

Recent advances in the Meth8/VL4 modal logic model checker

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In applied and theoretical mathematics, assertions are categorized in alphabetical order as: axiom; conjecture; definition, entry; equation; expression; formula; functor; hypothesis; inequality; metatheorem; paradox; problem; proof; schema; system; theorem; and thesis. We evaluate 452 artifacts in 2419 assertions to confirm 456 as tautology and 1963 as *not* (81.1%). We use Meth8, a modal logic checker in five models.

The semantic content or predicate basis of some expressions on their face does not disqualify them from evaluation by Meth8 in classical modal logic. However, the rules of classical logic, as based on the corrected Square of Opposition by Meth8, apply to virtually any logic system. Consequently some numerical equations are mapped to classical logic as Meth8 scripts.

The rationale for mapping quantifiers as modal operators is based on satisfiability and reproducibility of validation of the 24-syllogisms from the corrected Square of Opposition.

Test results are refuted as *not* tautologous, confirmed as tautologous, or neither. For a paradox, *not* tautologous means it is not a paradox, but not necessarily a contradiction either.

The experimental tests used variables for 4 propositions, 4 theorems, and 11 propositions. The size of truth tables are respectively for 16-, 256-, and 2048- truth values, using recent advances in look up table indexing.

The Meth8 modal theorem prover implements the logic system variant VL4 which corrects the quaternary Ł4 of Łukasiewicz. There are two sets of truth values on the 2-tuple {00, 10, 01, 11} as respectively {False for contradiction; Contingent for falsity; Non contingent for truthity; Tautology for proof} and {Unevaluated; Improper; Proper; Evaluated}. The designated *proof* value is T for tautology and E for evaluated. The model checker contains recent advances in parsing technology named sliding window.

The mapping of formulas in Meth8 script was performed by hand, checked, and tested for accuracy of intent. The Meth8 script uses literals and connectives in one-character. Propositions are p-z, and theorems are A-B. The connectives for {and, or, imply, equivalent} are {&, +, >, =}. The negated connectives for {nand; nor; not imply; exclusive-or} are {\, -, <, @}. The operators for {not; possibility $\diamond \exists$; necessity $\square \forall$ } are {\~, %, #}. Expressions are adopted for clarity as: (p=p) for tautologous; (p@p) for contradiction; and (x<y) for $x \in y$. The expression $x \leq y$ as "x less than or equal to y" is rendered in the negative as $\sim(y < x)$ or as $(\sim x > \sim y)$.

Definition	Axiom	Symbol	Name	Meaning	2-tuple	Binary ordinal
1	p=p	T	tautology	proof	11	3
2	p@p	F	contradiction	absurdum	00	0
3	%p>#p	N	non-contingency	truthity	01	1
4	%p<#p	C	contingency	falsity	10	2

Note the meaning of (%p>#p): a possibility of p implies the necessity of p; and some p implies all p. In other words, if a possibility of p then the necessity of p; and if some p then all p.

This shows equivalence of respective modal operators and quantified operators as in Appendix.

For Meth8 an immediate further application is mapping sentences of natural language into logical formulas, so a semi-automation of that linguistic process is near completion.

References

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No.	Name of artifact	Type of artifact	Results with instances
1	ABC	Conjecture	Invalidated
2	Abductive reasoning	System	Invalidated
3	Abduction, induction, deduction: Peirce	Inference	Invalidated(2) Validated(1)
4	Abstract theory of segments using Prolog	Proofs	Invalidated(15) Validated(3)
5	AGM / Levi and Harper bridging principles	Postulates	Invalidated(7) Validated(3)
6	Agnosticism as subset of atheism from no-belief	Conjecture	Invalidated(4) Validated(2)
7	AI: divide the dollar competition	Experiment	Invalidated(1)
8	AI: reduction for scalable deep learning	Algorithm	Invalidated(3)
9	Alcoholics Anonymous BB: We agnostics, p 53	Conjecture	Invalidated(5)
10	Alexandroff correspondence	Conditional	Invalidated(3)
11	Analysis as both correct and informative	Paradox	Invalidated(5)
12	Anderson division by zero as nullity	Theorem	Invalidated
13	Approximations of theories	System	Invalidated(1)
14	Athanasian creed (Holy Trinity)	Credo	Invalidated(1) Validated(2)
15	Axiomatizing category theory in free logic	Axioms	Invalidated
16	Banach order space, generating positive cone	Definition	Invalidated(2) Validated(1)
17	Banach-Tarski, shorter resuscitation attempt	Paradox	Invalidated(2)
18	Crucial claim in Step 3 of proof, shortest	Paradox	Invalidated(1)
19	Bar recursion	Mapping	Invalidated(2)
20	Barcan	Formula	Validated
21	Bayes rule	Rule	Invalidated(11) Validated(11)
22	BCI / BCK algebra	System	Invalidated(5) Validated(3)
23	Bell / CHSH / Spekken toy model	Inequalities	Invalidated
24	A shorter refutation	Theorem	Invalidated(2)
25	A simpler refutation	Theorem	Invalidated(2)
26	Bell's inequality by axiom of empty set	Theorem	Invalidated(2)
27	Bogus Bellian logic (BBL)	Theorem	Invalidated(5)
28	Coercive proof	Theorem	Invalidated(2)
29	Coin toss proof	Conjectures	Invalidated(2)
30	Original inequality with assumption	Conjecture	Invalidated(4)
31	Original inequality with assumptions	Conjectures	Invalidated(5)
32	Original inequality and CHSH	Conjectures	Invalidated(6)
33	Positive reasons proof	Theorem	Invalidated(6) Validated(3)
34	Tropical sum	Method	Invalidated(1)

