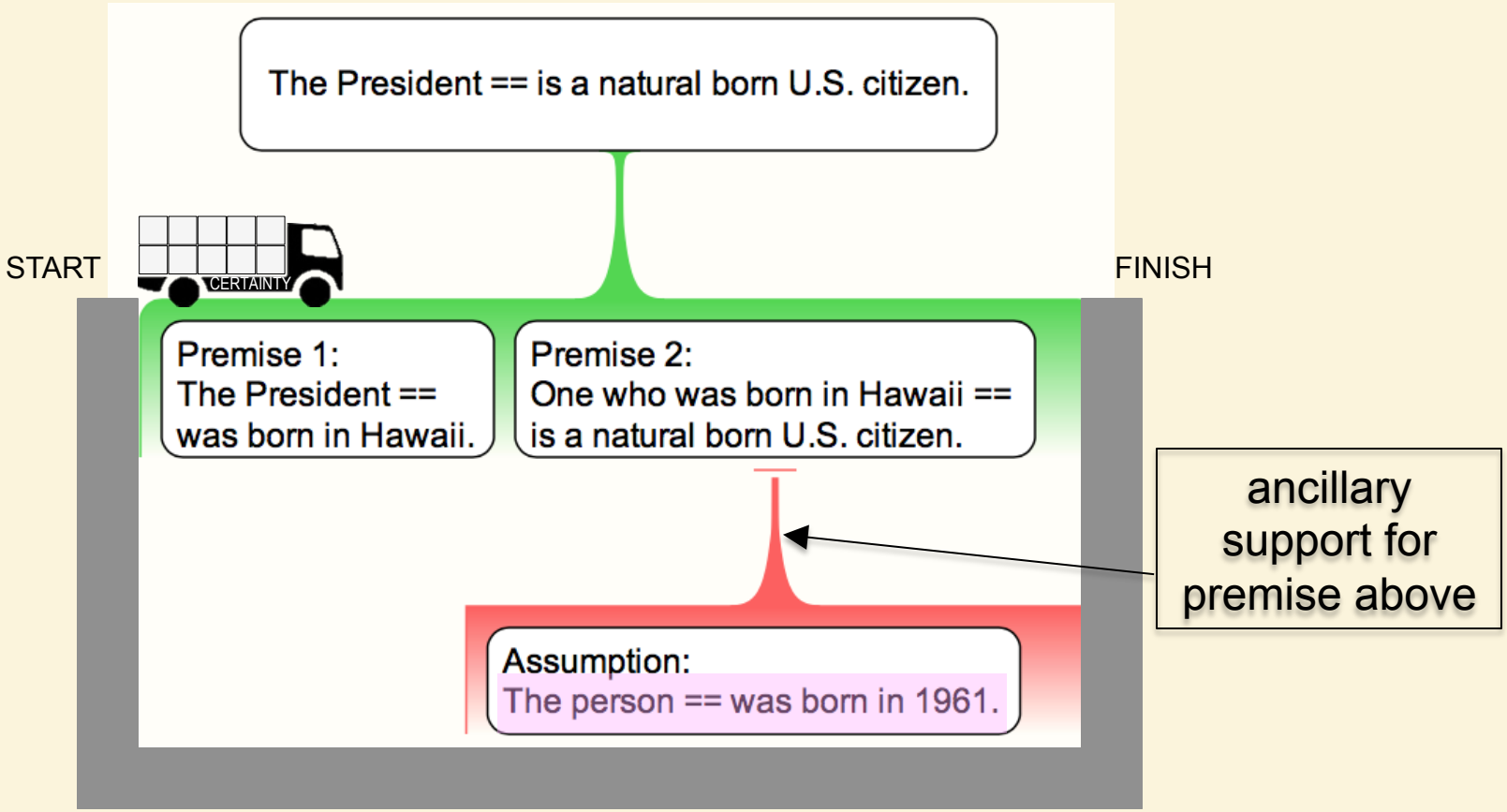


4. Assumption Support

An ASSUMPTION (in the red box) provides **necessary** (but not necessarily sufficient) or **ancillary** support to the premise it supports. It describes a state of affairs alleged as fact that supports the truth of the premise. So the subjective level of certainty of the truth of a premise can be impacted by the level of certainty of any of its assumptions. The assumption below is **necessary** (but not sufficient) for Premise 2 to be true. (Note red does not indicate an objection.)

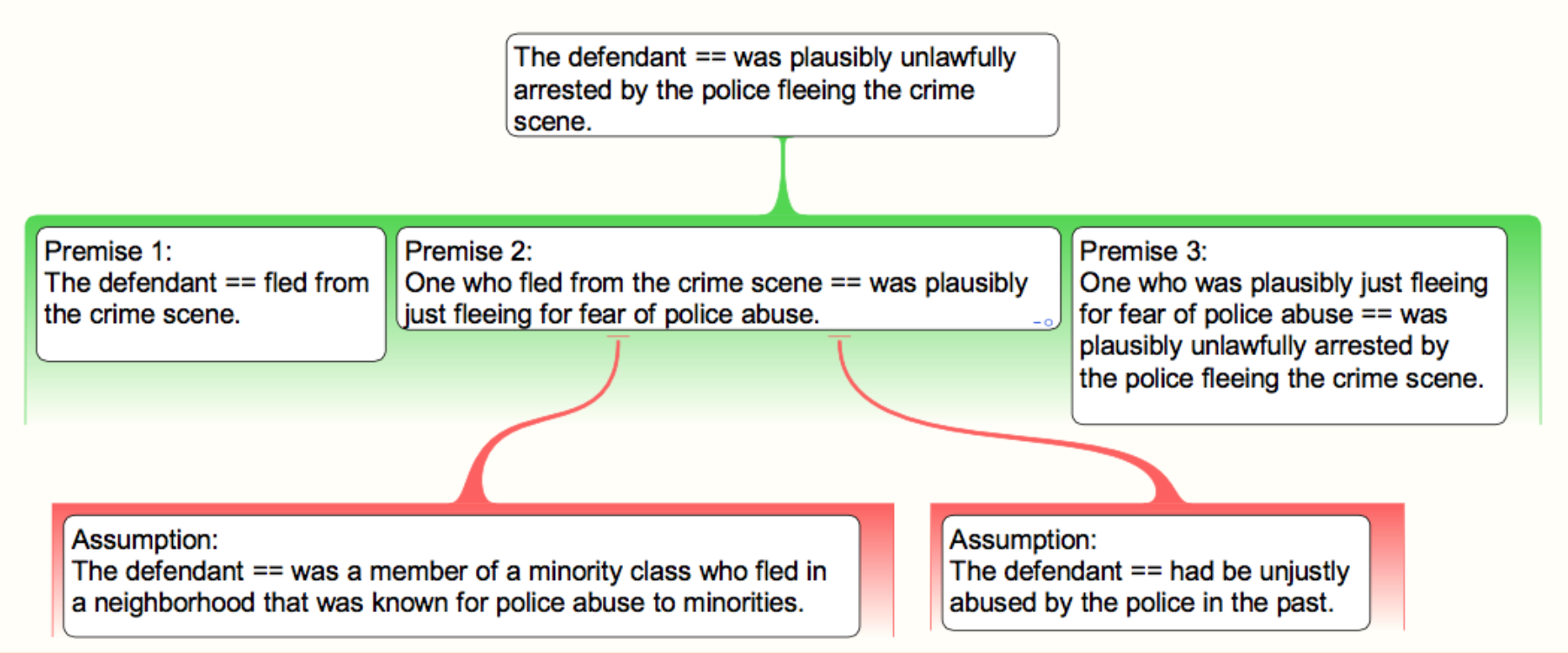


The ASSUMPTION below provides **ancillary** (helpful) support for Premise 2 to be true. From the information provided by this assumption, the audience knows that at least the objection regarding the timing of statehood of Hawaii is not an issue. In this manner, assumptions can be regard as anticipatory responses to possible objections.



The following example illustrates two ancillary ASSUMPTIONS.

"Among some citizens, particularly minorities and those residing in high crime areas, there is also the possibility that the fleeing person is entirely innocent, but, with or without justification, believes that contact with the police can itself be dangerous, apart from any criminal activity associated with the officer's sudden presence." *Illinois v. Wardlow*, 528 U.S. 119 (2000).



Wardlow illustrates that the choice and degree of acceptability of premises and assumptions can be dependent on the worldview of the audience. For example:

"(i) the warranting generalization may be *indeterminate* with respect to:
(a) frequency or universality (all/ most/ some); (b) level of abstraction; (c) defeasibility (exceptions, qualifications); (d) precision or "fuzziness"; (e) empirical base/confidence (accepted by scientific community; part of everyday firsthand or vicarious experience; speculative etc.);
(ii) it may be unclear as to identity (which generalization –there may be rival generalizations available to each side in a dialogue) or source (whose generalization *[e.g., power-over issues]*- male/female experience in a domestic violence case;
(iii) there may not in fact be a "cognitive consensus" on the matter, especially in a plural society;
(iv) value judgments (including prejudices, racist or gender stereotypes) may be masquerading as empirical propositions;
(v) when articulated, a generalization may be expressed in value laden language or in loaded categories." (Twining, 1999) (bracketed material inserted)

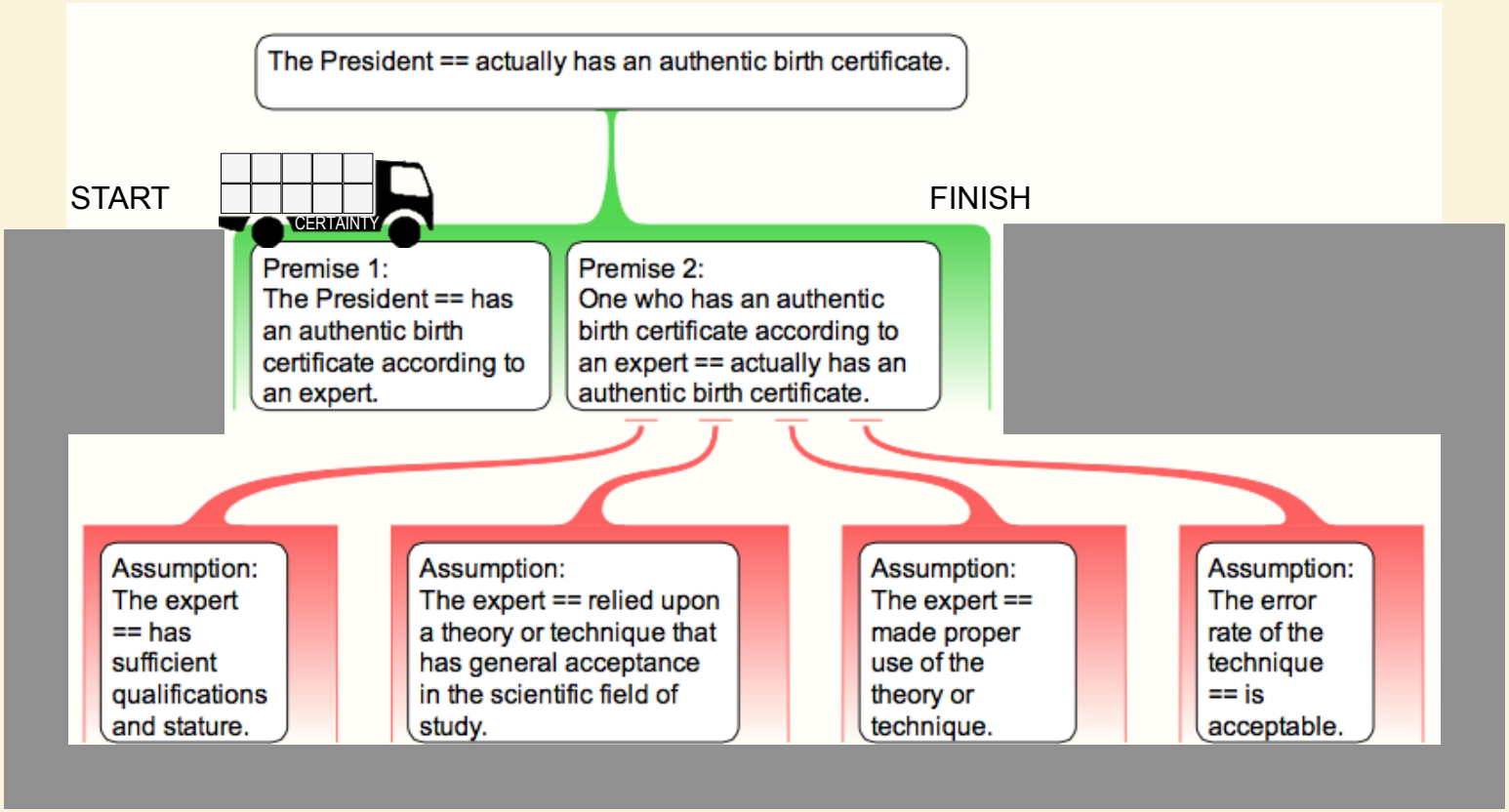
Thus, the use of generalizing in logical reasoning is "necessary, but dangerous" (Twining, 1999).

The choice of the appropriate generalization is also dangerous when the chooser lacks sufficient imagination to consider all the possible generalizations that might apply since the most appropriate one may be missed.

