

The adjoining figure is a universal logic coding template key for translating arguments into a natural language structurally correct logical form using Defeasible Class-Inclusion Transitivity (DCIT, dee ● kit). (Fig.1).

This logic template is based upon a universal defeasible logic algebraic algorithm (Laronge, 2012):

$$(A/Z) = (A/B) (B/C) (C/D) (D/E) (E/n) (n/Z)$$

Each linked premise and the conclusion is constructed as a categorical sentence with two homogenous terms consisting of a complex subject phrase and a complex predicate phrase without the use of a copula (e.g., “is”, “is not”). So this logic algorithm relies upon a binary logical structure (e.g., Plato) rather than the “ternary theory of logical syntax” adopted by Aristotle (Englebretsen, 1996). But the algorithm retains Aristotle’s homogeneity of the terms rather than Plato’s heterogeneity of terms. The subject phrase of the first premise is the subject phrase of the conclusion. And the predicate phrase of the last premise is the predicate phrase of the conclusion.

In addition, each premise after the first one begins with a universal quantifier (e.g., All, Any, One...who/that). And each premise (e.g., A/B) is supported by ancillary or necessary assumptions, if any, to accommodate defeasible inferences.

The DCIT *multiplication* logic algorithm is related to Sommers (2000) *plus/minus* term-functor algebraic monotonic logic algorithm.

This initial staging of argument dialogue text facilitates more error-free coding for automated logical analyses computer programs. Any proper mode of inference can be translated into this defeasible categorical class-inclusion transitivity mode of inference. And it can accommodate argument schemes (Walton, 2011).

The short example that follows illustrates the flexibility of the DCIT logic template to accommodate differing argument structures and attacks.

#	PREMISE SUBJECT COLUMN	PREMISE PREDICATE COLUMN	%	Assumptions Column
1	Subject Phrase of Conclusion...	...Predicate Phrase (including verb) of Premise 1.	acceptability (probative weight)	Supporting and Ancillary Assumptions for Adjoining Premise
2	Any (All/One) who (that)...	...[REPEATE PREVIOUS PREDICATE]...	acceptability (probative weight)	Supporting and Ancillary Assumptions for Adjoining Premise
n	Any (All/One) who (that)...	...[REPEATE PREVIOUS PREDICATE]...	acceptability (probative weight)	Supporting and Ancillary Assumptions for Adjoining Premise
n+1	Any (All/One) who (that)...	...[REPEATE PREVIOUS PREDICATE]...	acceptability (probative weight)	Supporting and Ancillary Assumptions for Adjoining Premise
MAIN CONCLUSION (E.G., CLAIM, CONTENTION, ASSERTION, THESIS)				Defeasible Class-Inclusion Transitivity MODE OF INFERENCE
Therefore...	Subject Phrase of Conclusion...	...Predicate Phrase of Conclusion	least amount of acceptability from above	Copyright © Joseph A. Laronge 2013 Figure 1

SALLY Nick, c'mon! I'm telling you!
 "Barack is a natural born citizen."

	Barack...	...is a natural born citizen.	100	Copyright © Joseph A. Laronge 2013 Figure 2
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NICK Why do you think so?

SALLY Because: "Barack was born in Hawaii."

#	PREMISE SUBJECT COLUMN	PREMISE PREDICATE COLUMN	%	Assumptions Column
1	Barack...	...was born in Hawaii.	100	[None stated.]
2	Any (All/One) who (that)...	...[REPEAT PREVIOUS PREDICATE]... ...is a natural born citizen of the U.S..	100	.
MAIN CONCLUSION				Defeasible Class-Inclusion Transitivity
	Therefore...	Barack... ...is a natural born citizen of the U.S..	100	Copyright © Joseph A. Laronge 2013 Figure 3

NICK What makes you think
 "Barack was born in Hawaii?"

#	PREMISE SUBJECT COLUMN	PREMISE PREDICATE COLUMN	%	Assumptions Column
1	Barack...	???	0	[None stated.]
2	Any (All/One) who (that)...	...[REPEAT PREVIOUS PREDICATE]... ...was born in Hawaii.	0	[None stated.]
3	Any (All/One) who (that)...	...[REPEAT PREVIOUS PREDICATE]... ...is a natural born citizen of the U.S..	100	[None stated.]
MAIN CONCLUSION				Defeasible Class-Inclusion Transitivity
	Therefore...	Barack... ...is a natural born citizen of the U.S..	0	Copyright © Joseph A. Laronge 2013 Figure 4

SALLY Because...
 "Barack received a Hawaiian Certificate of Birth."

#	PREMISE SUBJECT COLUMN	PREMISE PREDICATE COLUMN	%	Assumptions Column
1	Barack...	...received a Hawaiian Certificate of Birth.	100	[None stated.]
2	Any (All/One) who (that)...	...[REPEAT PREVIOUS PREDICATE]... ...was born in Hawaii.	100	[None stated.]
3	Any (All/One) who (that)...	...[REPEAT PREVIOUS PREDICATE]... ...is a natural born citizen of the U.S..	100	[None stated.]
MAIN CONCLUSION				Defeasible Class-Inclusion Transitivity
	Therefore...	Barack... ...is a natural born citizen of the U.S..	100	Copyright © Joseph A. Laronge 2013 Figure 5

NICK How do you know that?"