No.	Name of artifact	Type of artifact	Results with instances
35	Bellman's Lost in the forest problem, solution	Theorem	Validated(4)
36	Berkeley	Paradox	Invalidated
37	Bernstein-Vazirani	Algorithm	Invalidated(4) Validated(1)
38	No-cloning theorem	Theorem	Invalidated(2)
39	Bertrand-Chebyshev theorem / postulate	Theorem	Invalidated(2)
40	Betweenness theory	Axioms	Invalidated(9) Validated(7)
41	Biscuit conditionals	System	Invalidated(13)
42	Bisimulation, coinduction, Howes' congruence	Proof method	Invalidated(5)
43	Blameworthiness degrees	Coalition	Invalidated(3) Validated(5)
44	Block argumentation	Method	Invalidated(15)
45	Blok-Esakia	Theorems	Invalidated(5)
46	Bogdanov map, 2D conjugate of Hénon map	Formula	Invalidated
47	Born rule	Theorem	Invalidated(6)
48	Exclusivity rule as basis	Theorem	Invalidated(5)
49	Borsuk-Ulam theorem (BUT)	Conjecture	Invalidated(1)
50	Branching quantifier (Hintikka)	System	Invalidated
51	Brouwer fixed point theorem (BFPT)	Conjecture	Invalidated(3) Validated(2)
52	Browder's theorem	Conjecture	Invalidated(1)
53	Buddhist logic	Tetralemma	Invalidated(12)
54	Buridan's Ass	Paradox	Invalidated
55	Cantor's continuum conjecture, binary injection	Hypothesis	Invalidated(2)
56	Continuum conjecture, interpreted	Hypothesis	Invalidated(3)
57	Diagonal argument	Proof	Invalidated(3)
58	Pairing	Functor	Invalidated(2)
59	Carroll's tortoise and Achilles	Paradox	Invalidated
60	Caswell's significant curriculum issues (1952)	Theorem	Invalidated(5) Validated(1)
61	Causality	Axiom	Invalidated(3) Validated(2)
62	Category composition of morphisms	Definition	Invalidated(1)
63	CC conjecture of Lin Fan Mao	Conjecture	Invalidated(2)
64	Chaitin incompleteness and L constant	Theorem	Invalidated(3) Validated(1)
65	Chinese room argument: Brain Simulator Reply	Conjecture	Validated(3)
66	CHSH inequality	Conjecture	Invalidated(1)
67	Dual reality	Conjecture	Invalidated(1)
68	Church	Thesis	Invalidated