4. Assumption Sets

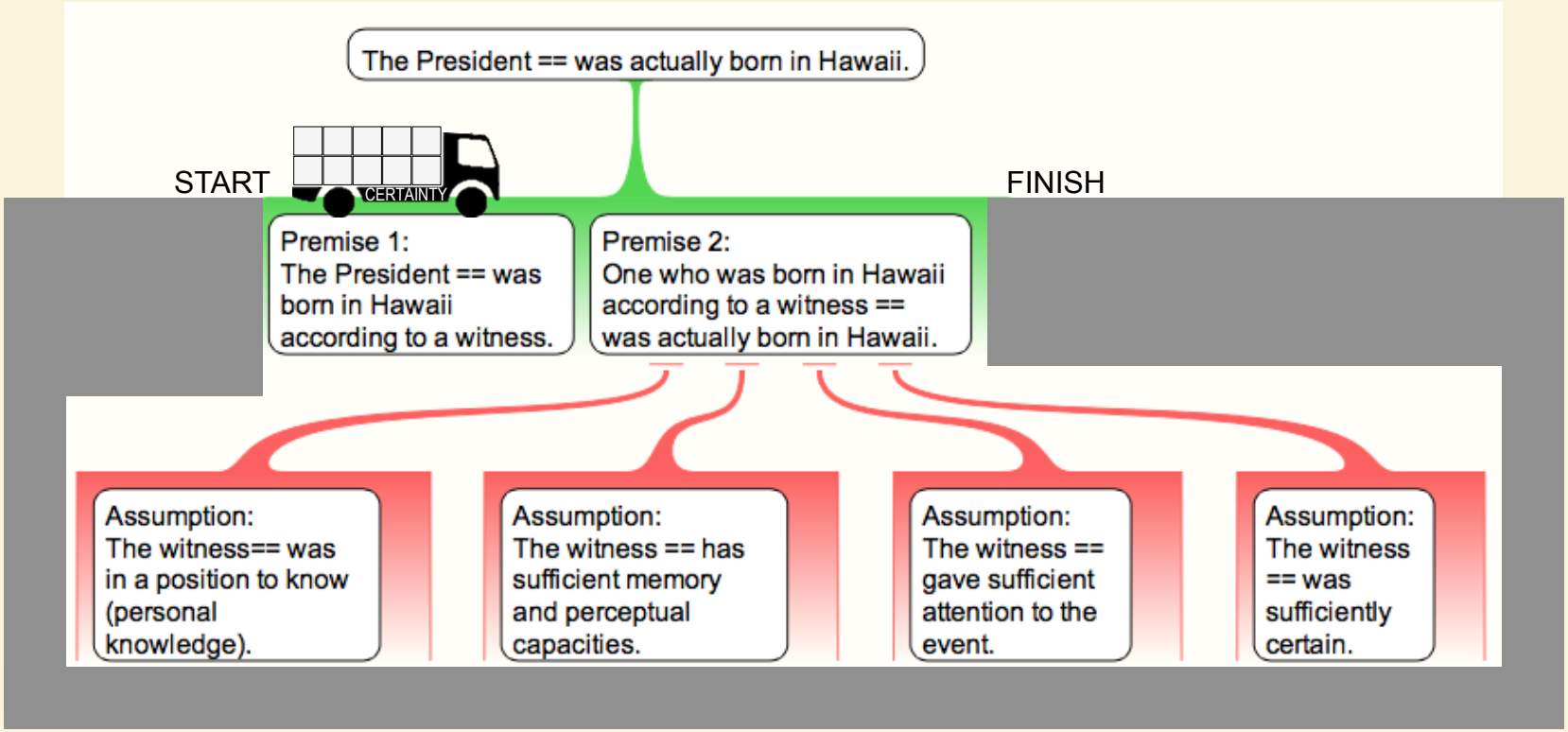
ASSUMPTIONS can also come in sets that can accompany certain types of reasoning (inference steps) such as ones that depend upon RELIABILITY OF A SOURCE, ANALOGY, and SAMPLE GENERALIZING.

Below is an example of four typical assumptions that accompany the circumstance when the RELIABILITY OF A SOURCE concerns an EXPERT.



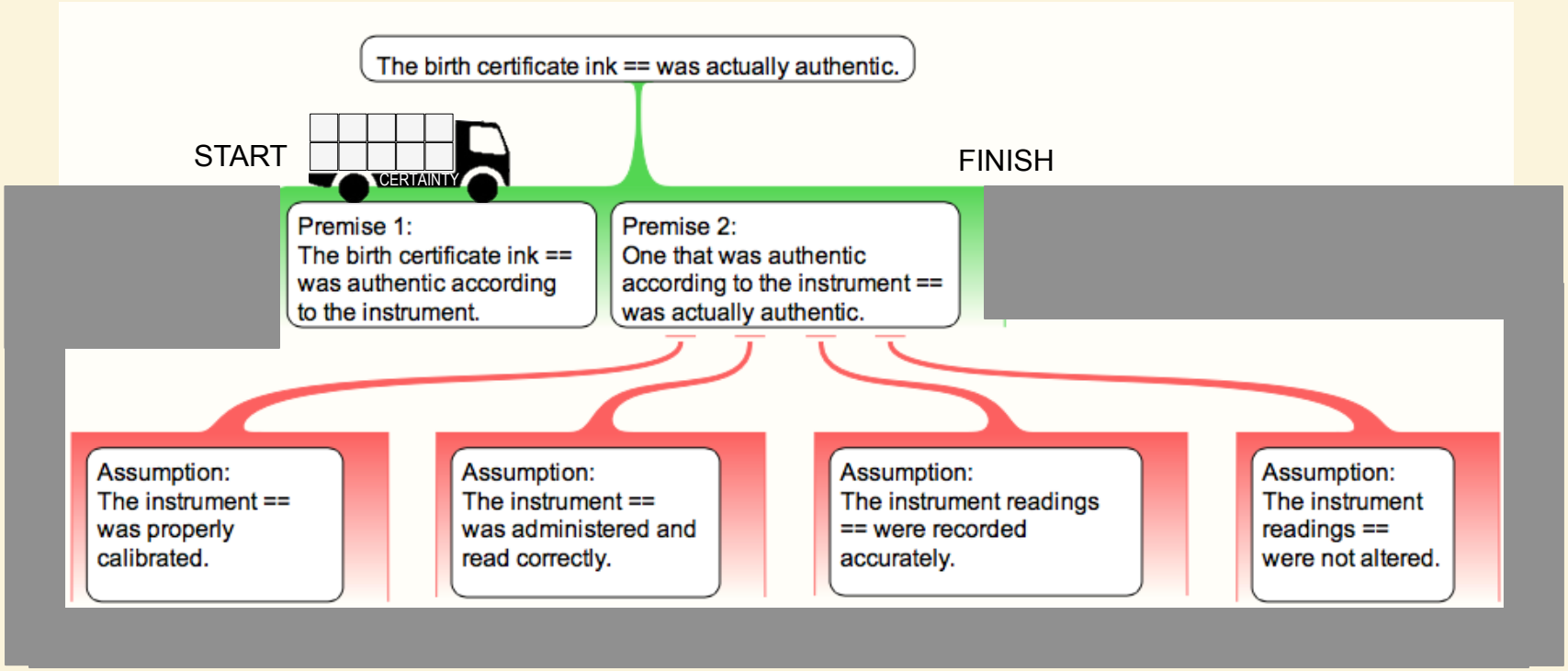
ASSUMPTIONS can also come in sets that can accompany certain types of reasoning (inference steps) such as ones that depend upon RELIABILITY OF A SOURCE, ANALOGY, and SAMPLE GENERALIZING.

Below is an example of four typical assumptions that accompany the circumstance when the RELIABILITY OF A SOURCE concerns a WITNESS.



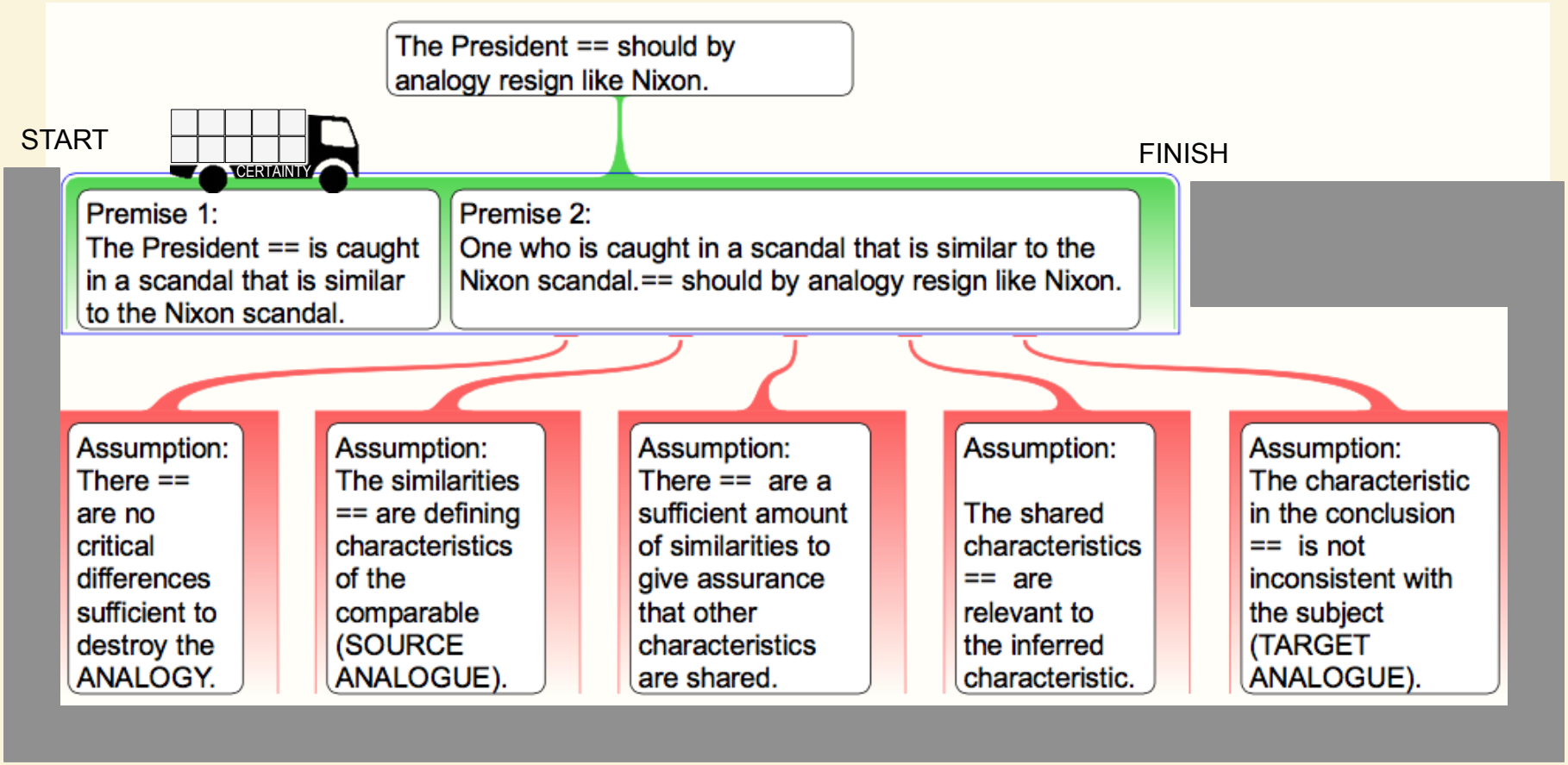
ASSUMPTIONS can also come in sets that can accompany certain types of reasoning (inference steps) such as ones that depend upon RELIABILITY OF A SOURCE, ANALOGY, and SAMPLE GENERALIZING.

Below is an example of four typical assumptions that accompany the circumstance when the RELIABILITY OF A SOURCE concerns a measuring INSTRUMENT.



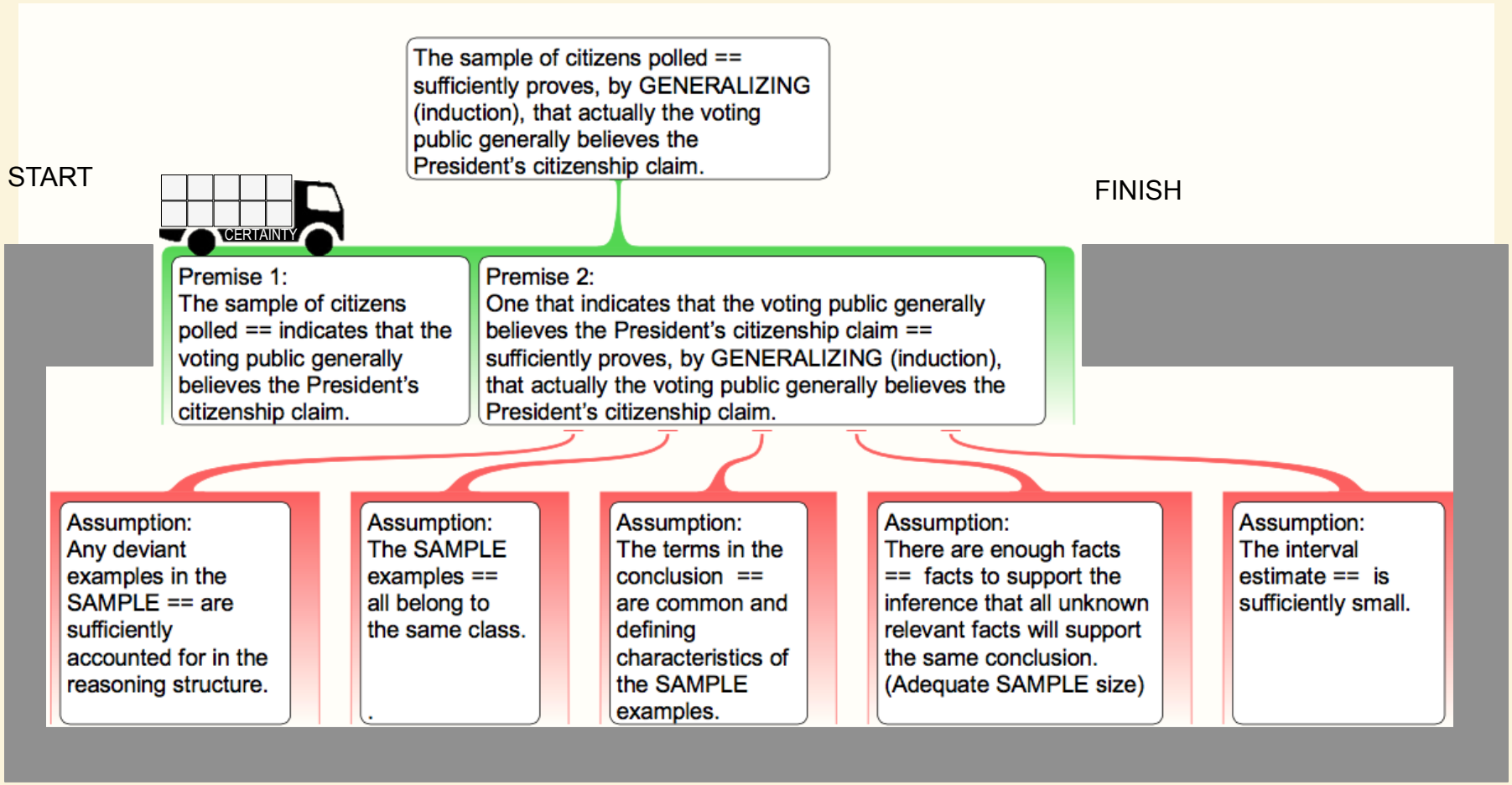
ASSUMPTIONS can also come in sets that can accompany certain types of reasoning (inference steps) such as ones that depend upon RELIABILITY OF A SOURCE, ANALOGY, and SAMPLE GENERALIZING.