#	PREMISE SUBJECT COLUMN	PREMISE PREDICATE COLUMN	%	Assumptions Column
1	Barack...	???	0	[None stated.]
2	Any (All/One) who (that)...	...[REPEAT PREVIOUS PREDICATE]...	0	[None stated.]
3	Any (All/One) who (that)...	...[REPEAT PREVIOUS PREDICATE]...	30	[None stated.]
4	Any (All/One) who (that)...	...[REPEAT PREVIOUS PREDICATE]...	100	[None stated.]
MAIN CONCLUSION				Defeasible Class-Inclusion Transitivity
	Therefore...	Barack... is a natural born citizen of the U.S..	0	Copyright © Joseph A. Laronge 2013 Figure 6

SALLY I know it because the White House posted on the internet the Hawaiian Certificate of Birth short form in 2008 and the long form in 2011.

#	PREMISE SUBJECT COLUMN	PREMISE PREDICATE COLUMN	%	Assumptions Column
1	Barack...	... received a Hawaiian Certificate of Birth based on two facts.	100	a. The White House posted the short form in 2008. b. The White House posted the long form in 2011.
2	Any (All/One) who (that)...	...[REPEAT PREVIOUS PREDICATE]...	100	[None stated.]
MAIN CONCLUSION				Defeasible Class-Inclusion Transitivity
	Therefore...	Barack... was issued a Hawaiian Certificate of Birth.	100	Copyright © Joseph A. Laronge 2013 Figure 7

SALLY So based on my line of reasoning I know that Barack is a natural born citizen of the U.S..

#	PREMISE SUBJECT COLUMN	PREMISE PREDICATE COLUMN	%	Assumptions Column
1	Barack...	... received a Hawaiian Certificate of Birth based on two facts.	100	a. The White House posted the short form in 2008. b. The White House posted the long form in 2011.
2	Any (All/One) who (that)...	...[REPEAT PREVIOUS PREDICATE]...	100	[None stated.]
3	Any (All/One) who (that)...	...[REPEAT PREVIOUS PREDICATE]...	100	[None stated.]
4	Any (All/One) who (that)...	...[REPEAT PREVIOUS PREDICATE]...	100	[None stated.]
MAIN CONCLUSION				Defeasible Class-Inclusion Transitivity
	Therefore...	Barack... is a natural born citizen of the U.S..	100	Copyright © Joseph A. Laronge 2013 Figure 8

NICK *But I heard that the Hawaiian Certificate of Birth was a forgery.*

#	PREMISE SUBJECT COLUMN	PREMISE PREDICATE COLUMN	%	Assumptions Column
1	Barack...	...produced only a forged Hawaiian Certificate of Birth.	50	[None stated.]
2	Any (All/One) who (that)...	...[REPEAT PREVIOUS PREDICATE]...	50	[None stated.]
MAIN CONCLUSION				Defeasible Class-Inclusion Transitivity
	Therefore...	Barack... ...received no authentic Hawaiian Certificate of Birth	50	Copyright © Joseph A. Laronge 2013 Figure 9

NICK *So your line of reasoning is broken because it falsely assumes that the Hawaiian Certificate of Birth is authentic.*

#	PREMISE SUBJECT COLUMN	PREMISE PREDICATE COLUMN	%	Assumptions Column
1	Barack...	... received a Hawaiian Certificate of Birth based on two facts.	100	a. The Whitehouse posted the short form in 2008. b. The Whitehouse posted the long form in 2011.
2	Any (All/One) who (that)...	...[REPEAT PREVIOUS PREDICATE]...	0	The Hawaiian Certificate of Birth is authentic.
3	Any (All/One) who (that)...	...[REPEAT PREVIOUS PREDICATE]...	0	[None stated.]
4	Any (All/One) who (that)...	...[REPEAT PREVIOUS PREDICATE]...	100	[None stated.]
MAIN CONCLUSION				Defeasible Class-Inclusion Transitivity
	Therefore...	Barack... ...is a natural born citizen of the U.S..	0	Copyright © Joseph A. Laronge 2013 Figure 10

SALLY *OK. Well I have another reason that proves Barack is a natural born citizen of the U.S..
“Governor Ambercrombie was a witness to the birth.”*

#	PREMISE SUBJECT COLUMN	PREMISE PREDICATE COLUMN	%	Assumptions Column
1	Barack...	...had a birth in Hawaii witnessed by Governor Ambercrombie.	100	[None stated.]
2	Any (All/One) who (that)...	...[REPEAT PREVIOUS PREDICATE]...	100	[None stated.]
3	Any (All/One) who (that)...	...[REPEAT PREVIOUS PREDICATE]...	100	[None stated.]
MAIN CONCLUSION				Defeasible Class-Inclusion Transitivity
	Therefore...	Barack... ...is a natural born citizen of the U.S..	100	Copyright © Joseph A. Laronge 2013 Figure 11

NICK Yeah maybe. But what assumptions are you relying upon about the Witness?