No.	Name of artifact	Type of artifact	Results with instances
69	Clausius-Clapeyron on spacial dimension	Equation	Invalidated(1)
70	Clifford tori 2D / Kanban cell neuron	Definition	Validated
71	Coherence in modal logic	Refutation	Invalidated(1)
72	Collatz (briefest known confirmation)	Conjecture	Invalidated(4) Validated(1)
73	Commutative short circuit on propositional logic	System	Invalidated (1)
74	Complementarity inequality	Refutation	Invalidated(2) Validated(1)
75	Complex (\mathbb{C}), imaginary number rendering	Method	Invalidated(1) Validated(1)
76	Conceptivistic / containment logic: proscription	Systems	Invalidated(3)
77	Conditional logic: improved Adams	Hypothesis	Invalidated(7)
78	Events in QL	Conjectures	Invalidated(8) Validated(1)
79	Confluence in rewrite systems	Property	Invalidated(3)
80	Connexive logic: Wansing's nightmare	System	Invalidated(2)
81	Aristotle, Boethius justifying connexive	Theses	Invalidated(4)
82	De Finettian logic conditionals	Indicatives	Invalidated(10)
83	Stit logic (see to it that)	System	Invalidated(13)
84	Constructivistic logic	System	Invalidated(14) Validated(2)
85	Continuum hypothesis	Conjecture	Invalidated(2) Validated(1)
86	Coq proof assistant	Prover	Invalidated(1)
87	Craig's interpolation	Theorem	Invalidated(2) Validated(2)
88	Creative theories in degrees of unsolvability	Theorem	Invalidated
89	D Ultrafilter contra continuum problem	Equation	Invalidated(1)
90	De Morgan algebras, existentially closed	System	Invalidated(2)
91	Dedekind lattice identity	Axiom	Validated
92	Dempster-Shafer belief and plausibility	Theory	Invalidated(3)
93	Density of all Turing and truth table degrees	Formula	Invalidated(2)
94	Description logic	System	Invalidated(2)
95	Power set POW on of any Ω -model	Operator	Invalidated(4)
96	Unions in descriptively near sets	Operator	Invalidated(6) Validated(2)
97	Dialetheism	System	Invalidated(4)
98	Dialetheism: inconsistent	System	Invalidated(2)
99	Dichotomy of selection	System	Invalidated
100	Disturbance	Feature	Invalidated(4)
101	Diverse double compiling	Schema	Invalidated
102	Domain theory of Dana Scott	System	Invalidated(6)

No.	Name of artifact	Type of artifact	Results with instances
103	Doxastic logic	System	Invalidated(8) Validated(13)
104	Drinker's paradox	Paradox	Invalidated
105	Dyatic semantics on paraconsistent logic C_I	Approach	Invalidated(4)
106	$E=mc^2$	Theorem	Invalidated(3) Validated(1)
107	EF-axiom: topology and near sets	Axiom	Invalidated
108	Ehrenfeucht-Mostowski indiscernables	Theorem	Invalidated(1)
109	Einstein–Podolsky–Rosen (EPR)	Paradox	Invalidated(1)
110	Elementary constructive set theory (ECST)/CZF	Definitions	Invalidated(6)
111	Entanglement vs untanglement: no-no go-go	Conjecture	Invalidated(28)
112	Epicurus invoked by Epictetus	Paradox	Invalidated(1)
113	Epimenides the Cretan	Paradox	Invalidated(1)
114	Epistemic coalition	Perfect recall	Invalidated(4) Validated(3)
115	Epistemic dynamic reasoning	System	Invalidated(2)
116	Epistemic Hilbert substructure	System	Invalidated(5)
117	Epistemic for knowledge and probability	System	Invalidated(2)
118	Epistemic navigation	System	Invalidated(8)
119	Epistemic quantifiers over agents	Conjecture	Invalidated(8) Validated(12)
120	Erdős-Strauss	Conjecture	Invalidated
121	Euathlus paradox	Paradox	Invalidated(9)
122	Euclidean geometry embedded in non Euclidean	Conjecture	Invalidated(3)
123	"Ex nihilo": some thing from nothing	Conjecture	Invalidated(4) Validated(4)
124	Fictional logic based on Levi-identity / AGM	System	Invalidated(5) Validated(4)
125	Finite direct powers of ω for modal model	System	Invalidated(1)
126	Fixedpoint operator mapping mu-calculus	Conjecture	Invalidated(2)
127	Fitch's knowability	Paradox	Invalidated(4)
128	FOL disjunctive normal forms (DNF): minimize	FOL Optimizer	Invalidated(2) Validated(1)
129	FOL continuous induction on real closed fields	System	Invalidated(11) Validated(1)
130	Forcing method	Paradoxes	Invalidated(2)
131	Frauchiger-Renner thought experiment	Paradox	Invalidated(5)
132	Frauchiger-Renner thought quantum model	Paradox	Invalidated(14) Validated(2)
133	Fredkin	Paradox	Invalidated(1)
134	Free will argument of Maimonides	Paradox	Invalidated(1)
135	Free will non-existence	Refutation	Invalidated(8) Validated(2)
136	Free will theorem: Clifton-Kochen-Specker	Theorem	Invalidated(1)