Below is an example of five typical assumptions that accompany an ANALOGY reasoning line.



ASSUMPTIONS can also come in sets that can accompany certain types of reasoning (inference steps) such as ones that depend upon RELIABILITY OF A SOURCE, ANALOGY, and SAMPLE GENERALIZING.

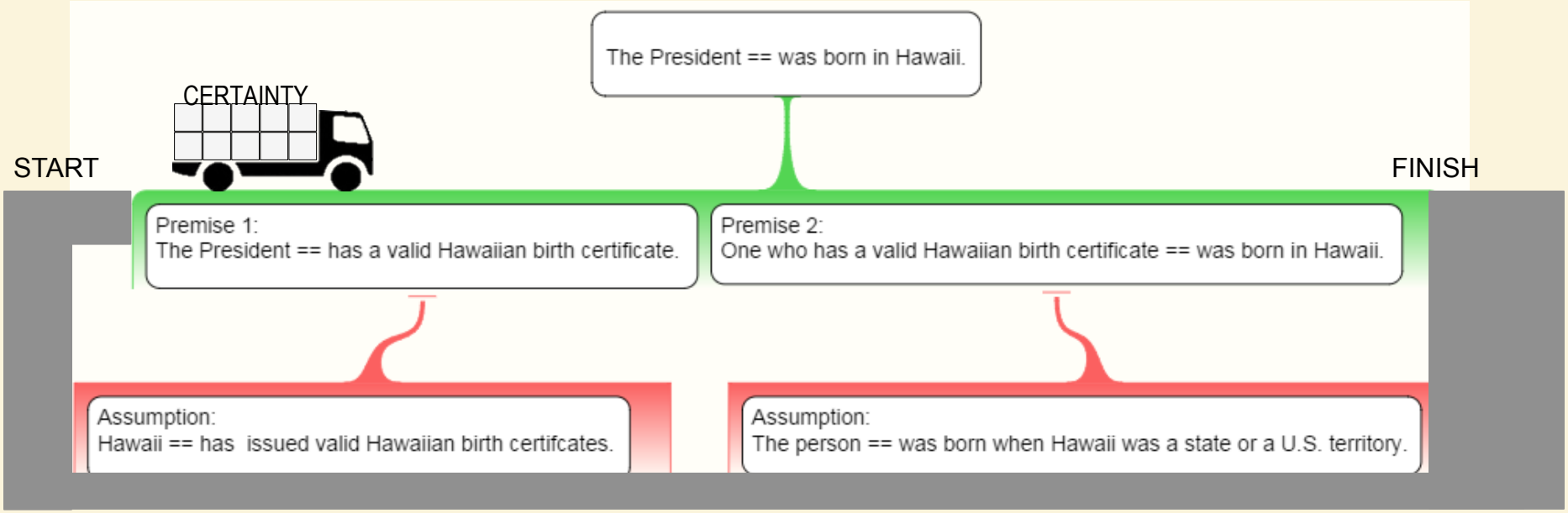
Below is an example of five typical assumptions that accompany a SAMPLE GENERALIZING reasoning line.



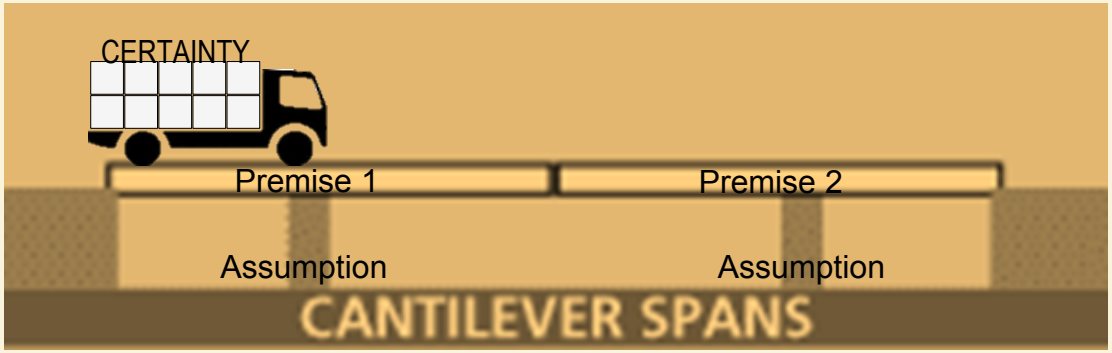
Evaluating Argument Strength

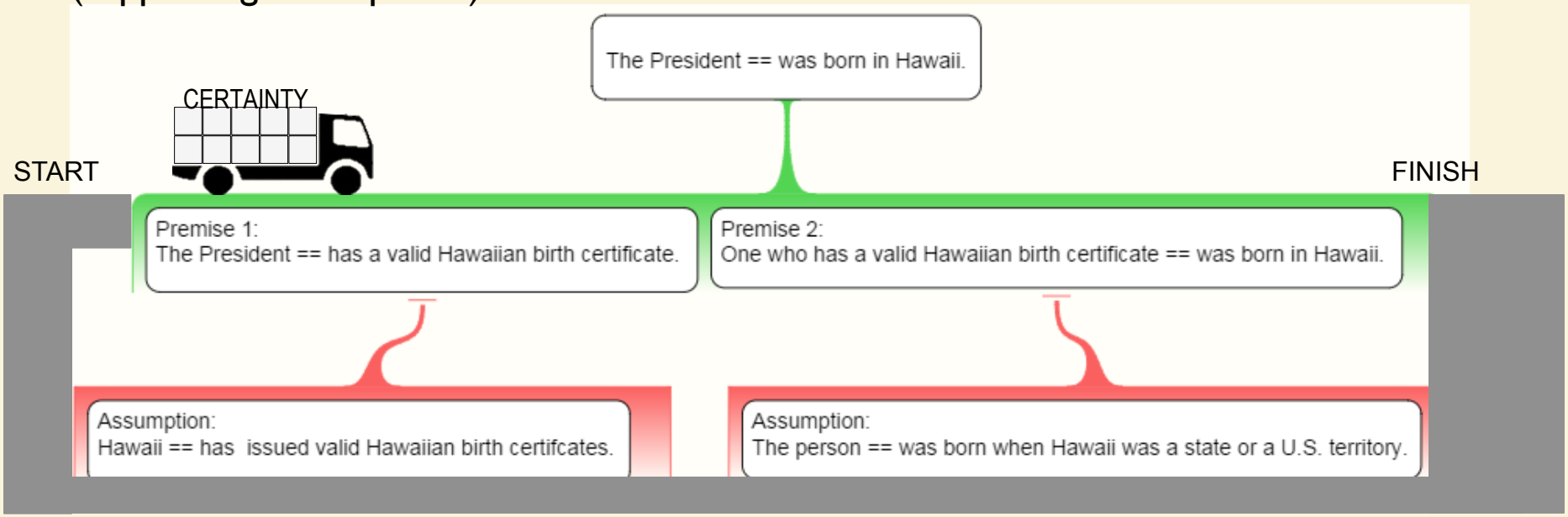
Once the four required elements of the Logic-Bridge design protocol are followed, you can be sure that the argument is clear and logical.

The next step is the evaluation of the strength of the argument. The strength of a correctly structured logical argument largely depends on the audience's subjective perception of the degree of acceptability, probability, or believability of the individual linked premises which is impacted by the strength of the assumptions.

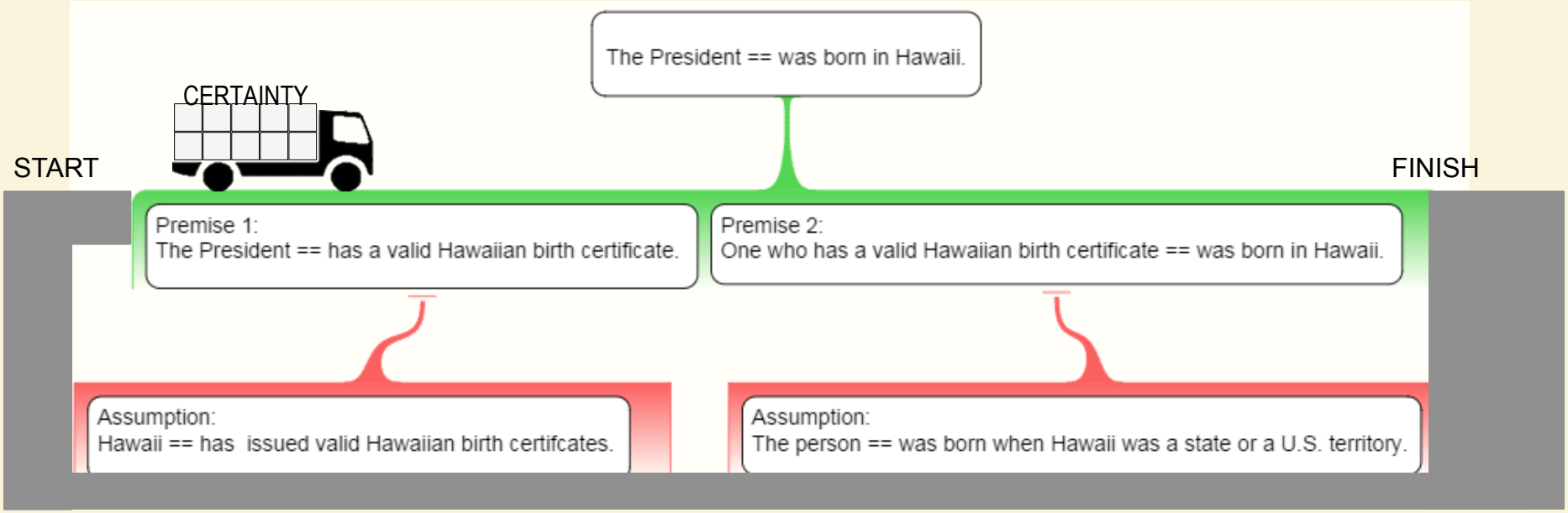


Remember that any argument structure can be analogized to a cantilever bridge with horizontal spans and vertical piers. The strength of the bridge depends of the strength of the spans (linked premises) and the strength of the piers (supporting assumptions).