#	PREMISE SUBJECT COLUMN	PREMISE PREDICATE COLUMN	%	Assumptions Column
1	Barack...	...had a birth in Hawaii witnessed by Governor Ambercrombie.	50	[None stated.]
2	Any (All/One) who (that)...	...[REPEAT PREVIOUS PREDICATE]...	0	???
3	Any (All/One) who (that)...	...is a natural born citizen of the U.S..	100	[None stated.]
MAIN CONCLUSION				Defeasible Class-Inclusion Transitivity
Therefore...	Barack...	...is a natural born citizen.	0	Copyright © Joseph A. Laronge 2013 Figure 12

SALLY I'm assuming that the Governor was in a position to know and that he remembered the event correctly.

#	PREMISE SUBJECT COLUMN	PREMISE PREDICATE COLUMN	%	Assumptions Column
1	Barack...	...was born in Hawaii according to Witness Governor Ambercrombie.	100	[None stated.]
2	Any (All/One) who (that)...	...[REPEAT PREVIOUS PREDICATE]...	100	a. The Witness was in a position to know. b. The Witness remembered the event correctly.
3	Any (All/One) who (that)...	...is a natural born citizen of the U.S..	100	[None stated.]
MAIN CONCLUSION				Defeasible Class-Inclusion Transitivity
Therefore...	Barack...	...is a natural born citizen.	100	Copyright © Joseph A. Laronge 2013 Figure 13

NICK Wait a minute. How do you know that the Governor was in a position to know?

#	PREMISE SUBJECT COLUMN	PREMISE PREDICATE COLUMN	%	Assumptions Column
1	The Governor...	???	0	[None stated.]
2	Any (All/One) who (that)...	...[REPEAT PREVIOUS PREDICATE]...	0	[None stated.]
MAIN CONCLUSION				Defeasible Class-Inclusion Transitivity
Therefore...	The Governor...	...was in a position to know of the birth???	0	Copyright © Joseph A. Laronge 2013 Figure 14

SALLY Because I saw the Maternity Ward Visitor Log.

#	PREMISE SUBJECT COLUMN	PREMISE PREDICATE COLUMN	%	Assumptions Column
1	The Governor...	...signed the Maternity Ward Visitor Log on the day of the birth.	100	[None stated.]
2	Any (All/One) who (that)...	...[REPEAT PREVIOUS PREDICATE]...	100	[None stated.]
MAIN CONCLUSION				Defeasible Class-Inclusion Transitivity
Therefore...	The Governor...	...was in a position to know of the birth.	100	Copyright © Joseph A. Laronge 2013 Figure 15

NICK But someone told me that he was born in Kenya.

#	PREMISE SUBJECT COLUMN	PREMISE PREDICATE COLUMN	%	Assumptions Column
1	Barack...	... was born in Kenya according to someone.	100	[None stated.]
3	Any (All/One) who (that)...	...[REPEAT PREVIOUS PREDICATE]...	20	[None stated.]
MAIN CONCLUSION				Defeasible Class-Inclusion Transitivity
	Therefore...	Barack... ..is not a natural born citizen of the U.S..	20	Copyright © Joseph A. Laronge 2013 Figure 16

SALLY Let's take a break and go get lunch!

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References

- ENGBRETTSEN, G. (1981). *Three Logicians: Aristotle, Leibniz, and Sommers and The Syllogistic*. Van Gorcum & Company, The Netherlands.
- ENGBRETTSEN, G. (1996). *Something to Reckon with: The Logic of Terms*. University of Ottawa Press, Ottawa, ON.
- ENGBRETTSEN, G. (1998). *Line Diagrams for Logic: Drawing Conclusions*. The Edwin Mellen Press, Lewiston.
- 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.
- SOMMERS, F. & ENGBRETTSEN, G. (2000). *An Invitation to Formal Reasoning*. Ashgate Publishing Company, Aldershot.
- VAN GELDER, T. (2003). Enhancing deliberation through computer supported visualization. In: *Visualizing Argumentation: Software Tools for Collaborative and Educational Sense-making* (P. A. Kirschner, S. J. Buckingham Shum & C. S. Carr eds.). 97–115. Springer, New York.
- WALTON, D. N. (2002). Are some modus ponens arguments deductively valid? *Informal Logic*, 22 (1), 19–46.
- WALTON, D. (2004). *Relevance in Argumentation*. Lawrence Erlbaum Associates, Inc, Mahwah.
- WALTON, D. (2011). Argument mining by applying argumentation schemes. *Studies in Logic*, 4 (1), 38–64.
- WOODS, J. (2010). Defeasible reasoning. In: *Dialectics, Dialogue and Argumentation. An Examination of Douglas Walton's Theories of Reasoning and Argument* (C. Tindale & C. Reed eds.). 239–261. College Publications, London.