No.	Name of artifact	Type of artifact	Results with instances
137	Free will theorem: FIN axiom	Hypothesis	Invalidated(2) Validated(2)
138	Free will theorem: MIN' axiom	Hypothesis	Invalidated(1)
139	Frequency dependence of mass	Theorem	Invalidated(3) Validated(1)
140	Functions as injective, surjective, bijective	Theorems	Validated(4)
141	Gentzen proof of sequent System G-M	System	Invalidated(6) Validated(2)
142	Gettier (justified belief)	Problem	Invalidated(6)
143	GHZ (Greenberger-Horne-Zeilinger)	Experiments	Invalidated(1)
144	Gleason	Theorem	Invalidated(1)
145	Gödel class with identity un-solvable	Conjecture	Invalidated(10) Validated(1)
146	Gödel compactness	Theorem	Invalidated(6) Validated(2)
147	Gödel completeness	Theorem	Invalidated
148	Gödel completeness, shortest	Theorem	Invalidated(2)
149	Gödel first incompleteness	Theorem	Invalidated(4)
150	Gödel incompleteness	Equations	Invalidated(14) Validated(1)
151	Gödel incompleteness FOL	Contradictions	Invalidated(14) Validated(1)
152	Gödel incompleteness theorem	Assistant tools	Invalidated(2) Validated(2)
153	Gödel incompleteness theorem	Refutation	Invalidated(7)
154	Gödel incompleteness via two counter-examples	Refutation	Invalidated(9) Validated(2)
155	Gödel-justification logic	Refutation	Invalidated(7) Validated(2)
156	Subsets	Models	Invalidated(2)
157	Gödel-Löb	Axiom	Invalidated
158	Gödel pairing function	Axiom	Invalidated(3) Validated(1)
159	Gödel recursion	Theorem	Validated
160	Gödel-Scott on God	Theorem schema	Invalidated
161	Goldbach's conjectures	Conjectures	Invalidated
162	Goldblatt-Thomason with back/forth duality	Theorem	Invalidated(3)
163	Graded modal logic	Frame classes	Invalidated(4) Validated(2)
164	Grassmannian (<i>recently discovered</i>)	Paradox	Invalidated
165	Hadamard gate	Theory	Invalidated(3) Validated(1)
166	Hahn-Banach	Theorem	Invalidated(5)
167	Hall	Effect	Invalidated
168	Hamiltonian quaternion	Definition	Invalidated(3)
169	Hardy's generalized paradox	Conjecture	Invalidated(6)
170	Hegel's dialectic	Method	Invalidated(6) Validated(3)

No.	Name of artifact	Type of artifact	Results with instances
171	Heider inspired international relations theory	Theory	Invalidated(5) Validated(1)
172	Heisenberg uncertainty principle	Axiom	Invalidated(2)
173	Conjecture	Principle	Invalidated(1)
174	Replacement theorem	Axiom	Inalidated (2) Validated(3)
175	Take a picture of an electron	Principle	Invalidated(6) Validated(2)
176	Henkin cyclic algebra and first order logic	System	Invalidated(9) Validated(6)
177	Applications to logic	Axioms	Invalidated(8) Validated(6)
178	Permutation model nonrepresentable	Assertion	Invalidated(1)
179	Herbrand semantics	System	Invalidated(6)
180	Heyting algebra	Algebra	Invalidated(21)
181	Heyting-Brouwer intuitionistic logic	Systems	Invalidated(9) Validated(1)
182	Heyting logic	Idempotency	Invalidated(2) Validated(1)
183	Hexagons of opposition for statistical modalities	Conjectures	Invalidated(9) Validated(1)
184	Higher-order mathematical induction	Principle	Invalidated(2) Validated(1)
185	Hilbert #10 Diophantine universal solution	Formulas	Invalidated
186	Hilbert generalization	System	Invalidated
187	Hilbert grand hotel	Paradox	Invalidated(1)
188	Hilbert / Kolmogorov intuitionistic logic	Systems	Invalidated(9)
189	Huhn 2-distributive lattice identity	Formula	Invalidated
190	Hydraulic forgiveness (confirmed)	Theorem	Invalidated(6) Validated(2)
191	Hydraulic corollary of peace	Corollary	Validated(1)
192	Ideals	Definition	Invalidated(4)
193	Ignorance of first choice	System	Invalidated
194	Imaginary numbers	Definition	Invalidated(2)
195	Imperative logic	System	Invalidated(3) Validated(4)
196	Implication combination forms from $(p \supset r) \supset r$	Theorems	Invalidated(3) Validated(16)
197	Inconsistent theory	Theorem	Invalidated
198	Extending the monad to a triad	Formulas	Invalidated
199	Kunen inconsistency	Theorem	Invalidated
200	Independence-friendly logic (Kreiselization)	System	Invalidated(2)
201	Indicative conditionals	Encyclopedia entry	Invalidated
202	Induction: Black raven (swan); Kripkenstein	System	Invalidated(3)
203	Induction: New riddle	Paradox	Invalidated(2)
204	Induction, coinduction: standard and mutual	System	Invalidated(4)