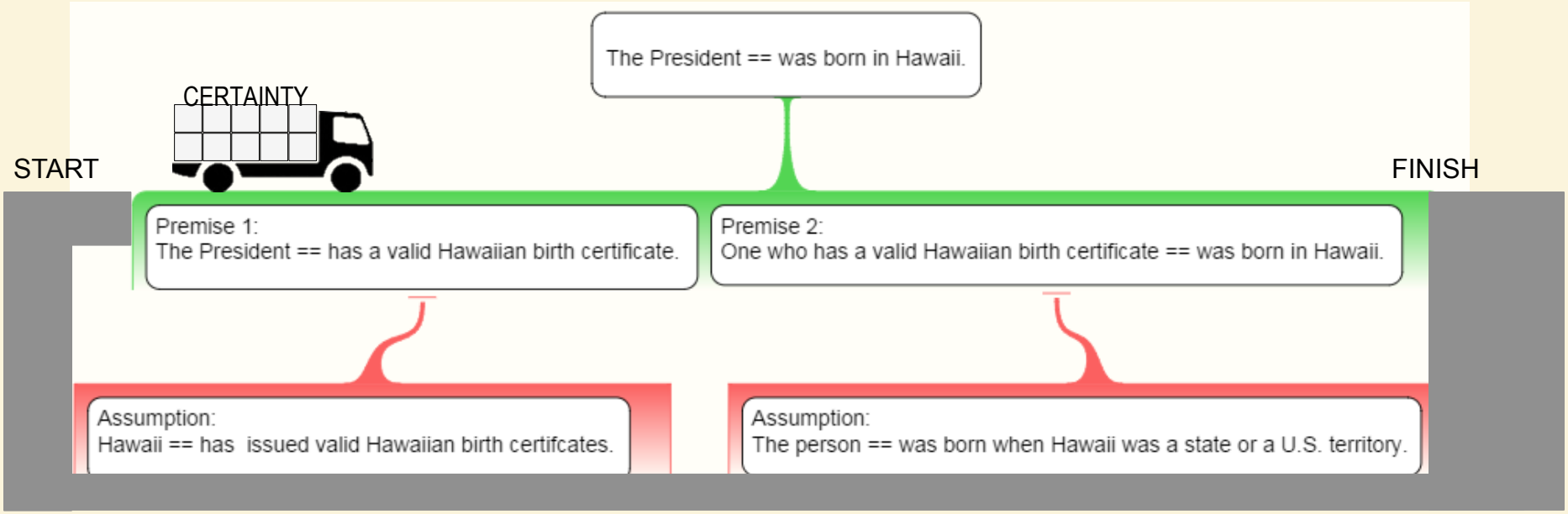




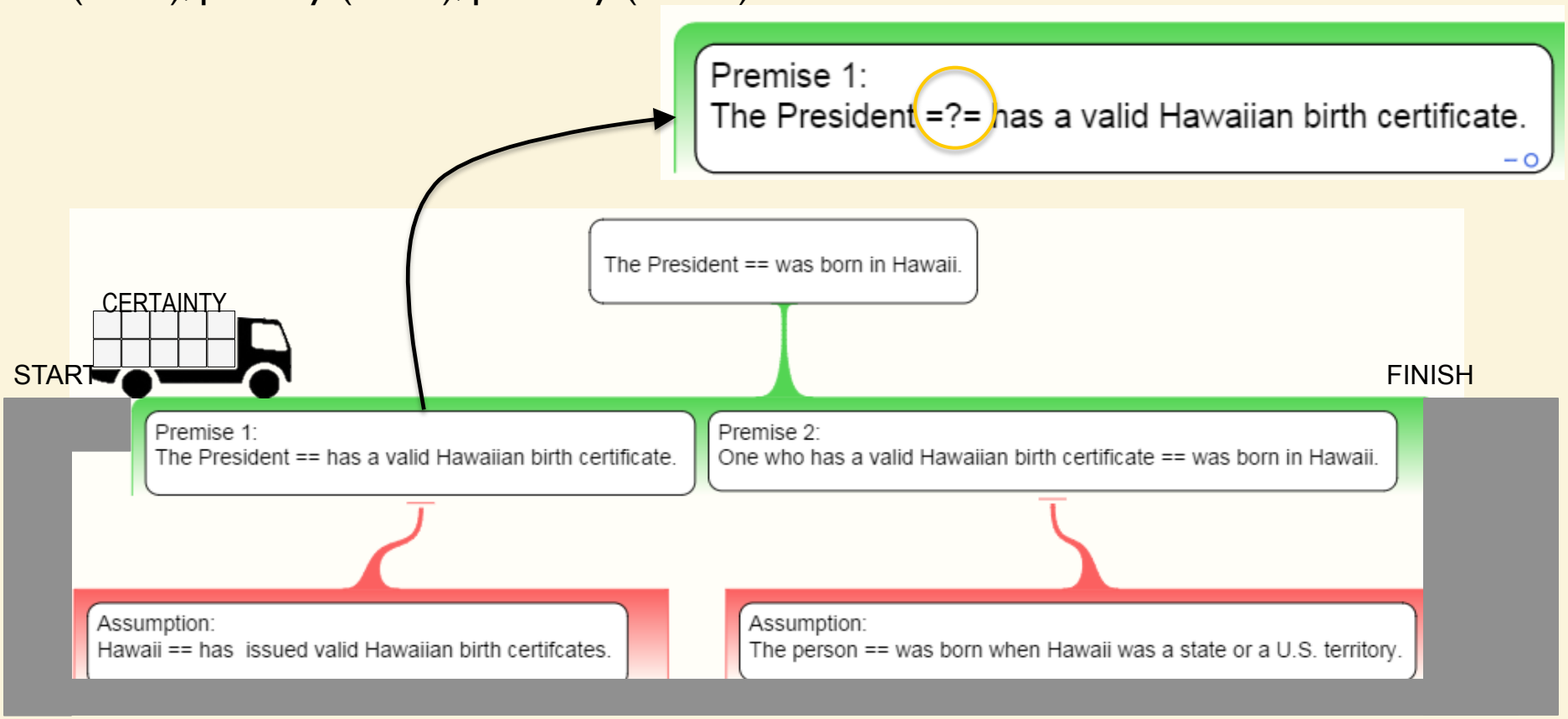
We finally get to discuss the metaphorical "CERTAINTY" truck that drives over the Logic-Bridge. It is driven by the audience who starts out with ten boxes filled with his or her total supply of CERTAINTY or belief for any line of reasoning. The amount is always 100% at the start (each box 10%).



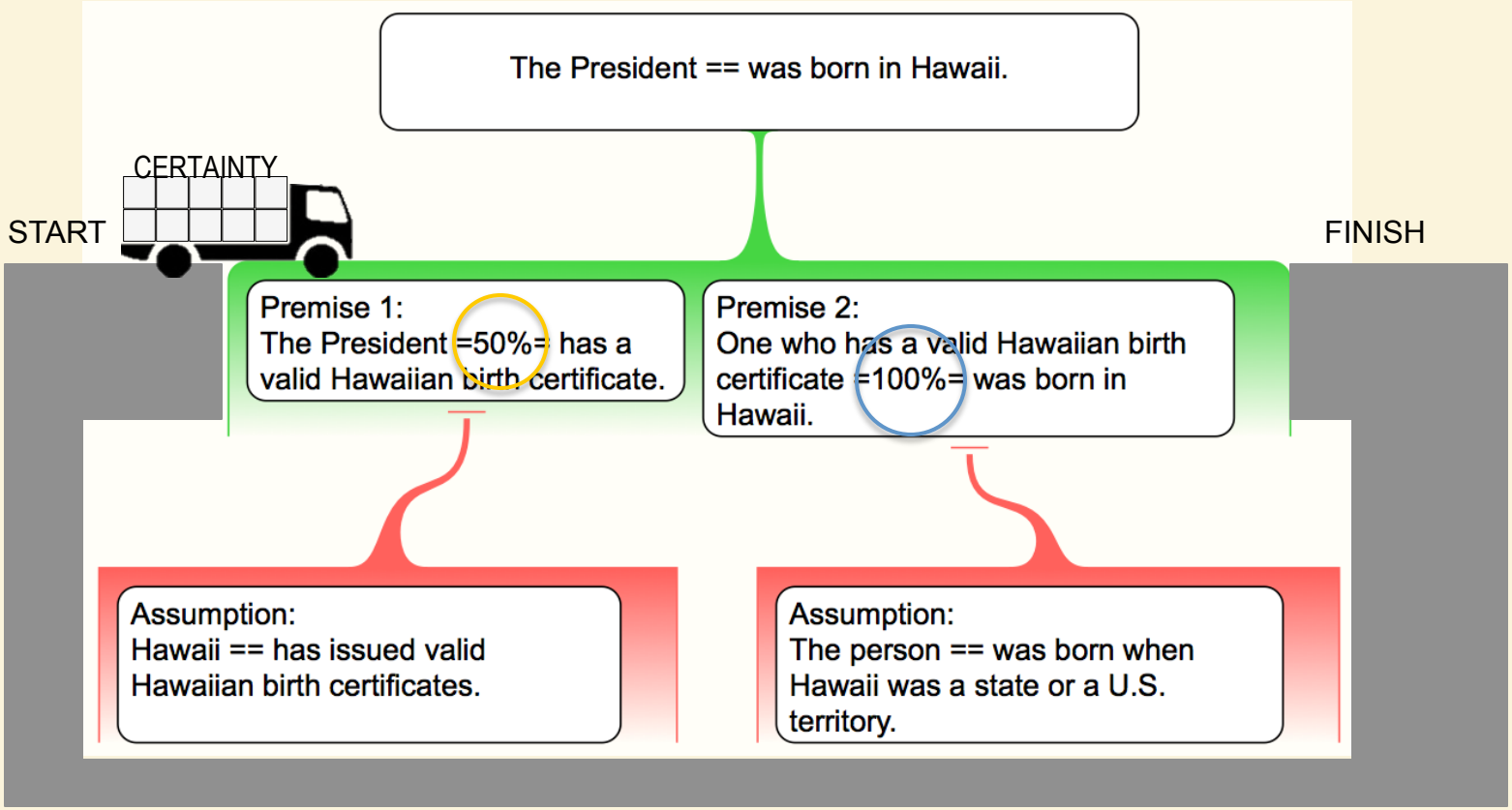
How much of his or her CERTAINTY is left at the FINISH of the Logic-Bridge depends on how strong the audience perceives the strength of each linked premise. If a premise isn't subjectively perceived strong enough to hold 100% of the CERTAINTY (e.g., the audience is not certain that the premise is a fact), then the audience must leave forever some of his or her CERTAINTY behind and continue on over the Logic-Bridge without it.



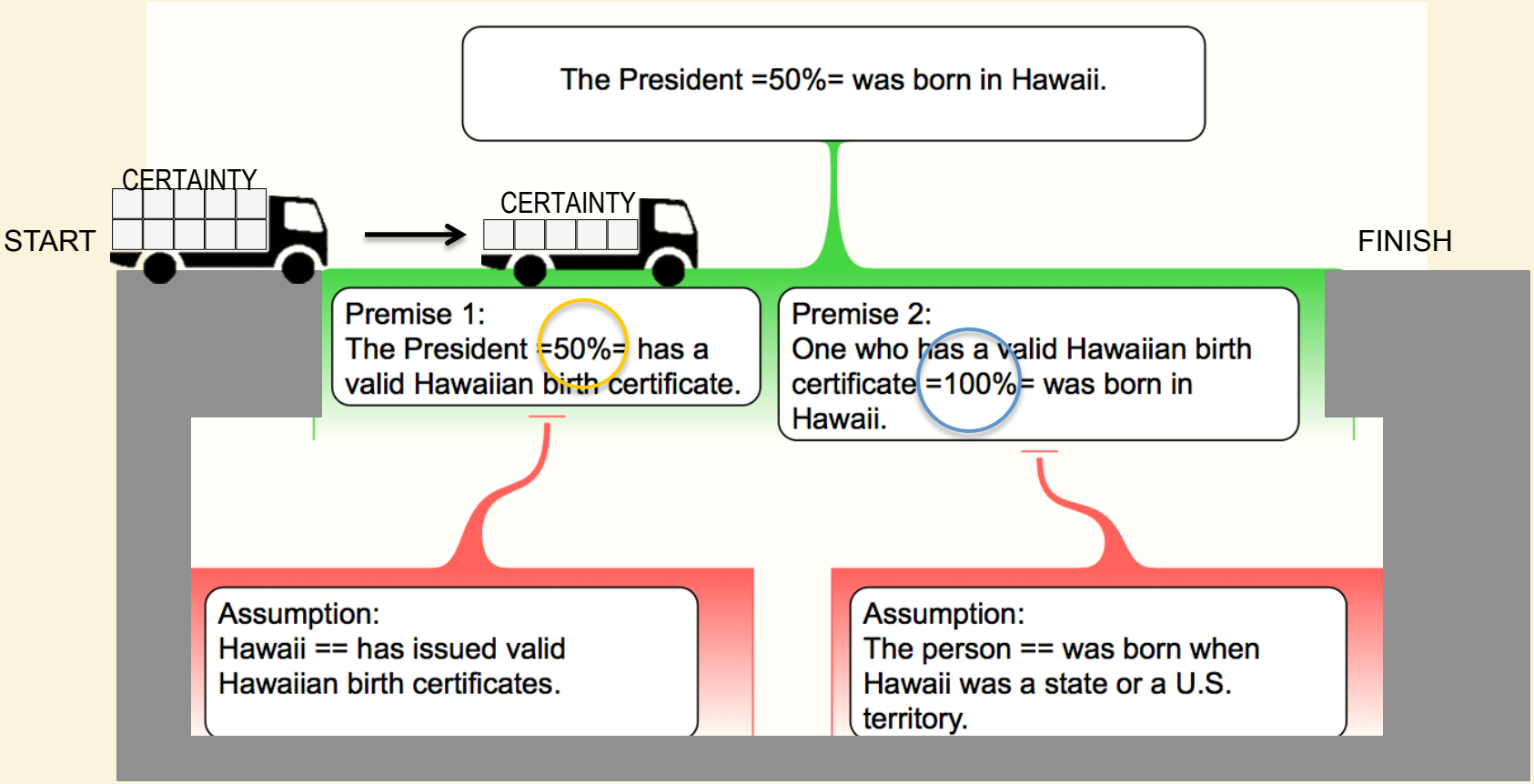
For example, the audience must decide how strong (e.g., 0% to 100%) is the nexus between the SUBJECT (The President) and the PREDICATE (has a valid Hawaiian birth certificate. (Note the question mark [?] at the nexus.) Stated another way, to what degree does the audience believe Premise 1 is true or certain (e.g., not at all (0%); absolutely (100%); possibly (<50%); probably (>50%).



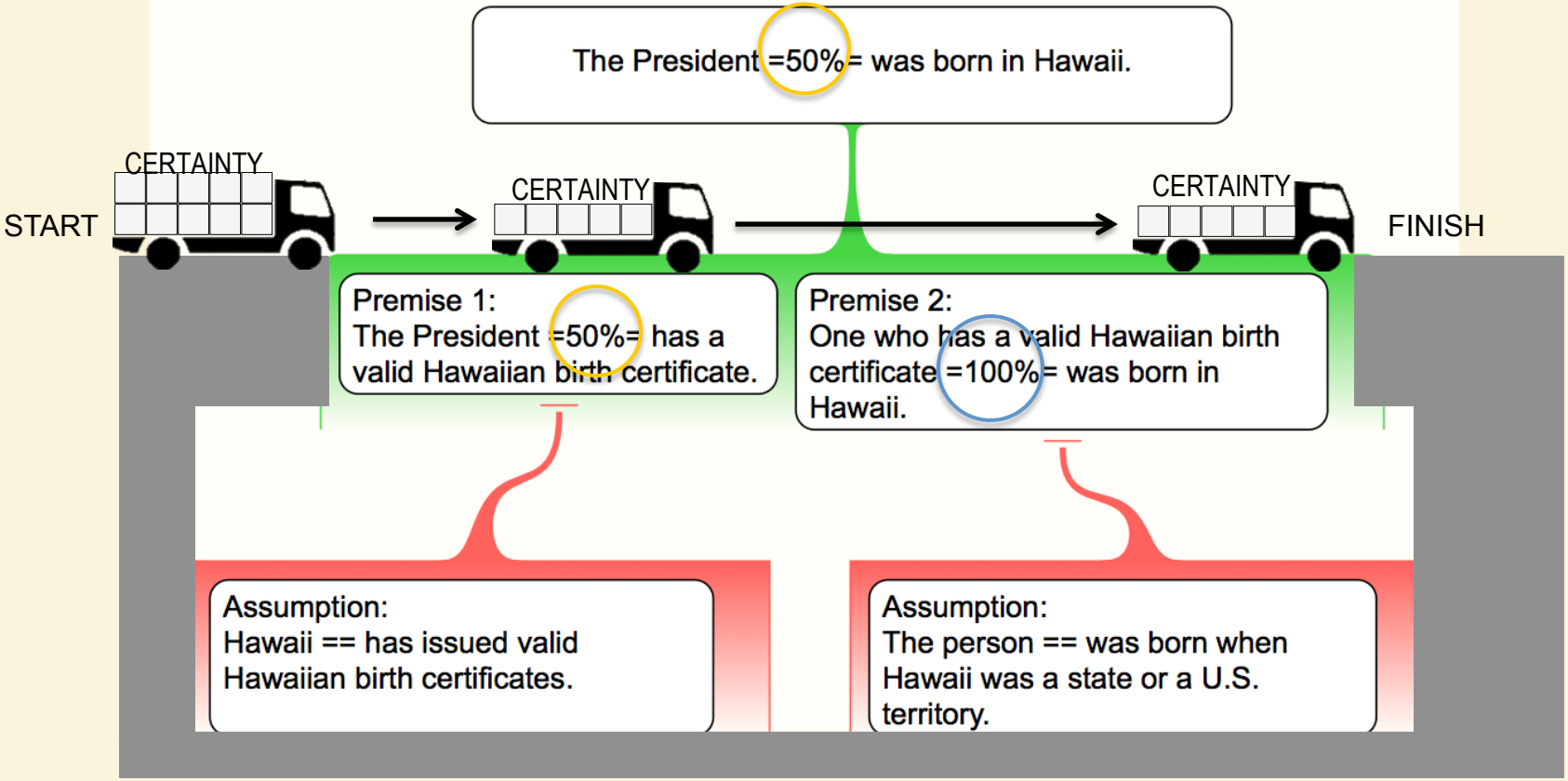
Hypothetically the audience might subjectively perceive that Premise 1 has a 50% probability of being true. But the second premise might be perceived by him or her to have a 100% level of certainty of being true. (Let's assume that the assumption are not assessed yet.)



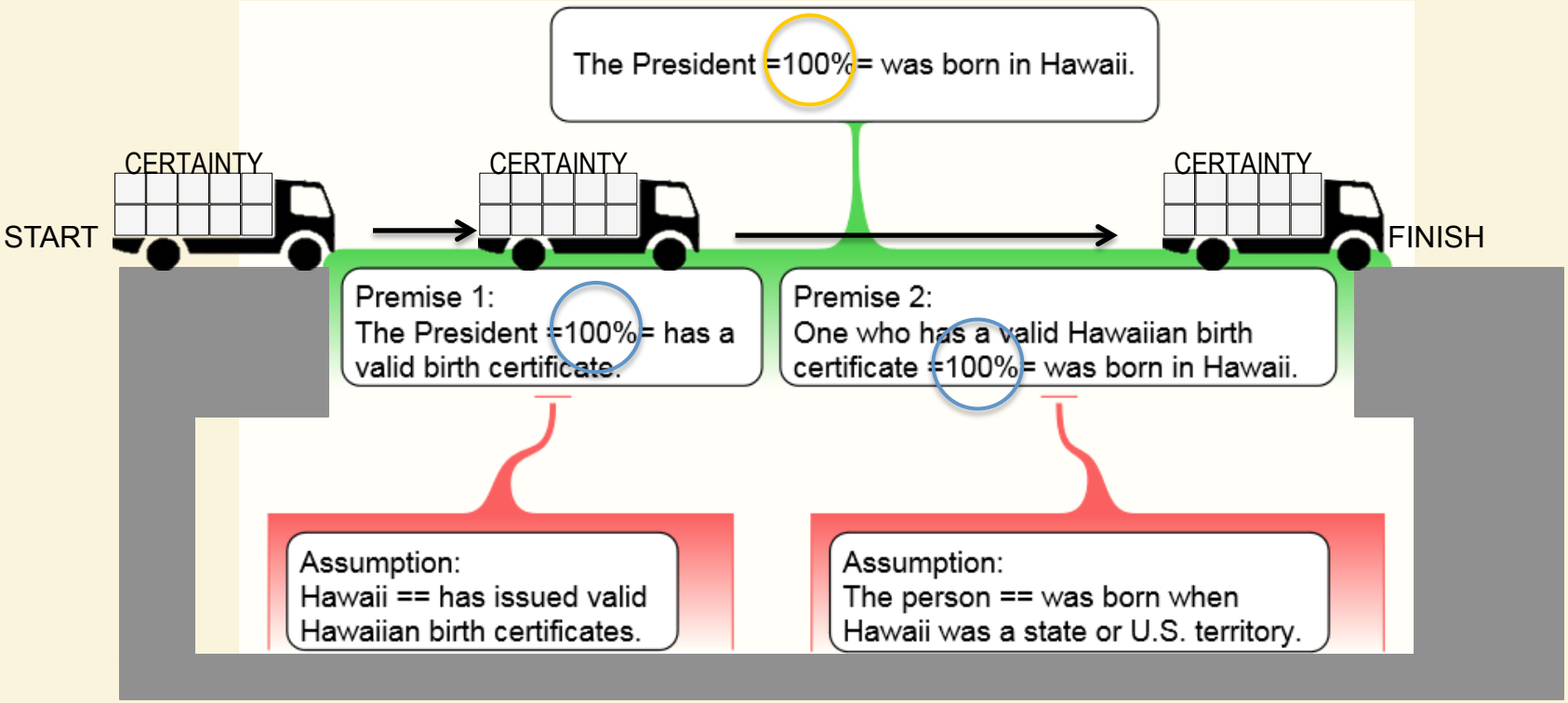
As the audience travels over Premise 1 it must leave behind half of his or her CERTAINTY or belief because he or she subjectively perceives that the strength of Premise 1 can only handle 50% of his or her load or weight of CERTAINTY. Half of the boxes have been removed.



A CONTENTION reached (justified) from one line of reasoning (without objections) possesses only the smallest subjective level of CERTAINTY of truth (e.g., 50%) that can be supported by any one of its premises. So in this example, even though the audience subjectively perceives the strength of Premise 2 at 100%, the level of CERTAINTY for the CONTENTION is only 50% based on the weakest premise (span) of the Logic-Bridge.

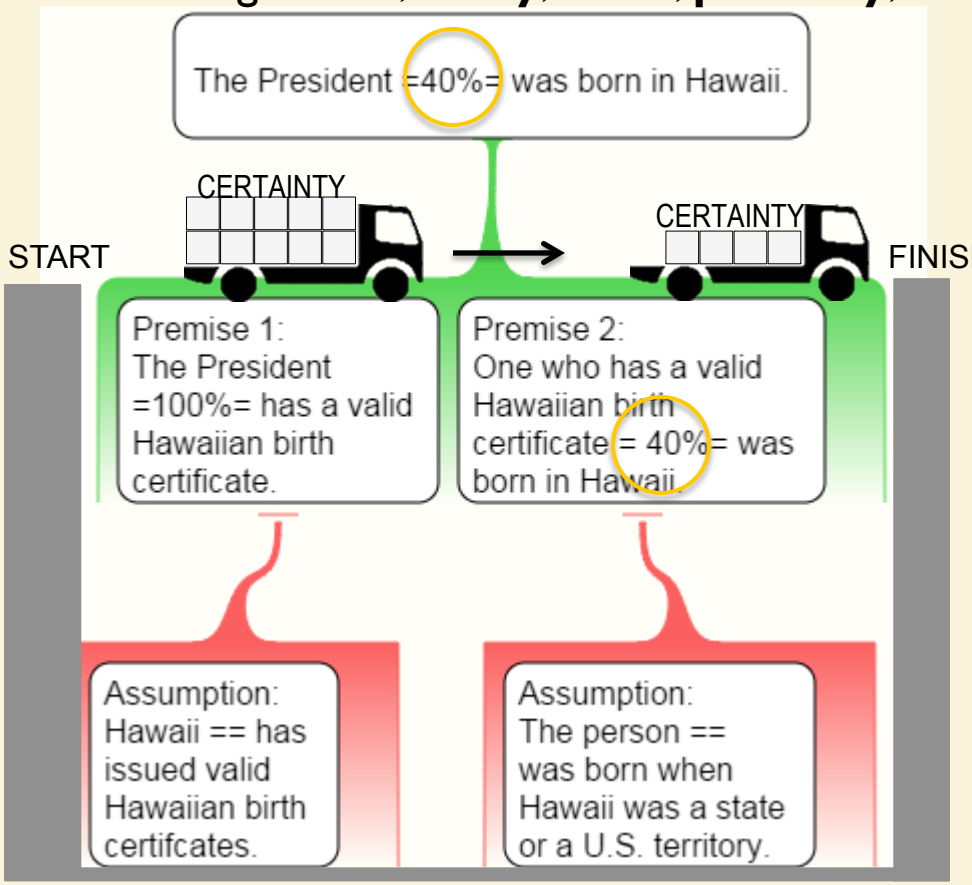


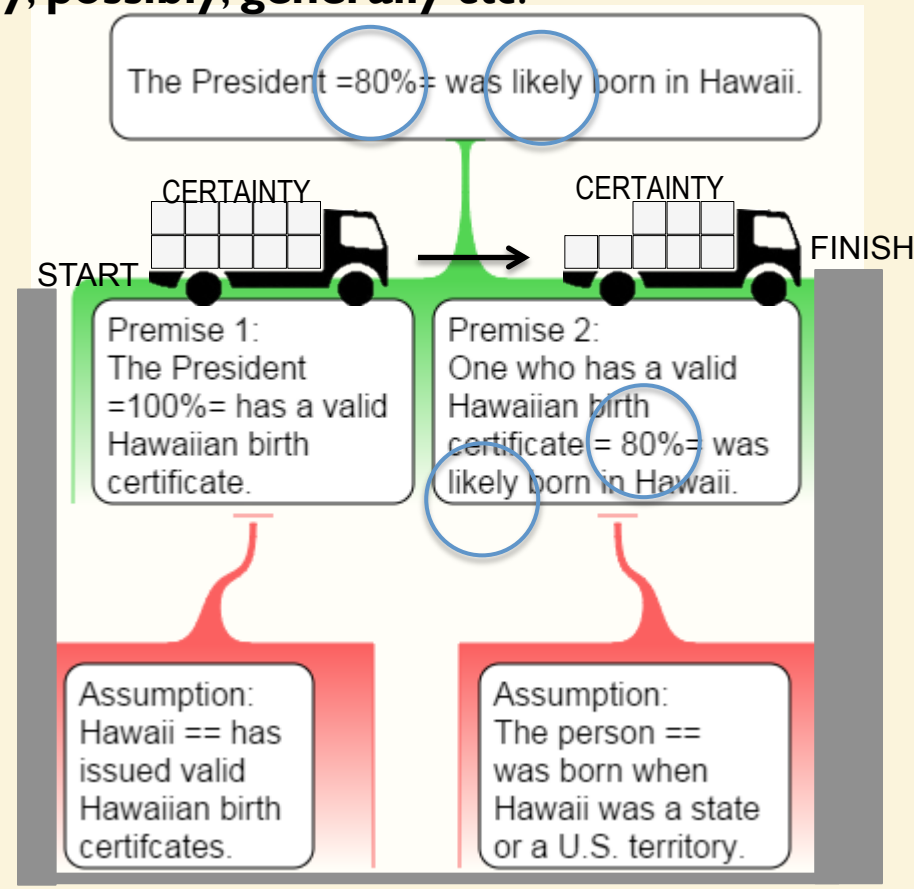
But remember, the determination of the strength of any premise is subjective. So a different audience might, as illustrated below, reach a totally different conclusion of the strength of the argument. Here the audience perceive each of the two premises as 100% (absolutely certain) so the contention is evaluated as 100% certain.