No.	Name of artifact	Type of artifact	Results with instances
205	Induction in Elem. Arith. for reduction property	Formulas	Invalidated(2)
206	Inequality: 'arbitrarily' vs 'sufficiently large'	Conjecture	Invalidated(2) Validated(1)
207	Infinite set theory	Theorem	Invalidated
208	Information theory: mutual information	Definition	Invalidated(4)
209	Interval logic for model checking	System	Invalidated(3)
210	Join-prime in lattice theory	Definition	Validated
211	Jonsson positive logic: retromorphism	System	Invalidated(3)
212	k -triangular set function logic	Definition	Validated(1)
213	Kanban cell neuron maps whole brain	Model	Invalidated(242)Validated(14)
214	Kant: falsity of syllogistic figures	Theorems	Invalidated(8) Validated(2)
215	Karpenko, S.A.	System K-Ł4	Invalidated(6) Validated(8)
216	King algebras on rough set concept analysis	Algebra	Invalidated(5)
217	Kleene lattices, reversible	Axiomization	Invalidated(3) Validated(1)
218	Kramers-Kronig	Relation	Invalidated
219	Kripke-Platek and CZF	Set Theory	Invalidated(1)
220	Kuratowski–Zorn lemma (Zorn's lemma)	Lemma	Invalidated
221	Lachlan problem solution	Problem	Invalidated(4)
222	Lambda λ -calculus and LISP	System	Invalidated(7) Validated(1)
223	Lean prover from Microsoft	System	Invalidated(3)
224	Leibniz' ontological proof	Proof	Invalidated(1) Validated(1)
225	Briefest known ontological proof of God	Proof	Validated(2)
226	Lemmon D	Axiom	Invalidated
227	van Leunen deformation field	Conjecture	Invalidated(4)
228	van Leunen lattice logic, weak modular	Theorem	Invalidated(2)
229	Liar	Paradox	Invalidated
230	Prior rendition	Paradox	Invalidated
231	Kripke rendition	Paradox	Invalidated
232	Line through a circle	Conjecture	Validated(1)
233	Linear algebra	Theorems	Invalidated(4)
234	Linear programming: Kharun-Kush-Tucker	Conditions	Invalidated(4)
235	Liouville	Theorem	Invalidated(2) Validated(1)
236	Löb original, corrected	Theorem	Invalidated(1) Validated(1)
237	Löb with Gödel incompleteness	Theorems	Invalidated(3)
238	Lobachevskii non Euclidean geometry	Consistency	Invalidated(1) Validated(1)

No.	Name of artifact	Type of artifact	Results with instances
239	Lonely runner	Conjecture	Invalidated(8) Validated(1)
240	Löwenheim–Skolem	Theorem	Invalidated(5)
241	Löwenheim–Skolem, Hilbert style	Metatheorem	Invalidated(4)
242	Luce model (general)	Definitions/axioms	Validated(5)
243	Łukasiewicz nightmare: $(\diamond p \& \diamond q) \rightarrow \diamond(p \& q)$	Allegation	Invalidated(4) Validated (3)
244	Łukasiewicz modal Ł4	Objections	Invalidated(8) Validated(1)
245	Lyndon interpolation and GL	Interpolation	Invalidated(8) Validated(1)
246	Majorana's 'root'	Equations	Invalidated(9)
247	Matita prover superposition	Algorithms	Invalidated (3)
248	Mereology, behavioral	System	Invalidated(2)
249	Mereotopology, distributive	Relations	Invalidated(9)
250	Metaphysics: "Something rather than nothing"	Problem	Validated(2)
251	Meth8/VŁ4 self-proof in one variable	Theorem	Validated(8)
252	Meth8 versus Prover9 via Lifshitz	Problem	Validated
253	Minkowski plane, classical set of points/cycles	Theorems	Invalidated(2) Validated(1)
254	Modal aleatoric calculus	System	Invalidated(6)
255	Modal coalgebraic geometric logic	System	Invalidated(2)
256	Modal logics: 2; 3; 4; B; D; E; K; M; T; and W	Systems	Invalidated(2) Validated(8)
257	Modal GL ₂	Logic	Invalidated(8) Validated(1)
258	Modern modal logics (2): JYB4 and AR4	Axioms	Invalidated(12) Validated(17)
259	Modified divine command	Theory	Invalidated
260	Modus ponens consequent as conditional	Rule	Invalidated(3) Validated(1)
261	Molyneux's problem	Problem	Invalidated(1)
262	Moore's paradox	Paradox	Invalidated(2) Validated(1)
263	Moral absolutism impossible	Conjecture	Invalidated(3) Validated(1)
264	Relativity of moral absolutism	Conjecture	Invalidated(2) Validated(1)
265	Most	Quantifier	Invalidated(2)
266	Necessitation: K, T, 4, B, D, 5; D, M, S4, B, S5	Axiom	Invalidated(10) Validated(7)
267	Leonard Nelson's criticism of epistemology	System	Invalidated
268	von Neuman-Bernays-Gödel [NBG]	Theory	Invalidated(2) Validated(3)
269	Neutrosophic logic	Theorems	Invalidated(5)
270	Dezert-Smarandache	Theory	Invalidated(2)
271	Generalized Hegel's dialectics	Method	Invalidated(4)
272	Generalized intuitionistic, fuzzy logic	System	Invalidated(2)

No.	Name of artifact	Type of artifact	Results with instances
273	Geometry of Smarandache / Lin Fan Mao	Definition	Invalidated(2)
274	MANET attack genetics	Algorithm	Invalidated(1)
275	Negated adjectival phrases	Lattices	Invalidated(2)
276	Neutrosophic logic: theory of everything	Theorem	Invalidated(2)
277	Neutrosophic sets	Properties	Invalidated(3)
278	Neutrosophy with dependent probability	Definitions	Invalidated(3) Validated(2)
279	Quinary	System	Invalidated(2)
280	Retract crisp set topology	Propositions	Invalidated(5)
281	Smarandache multi-space theory	System	Invalidated(5)
282	Soft lattice theory	Theorem	Invalidated(2)
283	Unification of other logics	Axioms / Rules	Invalidated(2)
284	Values as 1, 0, between 0 and 1	Designated logic	Invalidated(2)
285	Vector space on $\{-0, 0, 0 < p < 1, 1, 1+\}$	Multi-valued logic	Invalidated(3)
286	Newcomb's game	Paradox	Invalidated(2)
287	Non-deterministic logic	Completeness	Invalidated(8)
288	Nothing does not imply a non existent null set	Definition	Invalidated(7)
289	Nucleosynthesis	Definitions	Invalidated(4)
290	Optimization for complex number programming	Conjecture	Invalidated(1)
291	Ordinal Turing machine (OTM) on set theory	Conjectures	Invalidated(3)
292	P=NP; 3-SAT	Conjectures	Invalidated(5)
293	Paraconsistency, machine-assisted view	Axioms	Invalidated
294	Paraconsistent contradiction	Conext	Invalidated
295	Paradox refutation reduced to one variable	Method	Validated
296	Partial awareness	System	Invalidated(8) Validated(1)
297	Pauli exclusion	Principle	Invalidated(4)
298	Peano arithmetic 9, 1-8	Axioms	Invalidated(1) Validated(8)
299	PL4	System	Invalidated(10)
300	Playfair axiom	Axiom	Validated(1)
301	Płonka sums of inclusive consequence relations	Inclusion	Invalidated(1)
302	Poincaré recurrence theorem	Theorem	Invalidated(2)
303	Poison modal logic (PML)	System	Invalidated(4)
304	Karl Popper on God	Proof	Validated
305	PowerEpsilon mathematical induction	Axiom	Validated(1)
306	Pratt-Floyd-Hoare logic correctness	System	Invalidated(5)

No.	Name of artifact	Type of artifact	Results with instances
307	Preference profiles	Algorithm	Invalidated(6)
308	Prevarieties and quasivarieties of logic	Monoids	Invalidated(4)
309	Prenex normal format	Rules	Invalidated(11) Validated(3)
310	Shortest refutation based on implication	Rules	Invalidated(2) Validated(2)
311	Prisoner's paradox	Paradox	Invalidated(3)
312	Prover9 vs Meth8 differences	System	Invalidated
313	Pure alethic modal logic	System	Invalidated(1) Validated(1)
314	Quantifiers and operators	Connectives	Invalidated(12)
315	Quantum arithmetic for repeat-until-success	Circuits	Invalidated(2)
316	Block chain	Cryptography	Invalidated(1)
317	Classical logic as completion of QL	System	Invalidated(16) Validated(6)
318	Control by observation	System	Invalidated
319	Entanglement	Conjecture	Invalidated(5)
320	Gates correspond to logical operators	Theorems	Invalidated(4) Validated(1)
321	Gates refuted	Theorems	Invalidated(8) Validated(1)
322	Gedanken experiment	Conjectures	Invalidated(8)
323	Logic	System	Invalidated(17) Validated(2)
324	Masking	Conjectures	Invalidated(5) Validated(2)
325	Probability	Axiom	Invalidated(1)
326	Probability	Rule	Invalidated(2)
327	Quaternion on classical logic	Definition	Invalidated(5)
328	Simulation of Hamiltonian spectra	Operator	Invalidated(1)
329	Spin-statistics	Theorem	Invalidated(4) Validated(4)
330	Superposition as the red herring	Conjecture	Invalidated (3)
331	Superposition disproves Schrödinger cat	Conjecture	Invalidated(5) Validated(2)
332	Ternary probability of qutrit	Hypothesis	Invalidated(3)
333	Three lights experiment of qutrit	Conjecture	Invalidated(1)
334	Questions and answers	Problem	Invalidated(4) Validated(1)
335	Ramsey's theorem for the 2-color case	Theorem	Validated(2)
336	Ranjan, A.	Problem	Validated
337	Rational emotive behavior therapy (REBT/LBT)	Systems	Invalidated(16)
338	Realizability semantics for QML	Theorems	Invalidated(3)
339	Reichenbach common cause / event-splitting	Principle	Invalidated
340	Relativization (structural induction) in weighting	Method	Invalidated(1)