Qualifiers

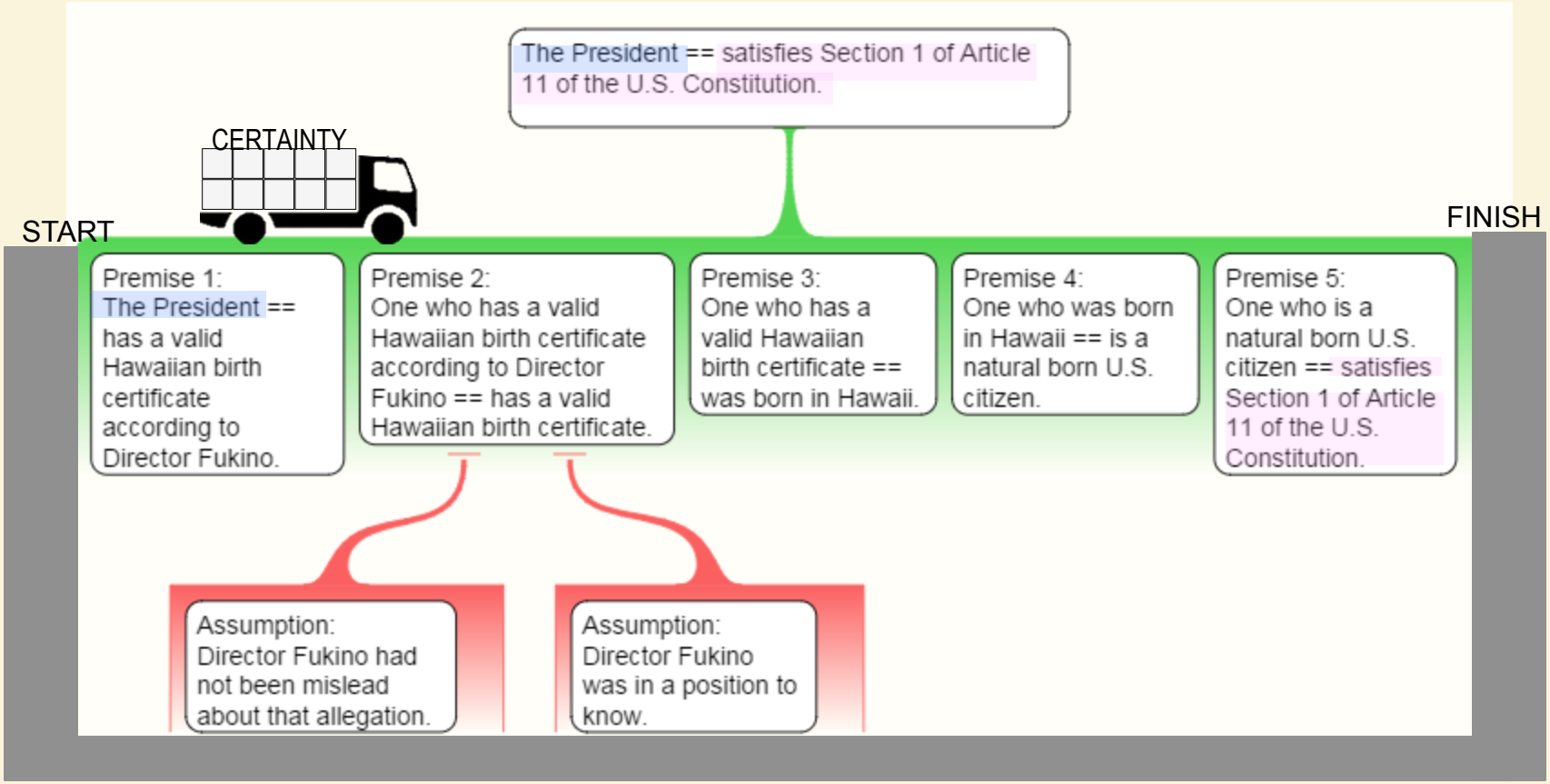
This example illustrate the using QUALIFIERS to possibly increase the perceived level of certainty of a contention by adding QUALIFIERS where appropriate. Of course, the addition of a QUALIFIER to a contention does change the level of certainty explicitly expressed for that contention. Examples of QUALIFIERS include the following: **some**, **many**, **most**, **probably**, **likely**, **possibly**, **generally** etc.





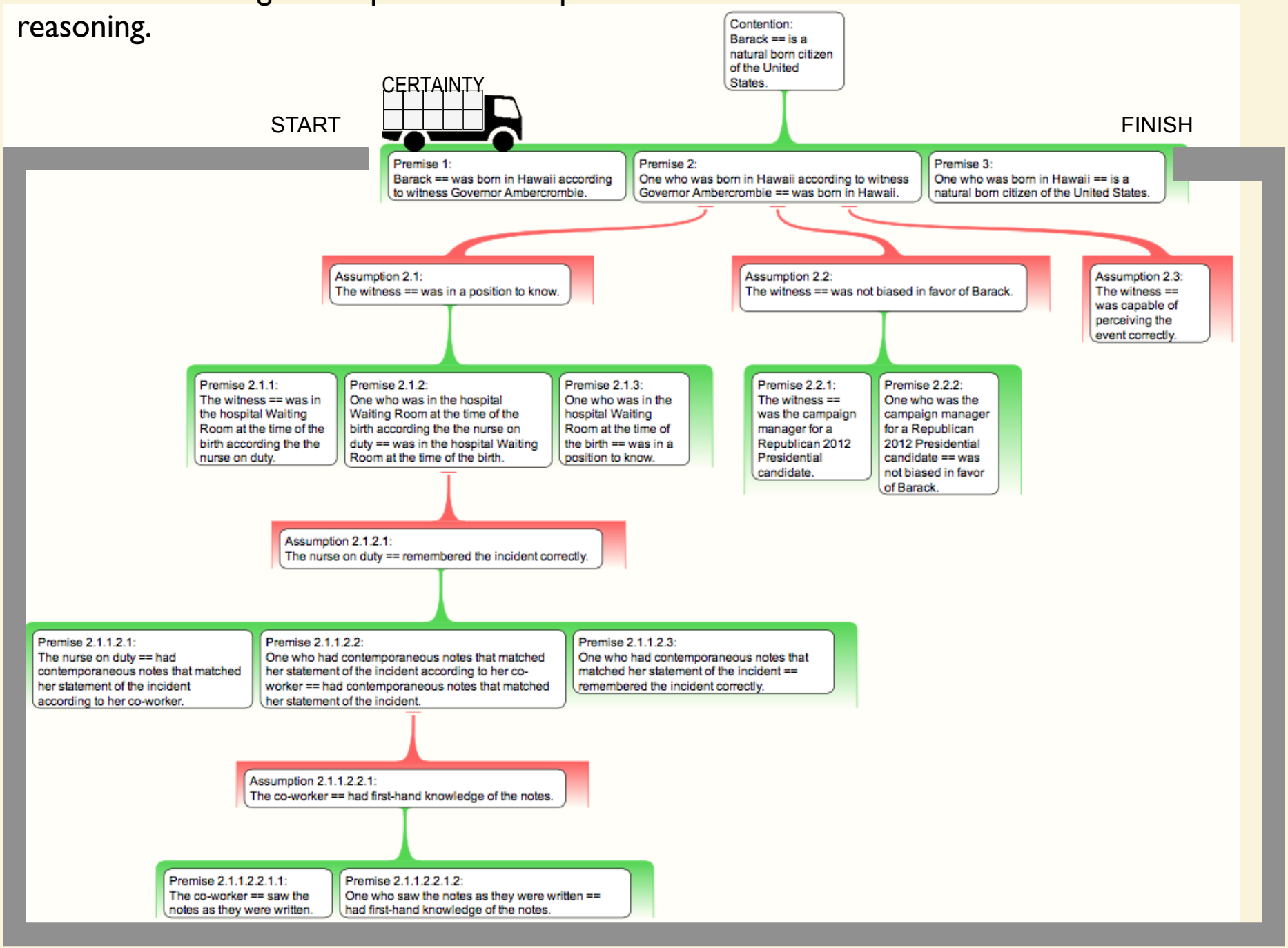
Multiple Linkages

A line of reasoning can consist of multiple linkages rather than just one linkage with two premises. In this example, there are five transitively linked premises and two assumptions. A line of reasoning grows in a linear path rather than as a tree or pyramid structure.



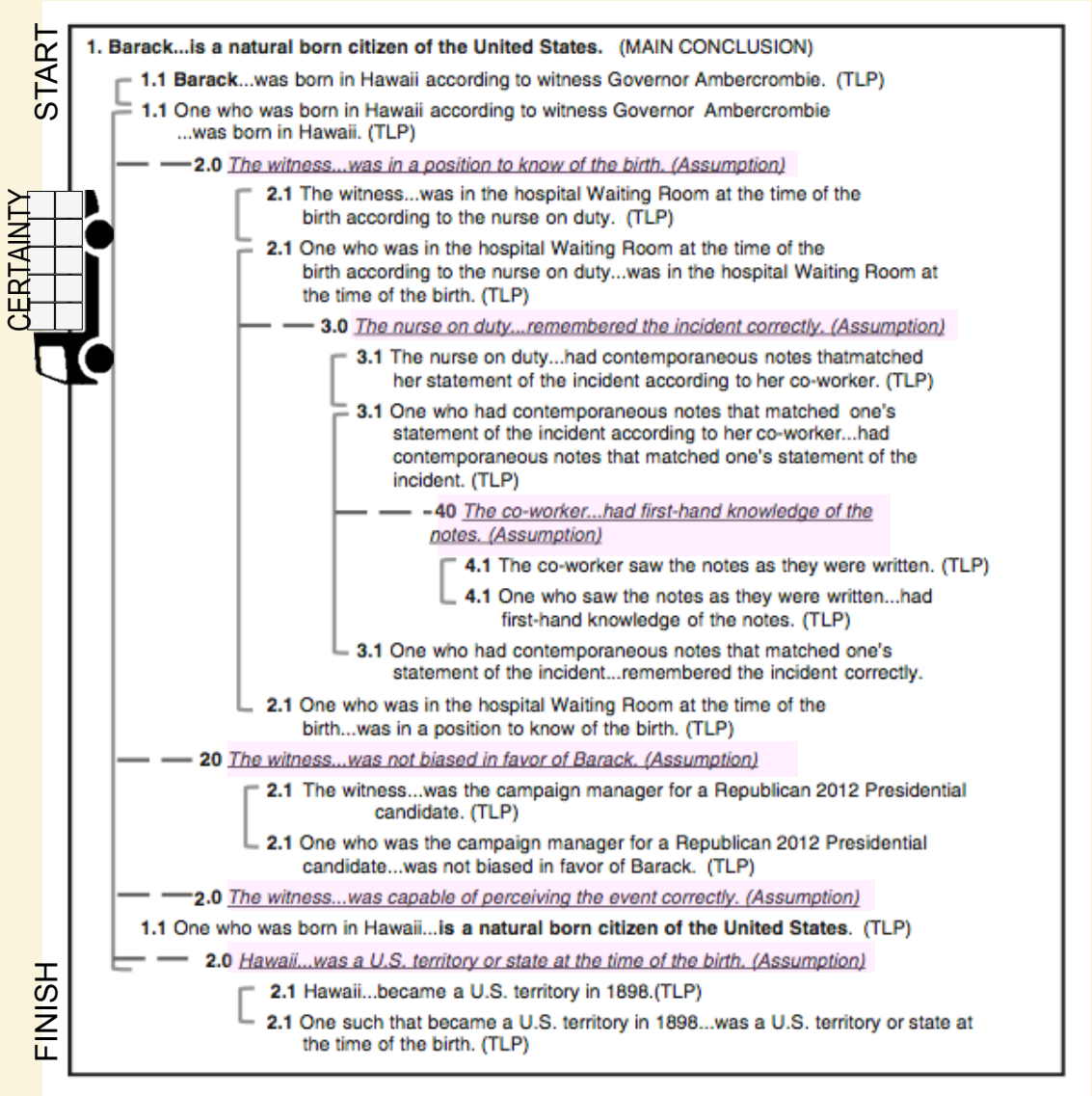
Inferential Net Levels

A line of reasoning can depend on multiple levels of ASSUMPTIONS with their own lines of reasoning.



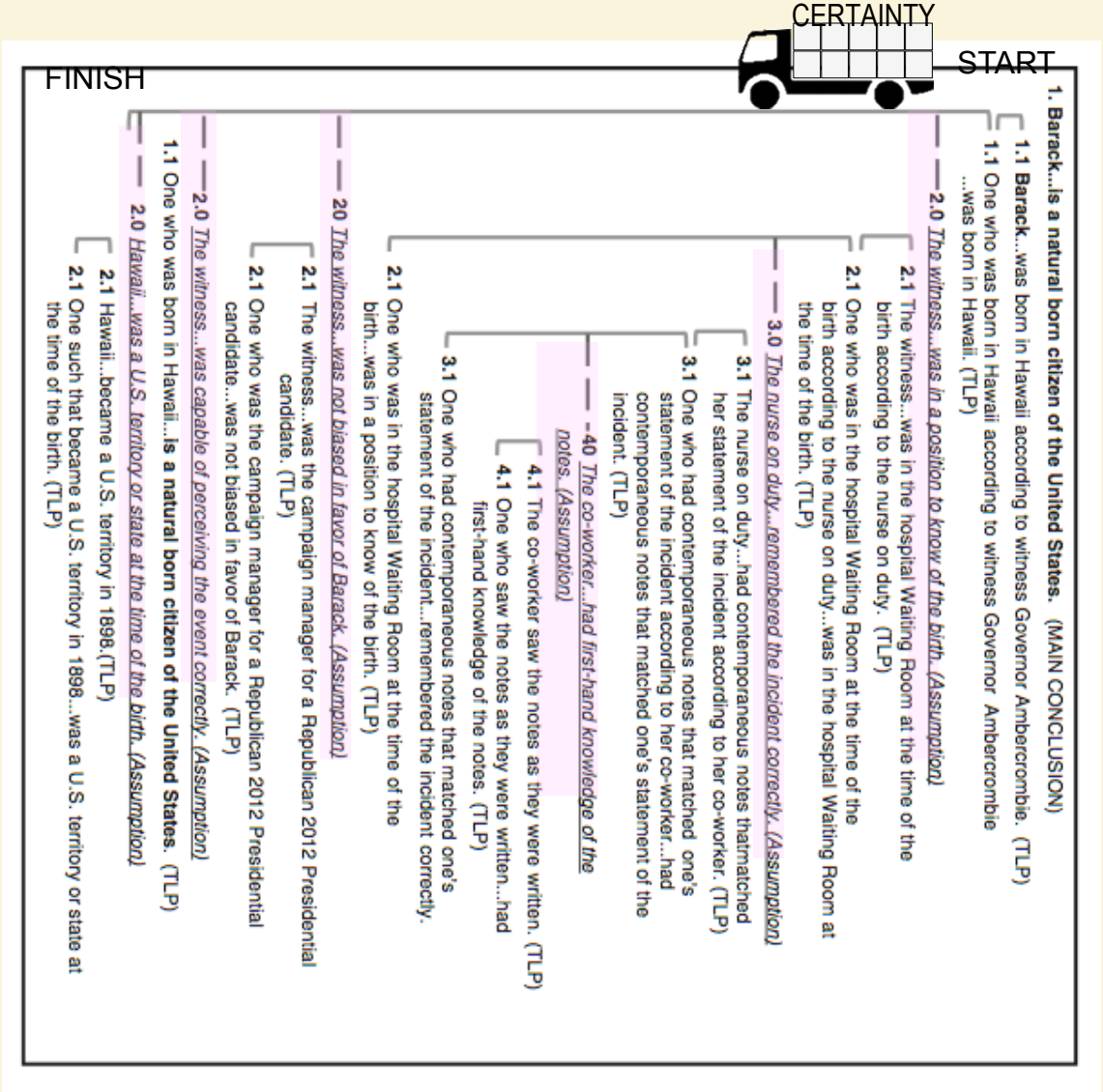
MAIN CONCLUSION: Barack is a natural born citizen of the United States.

The previous argument can also be mapped in a Logic-Bridge outline pattern. In this design, the linked premises are connected with the same vertical margin (with a X.1 label) and the assumptions are horizontally attached (with a X.0 label and red highlight). In essence, the bridge has been turned on its side. This outline form is helpful when only a word processor or pencil is available.



MAIN CONCLUSION: Barack is a natural born citizen of the United States.

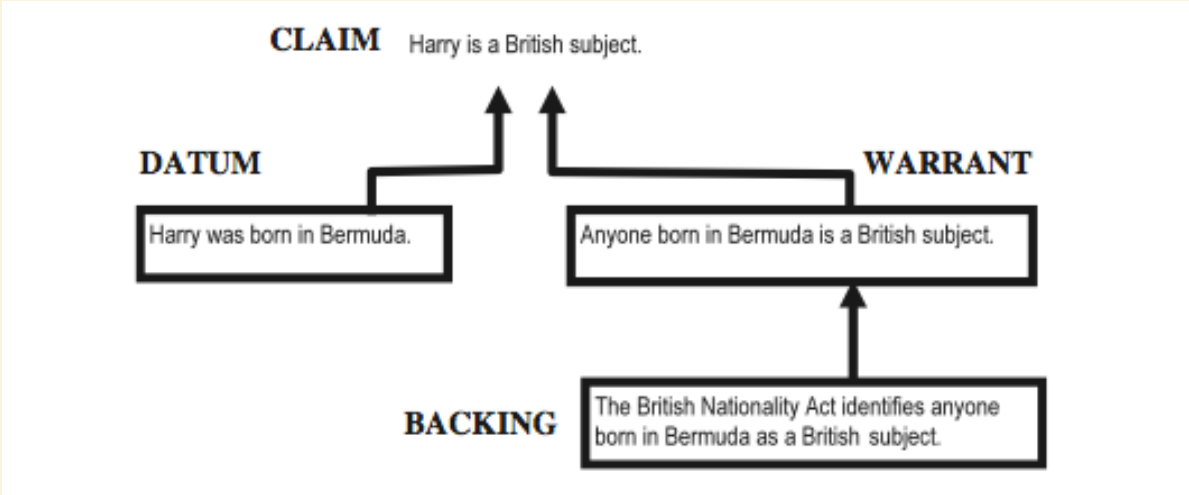
When the the Logic-Bridge outline pattern is rotated on its side, the typical bridge-like structure becomes more evident.



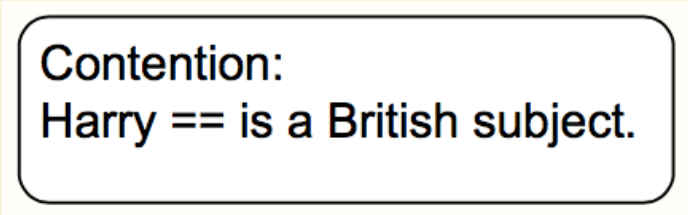
*Toulmin, S. The Uses of Argument. (1958). Updated ed. Cambridge: Cambridge UP, 2003.

Toulmin Model*

MAIN CONCLUSION: Harry is a British subject.

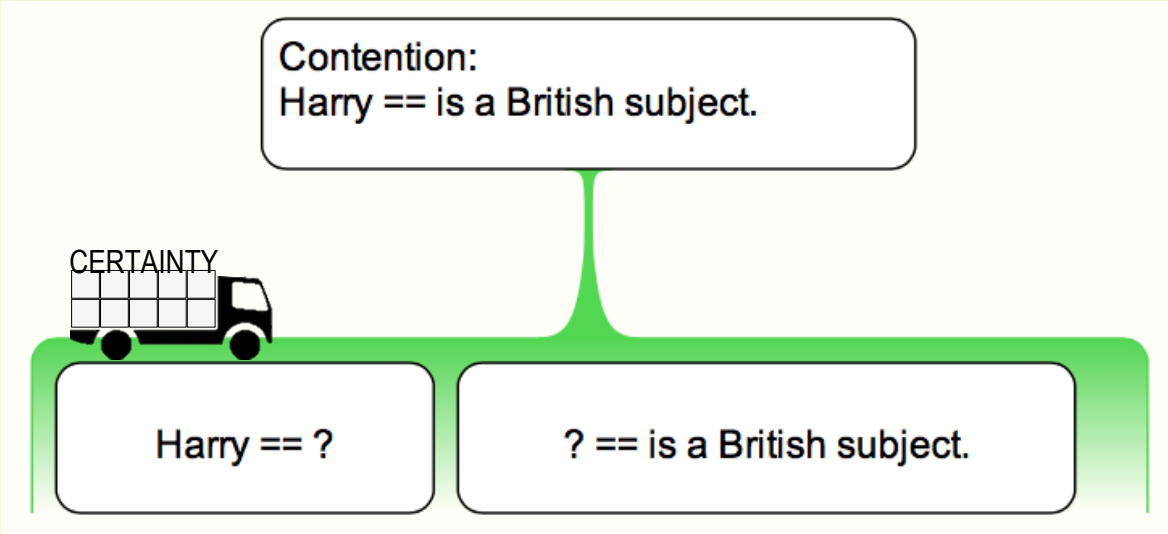


MAIN CONCLUSION: Harry is a British subject.



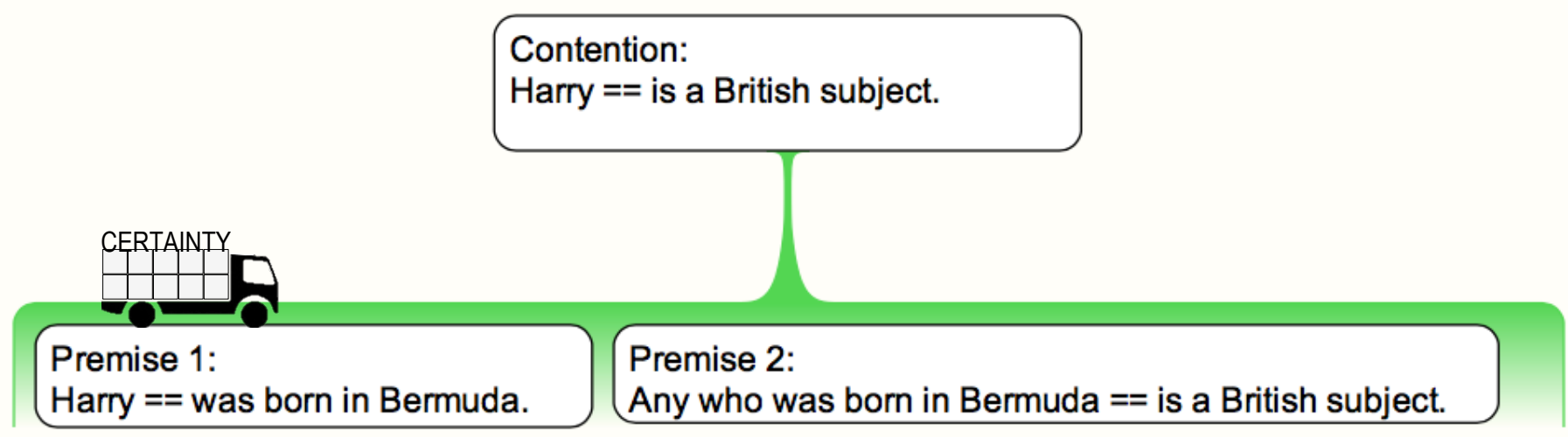
ADVOCATE: My contention (claim or conclusion) is that "Harry is a British subject."

MAIN CONCLUSION: Harry is a British subject.



AUDIENCE: How did you reach that conclusion?

MAIN CONCLUSION: Harry is a British subject.

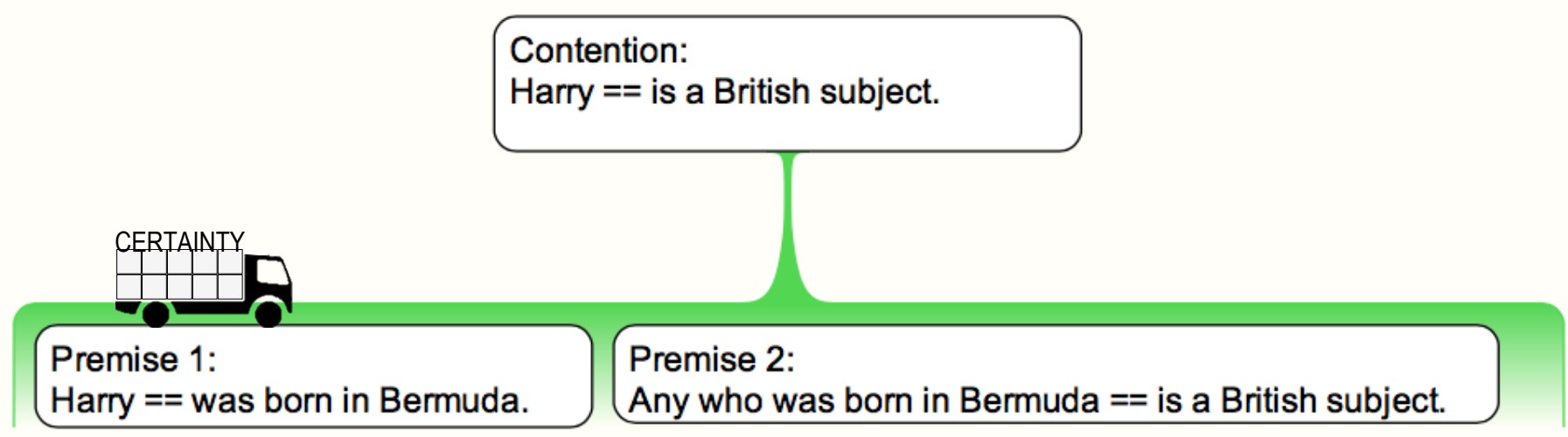


ADVOCATE: My line of reasoning consists of two premises:

1. Harry was born in Bermuda.
2. Any who was born in Bermuda is a British subject.

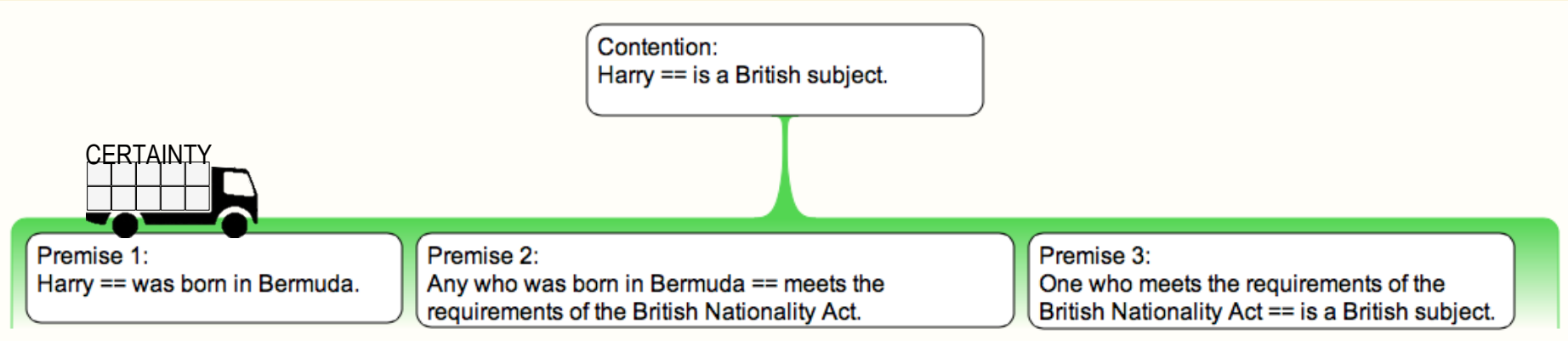
Therefore, Harry is a British subject.

MAIN CONCLUSION: Harry is a British subject.



AUDIENCE: How did you arrive at Premise 2?

MAIN CONCLUSION: Harry is a British subject.