No.	Name of artifact	Type of artifact	Results with instances
341	Relevance logic	System	Invalidated(7)
342	Definition in R	Model	Invalidated(2)
343	Reverse mathematics: recursive comprehension	Principle	Invalidated(10) Validated(2)
344	Measurability and computability	Theory	Invalidated(1) Validated(2)
345	Riemann: only zeroes at 0, 1/2	Hypothesis	Invalidated
346	Excluded middle	Conjecture	Invalidated(4)
347	Extended complex numbers on sphere	Operators	Invalidated(3) Validated(2)
348	Zeta function, Caceres 6	Proposition	Invalidated(4)
349	Zeta function, properties	Axioms	Invalidated(7)
350	Roman Catholic Church (RCC)	(Dogma)	Invalidated(7)
351	Canon law as noncontradictory/infallible	Theorem	Invalidated(4)
352	Erasmus contra Luther	Controversy	Validated
353	Infallibility and the Historic Church	Pius IX	Invalidated(2)
354	Invalid epiclesis with silent Holy Ghost	Canons	Invalidated(4) Validated(1)
355	Magisterium	Paul VI	Invalidated(1)
356	Primacy of the Roman See	Pius XI	Invalidated(1)
357	Sacred heart of Jesus	Pius XI	Invalidated(3)
358	Tradition above scripture	Pius IX	Invalidated(4)
359	Twelfth promise of St Alacoque	Vision	Invalidated(3)
360	Rosser's theorem on consistency	Theorem	Invalidated(6) Validated(1)
361	Rota lattice theory, distributive	Axiom	Invalidated
362	Russell	Paradox	Invalidated
363	S5II+ propositional quantification	System	Invalidated
364	Sabotage modal logic (revisited)	System	Invalidated(6)
365	Sacchetti's modal logics of provability	Definition	Invalidated(1)
366	Schematic refutations of formula schemata	Method	Invalidated(2)
367	Schrödinger's cat	Paradox	Invalidated
368	Self-equilibrium	Law / Paradox	Invalidated
369	Sliding scale in law	Theorem	Invalidated(3)
370	Solovay arithmetical / semantical completeness	Theorem	Invalidated(10) Validated(2)
371	Sorites	Paradox	Invalidated
372	Special theory of relativity: Crothers refutation	Confirmation	Validated
373	Square (Łukasiewicz) and Cube (Seuren)	Systems	Invalidated(27) Validated(15)
374	Square of Opposition Meth8 Corrected	System	Validated