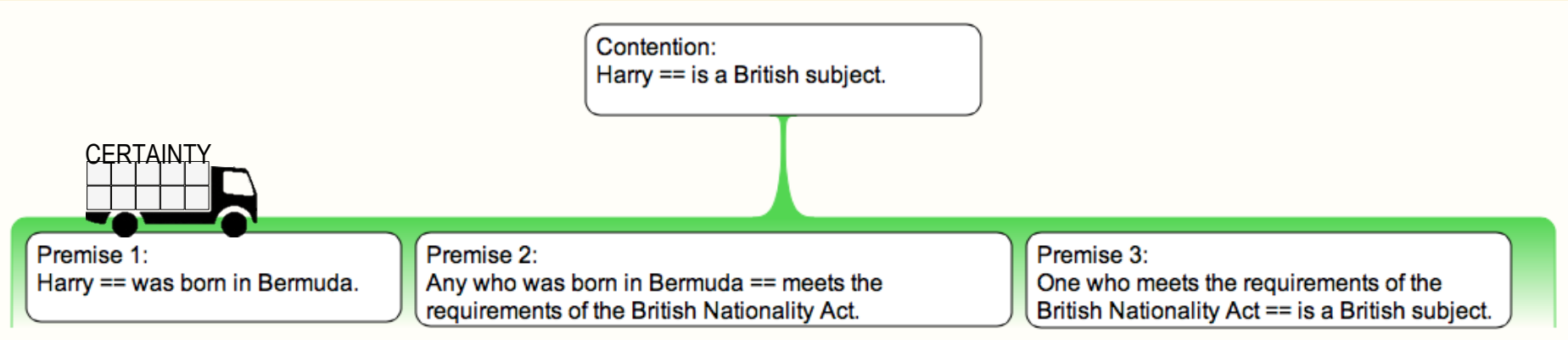


ADVOCATE: My new line of reasoning consists of three premises:

1. Harry was born in Bermuda.
2. One who was born in Bermuda meets the requirements of the British Nationality Act.
3. One who meets the requirements of the British Nationality Act.
 is a British subject.

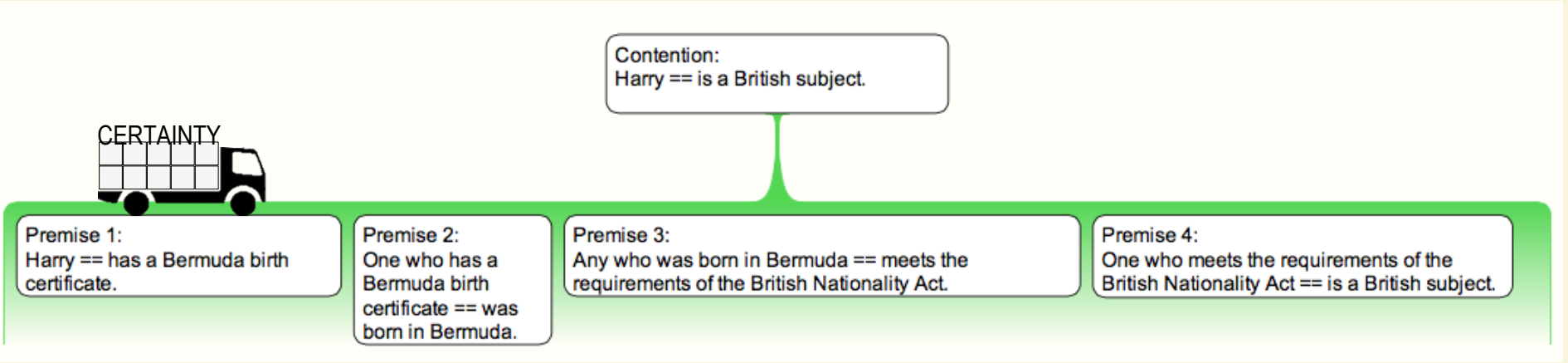
Therefore, Harry is a British subject.

MAIN CONCLUSION: Harry is a British subject.



AUDIENCE: OK. I agree to some extent with your Premise number 2 and 3. But how did you arrive at Premise 1?

MAIN CONCLUSION: Harry is a British subject.

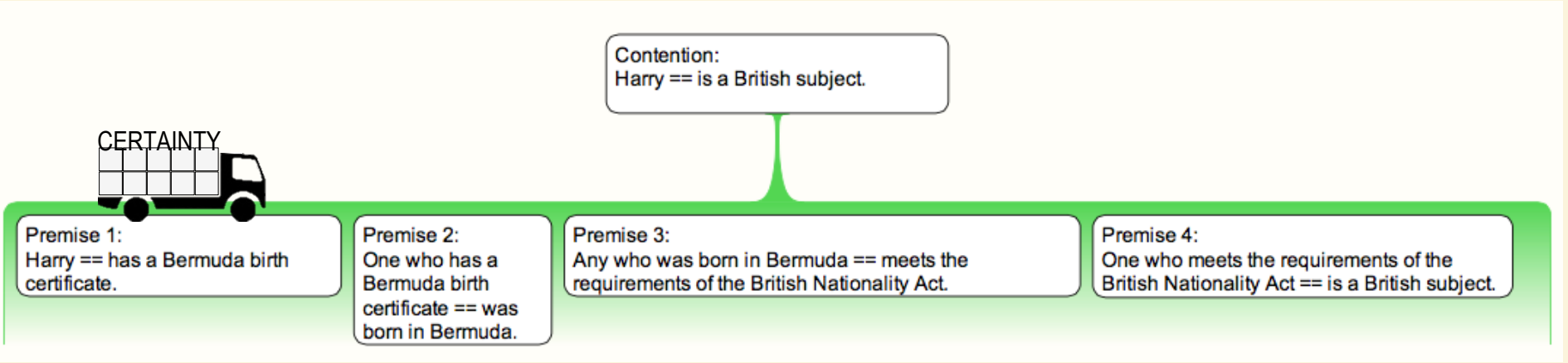


ADVOCATE: My line of reasoning consists of four premises:

1. Harry has a Bermuda birth certificate.
2. One who has a Bermuda birth certificate was born in Bermuda.
3. Any who was born in Bermuda meets the requirements of the British Nationality Act.
4. One who meets the requirements of the British Nationality Act is a British subject.

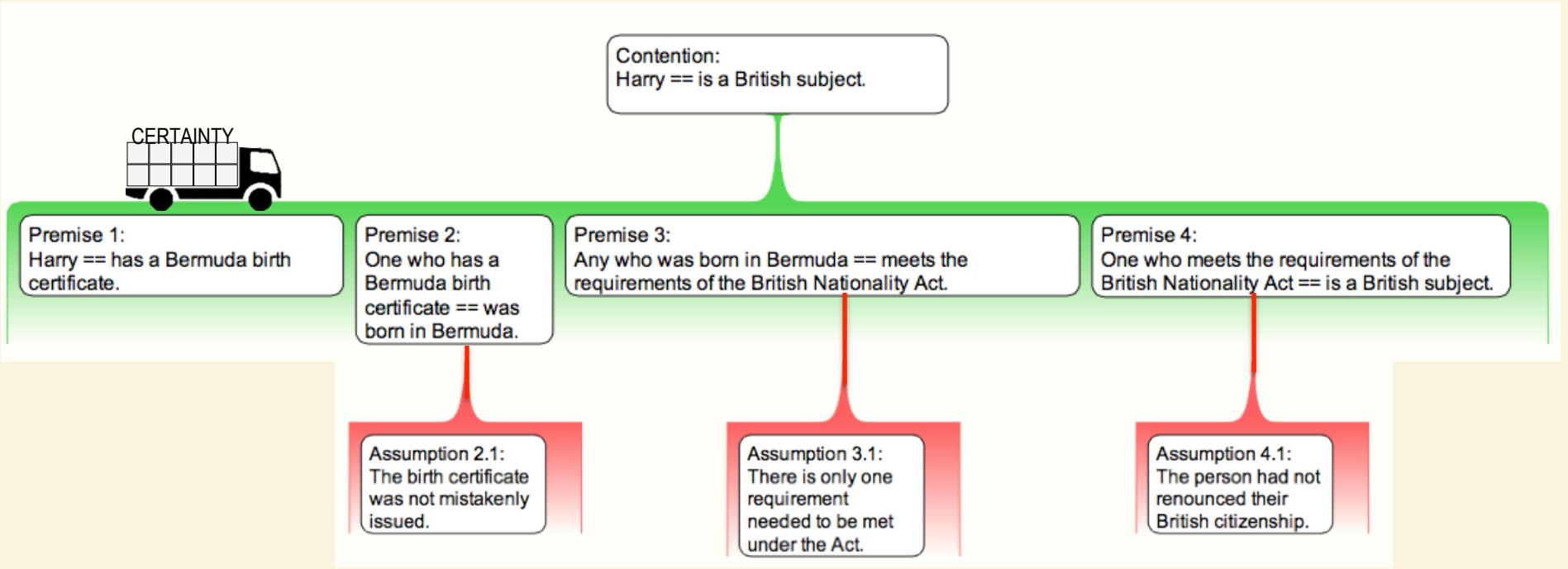
Therefore, Harry is a British subject.

MAIN CONCLUSION: Harry is a British subject.



AUDIENCE: What assumptions are you making?

MAIN CONCLUSION: Harry is a British subject.

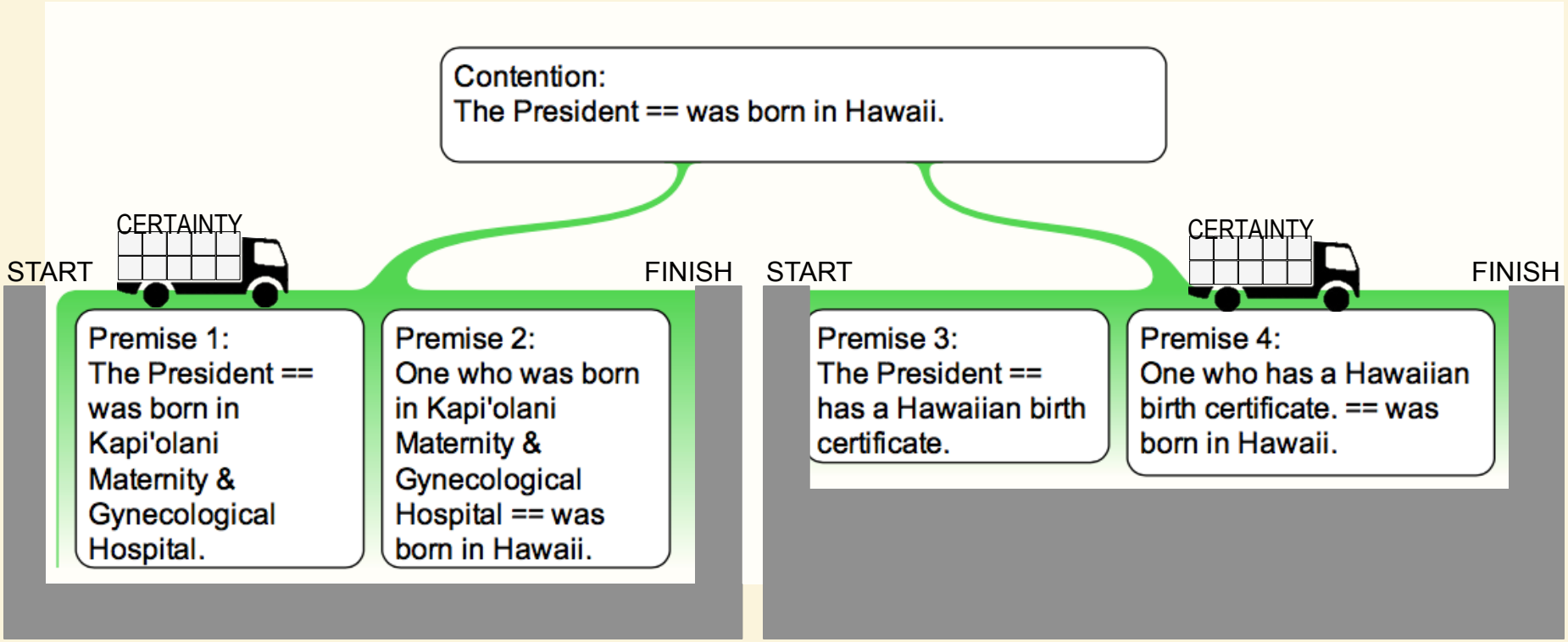


ADVOCATE: I am making three assumptions.

Multiple Lines of Reasoning

This argument configuration is called a "convergent" argument.

This example illustrates multiple (i.e., two) lines of reasoning reaching the same CONTENTION. Multiple lines of reasoning may increase the subjective perception of the level of certainty of the CONTENTION.



Objections (e.g. rebuttals)

(see Part 2 presentation)

Endnotes

ENGLEBRETSEN, G. (1981). *Three Logicians: Aristotle, Leibniz, and Sommers and The Syllogistic*. Van Gorcum & Company, The Netherlands.

[2] ENGLEBRETSEN, G. (1996). *Something to Reckon with: The Logic of Terms*. University of Ottawa Press, Ottawa, ON.

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LARONGE, J. A. (2012). A generalizable argument structure using defeasible class-inclusion transitivity for evaluating evidentiary probative relevancy in litigation. *Journal of Logic and Computation*, 22(1):129-162.

LARONGE, J. A. (2012). Evaluating universal sufficiency of a single logical form for inference in court. *Law, Probability and Risk*, 11(2-3):159-196.

[1] SOMMERS, F. & ENGLEBRETSEN, G. (2000). *An Invitation to Formal Reasoning*. Ashgate Publishing Company, Aldershot.

Acknowledgements

I gratefully acknowledge the years of collegial support in conventional argument mapping by Tim van Gelder (www.austhinkconsulting.com). I am also grateful for the years of encouragement and support of Peter Tillers (http://en.wikipedia.org/wiki/Peter_Tillers). I also want to acknowledge the encouragement and the body of work of Douglas Walton (http://www.dougwalton.ca/) that provided me with a course of study for my understanding of argumentation. I also acknowledge the seminal work of Fred Sommers (http://www.ontology.co/sommersf.htm) and George Englebretsen in the "New Syllogistic." (The Logic-Bridge is one approach in the "New Syllogistic.") Finally, I wish to gratefully acknowledge Sharone Lee for our years of ongoing discussions on the placement and utility of fact-based inquiry within the dimensional structures of knowledge.