No.	Name of artifact	Type of artifact	Results with instances
375	Square of Opposition Modern Revised	System	Invalidated
376	Square of Opposition	Proportions	Invalidated(3)
377	Stable set lattices	Modal operators	Invalidated(2)
378	Stone space type lattice logic model	Theory	Invalidated(2)
379	Stone-Wales rotation transform reversibility	Theorem	Invalidated(2) Validated(1)
380	Superposition of states	Principle	Invalidated(6)
381	Supply and demand	Conjecture	Invalidated(6)
382	Surveillance objectives	Subgames	Invalidated(2)
383	Suzko's minimal truth values for universal logic	Problem	Invalidated(3)
384	Symplectic vector space	Theorem	Invalidated(2)
385	Tarski's undefinability of truth	Theorem	Invalidated(2)
386	Tarski–Grothendieck set theory	Axiom	Invalidated(2)
387	Tarski–Grothendieck Metamath ax-groth	Axiom	Invalidated(7)
388	Traski's planar Eucleadian R-geometry	System	Invalidated(8) Validated(2)
389	Theory of logic for glutty, gappy relations	System	Invalidated(16)
390	Three-valued, bivalent logic VL3	System	Validated(10)
391	Time as God	Conjecture	Validated(2)
392	Time as coexisting past, present, future states	Conjecture	Invalidated(3)
393	Time as tense via converse implication (EQT)	Conjectue	Validated(1)
394	Topological manifold transition	Function	Invalidated(1)
395	Topological T ₀ -space	Differ modality	Invalidated(3)
396	Totherian sets	Theory	Invailded (5)
397	Translation invariance of superposition calculus	Property	Invalidated(2)
398	Triangle inequality	Conjecture	Validated(1)
399	Trivial proofs for a troll	Conjectures	Validated(3)
400	Trolley ethical thought experiment	Problem	Invalidated(3)
401	Turing halting problem	Problem	Invalidated(2) Validated(1)
402	Twin paradox	Paradox	Invalidated(2)
403	Two-sided page	Paradox	Invalidated(5) Validated(1)
404	Unanswered logic questions	Conjectures	Invalidated(2) Validated(1)
405	Unfalsifiability	Conjecture	Invalidated(2) Validated(2)
406	Unification of simple symmetrical modal logics	Type	Invalidated(2)
407	Universal finite set	Theorem	Invalidated(2)
408	Universal network	Operator	Invalidated(5)

No.	Name of artifact	Type of artifact	Results with instances
409	Universal logic VL4	Logic	Validated
410	Veblen (corrected)	Axiom	Invalidated(1) Validated(1)
411	Vector conjectue for two points implying a third	Conjecture	Validated(1)
412	Verilog / VHDL hardware logic	Connectives	Invalidated(36)
413	Veronoï regions (with "nonempty sets")	Definition	Invalidated
414	Vickrey auction	Theorem	Invalidated(10) Validated(2)
415	Vietoris space modal operators	Definitions	Invalidated(2)
416	VL4 theorems for S5	Theorems	Invalidated(8)
417	Vongehr's shift rendering QM "natural"	Paradigm	Invalidated(2) Validated(3)
418	W (K4W)	Theorem	Invalidated
419	Wadge order (and on Scott domain)	Theorem	Invalidated(4)
420	Well ordering property	Axiom	Invalidated
421	White's model of creation	System	Invalidated(7) Validated(1)
422	Wittgenstein's ab-notation	System	Invalidated(3)
423	X-homology on manifolds in topology	Axiom	Invalidated(1)
424	Yalcin logic	Axioms	Invalidated(2)
425	Yinyang	System	Invalidated(1) Validated(3)
426	Zadeh first operators on fuzzy logic	System	Invalidated(5)
427	Historical assumptions	Axioms	Invalidated(4) Validated(1)
428	Resolution and symmetry in Z-numbers	Definitions	Invalidated(3)
429	Zarski topology affine varieties, scheme theory	Definitions	Invalidated(3)
430	Zermelo-Fraenkel constructive (CZF)	Axioms	Invalidated(9) Validated(1)
431	Zermelo-Fraenkel (ZFC):	(Axioms)	Invalidated(25) Validated(2)
432	Shortest refutatation of 9 axioms	Axioms	Invalidated(10)
433	ZFC Choice	Axiom	Invalidated
434	ZFC Empty set	Axiom	Invalidated
435	Shortest refutation	Axiom	Invalidated(3)
436	ZFC Extensionality	Axiom	Invalidated(1) Validated(1)
437	ZFC Extensionality (another rendition)	Axiom	Invalidated(1)
438	ZFC Infinity	Axiom	Invalidated(2)
439	ZF INF	Axiom	Invalidated
440	ZFC Pairing	Axiom	Invalidated
441	ZFC Power set	Axiom	Invalidated
442	ZFC Regularity or foundation	Axiom	Invalidated

No.	Name of artifact	Type of artifact	Results with instances
443	ZFC Schema of replacement	Axiom	Invalidated
444	ZFC Specification	Axiom	Validated
445	ZFC Union	Axiom	Invalidated
446	ZFC Well ordering	Axiom	Invalidated(2)
447	ZF Law of excluded middle: infinite set	Axiom	Invalidated(2)
448	ZF supremum and infimum	Definitions	Invalidated(3)
449	ZFC ⁰ : schemas of comprehension, replacement	Axioms	Invalidated(2)
450	Zero and three in arithmetic	Theorems	Validated(9)
451	Zero knowledge proof	Theorem	Invalidated
452	Zeroth law of thermodynamics	Theorem	Invalidated(3) Validated(2)