

Recent advances in the Meth8/VL4 modal logic model checker [Table of contents]

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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 424 artifacts in 2310 assertions to confirm 449 as tautology and 1861 as *not* (80.6%). 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-Tarski	Paradox	Invalidated
17	Bar recursion	Mapping	Invalidated(2)
18	Barcan	Formula	Validated
19	Bayes rule	Rule	Invalidated(11) Validated(11)
20	BCI / BCK algebra	System	Invalidated(5) Validated(3)
21	Bell / CHSH / Spekken toy model	Inequalities	Invalidated
22	A shorter refutation	Theorem	Invalidated(2)
23	A simpler refutation	Theorem	Invalidated(2)
24	Bell's inequality by axiom of empty set	Theorem	Invalidated(2)
25	Bogus Bellian logic (BBL)	Theorem	Invalidated(5)
26	Coercive proof	Theorem	Invalidated(2)
27	Coin toss proof	Conjectures	Invalidated(2)
28	Original inequality with assumption	Conjecture	Invalidated(4)
29	Original inequality with assumptions	Conjectures	Invalidated(5)
30	Original inequality and CHSH	Conjectures	Invalidated(6)
31	Positive reasons proof	Theorem	Invalidated(6) Validated(3)
32	Tropical sum	Method	Invalidated(1)
33	Berkeley	Paradox	Invalidated
34	Bernstein-Vazirani	Algorithm	Invalidated(4) Validated(1)

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

No.	Name of artifact	Type of artifact	Results with instances
69	Commutative short circuit on propositional logic	System	Invalidated (1)
70	Complementarity inequality	Refutation	Invalidated(2) Validated(1)
71	Complex (\mathbb{C}), imaginary number rendering	Method	Invalidated(1) Validated(1)
72	Conceptivistic / containment logic: proscription	Systems	Invalidated(3)
73	Conditional logic: improved Adams	Hypothesis	Invalidated(7)
74	Events in QL	Conjectures	Invalidated(8) Validated(1)
75	Confluence in rewrite systems	Property	Invalidated(3)
76	Connexive logic: Wansing's nightmare	System	Invalidated(2)
77	Aristotle, Boethius justifying connexive	Theses	Invalidated(4)
78	De Finettian logic conditionals	Indicatives	Invalidated(10)
79	Stit logic (see to it that)	System	Invalidated(13)
80	Constructivistic logic	System	Invalidated(14) Validated(2)
81	Continuum hypothesis	Conjecture	Invalidated(2) Validated(1)
82	Craig's interpolation	Theorem	Invalidated(2) Validated(2)
83	Creative theories in degrees of unsolvability	Theorem	Invalidated
84	D Ultrafilter contra continuum problem	Equation	Invalidated(1)
85	De Morgan algebras, existentially closed	System	Invalidated(2)
86	Dedekind lattice identity	Axiom	Validated
87	Dempster-Shafer belief and plausibility	Theory	Invalidated(3)
88	Density of all Turing and truth table degrees	Formula	Invalidated(2)
89	Description logic	System	Invalidated(2)
90	Descriptive near set unions	Operator	Invalidated(6) Validated(2)
91	Dialetheism	System	Invalidated(4)
92	Dialetheism: inconsistent	System	Invalidated(2)
93	Dichotomy of selection	System	Invalidated
94	Disturbance	Feature	Invalidated(4)
95	Diverse double compiling	Schema	Invalidated
96	Doxastic logic	System	Invalidated(8) Validated(13)
97	Drinker's paradox	Paradox	Invalidated
98	$E=mc^2$	Theorem	Invalidated(3) Validated(1)
99	EF-axiom: topology and near sets	Axiom	Invalidated
100	Ehrenfeucht–Mostowski indiscernables	Theorem	Invalidated(1)
101	Einstein–Podolsky–Rosen (EPR)	Paradox	Invalidated(1)
102	Energy-mass equation, $E=mc^2$	Theorem	Invalidated(3) Validated(1)

No.	Name of artifact	Type of artifact	Results with instances
103	Entanglement vs untanglement: no-no go-go	Conjecture	Invalidated(28)
104	Epicurus invoked by Epictetus	Paradox	Invalidated(1)
105	Epimenides the Cretan	Paradox	Invalidated(1)
106	Epistemic coalition	Perfect recall	Invalidated(4) Validated(3)
107	Epistemic dynamic reasoning	System	Invalidated(2)
108	Epistemic Hilbert substructure	System	Invalidated(5)
109	Epistemic for knowledge and probability	System	Invalidated(2)
110	Epistemic navigation	System	Invalidated(8)
111	Epistemic quantifiers over agents	Conjecture	Invalidated(8) Validated(12)
112	Erdős-Strauss	Conjecture	Invalidated
113	Euathlus paradox	Paradox	Invalidated(9)
114	"Ex nihilo": some thing from nothing	Conjecture	Invalidated(4) Validated(4)
115	Fictional logic based on Levi-identity / AGM	System	Invalidated(5) Validated(4)
116	Fixedpoint operator mapping mu-calculus	Conjecture	Invalidated(2)
117	Fitch's knowability	Paradox	Invalidated(4)
118	FOL disjunctive normal forms (DNF): minimize	FOL Optimizer	Invalidated(2) Validated(1)
119	FOL continuous induction on real closed fields	System	Invalidated(11) Validated(1)
120	Forcing method	Paradoxes	Invalidated(2)
121	Frauchiger-Renner thought experiment	Paradox	Invalidated(5)
122	Frauchiger-Renner thought quantum model	Paradox	Invalidated(14) Validated(2)
123	Fredkin	Paradox	Invalidated(1)
124	Free will argument of Maimonides	Paradox	Invalidated(1)
125	Free will non-existence	Refutation	Invalidated(8) Validated(2)
126	Free will theorem: Clifton-Kochen-Specker	Theorem	Invalidated(1)
127	Free will theorem: FIN axiom	Hypothesis	Invalidated(2) Validated(2)
128	Free will theorem: MIN' axiom	Hypothesis	Invalidated(1)
129	Frequency dependence of mass	Theorem	Invalidated(3) Validated(1)
130	Functions as injective, surjective, bijective	Theorems	Validated(4)
131	Gentzen proof of sequent System G-M	System	Invalidated(6) Validated(2)
132	Gettier (justified belief)	Problem	Invalidated(6)
133	GHZ (Greenberger-Horne-Zeilinger)	Experiments	Invalidated(1)
134	Gleason	Theorem	Invalidated(1)
135	Gödel compactness	Theorem	Invalidated(6) Validated(2)
136	Gödel completeness	Theorem	Invalidated

No.	Name of artifact	Type of artifact	Results with instances
137	Gödel completeness, shortest	Theorem	Invalidated(2)
138	Gödel first incompleteness	Theorem	Invalidated(4)
139	Gödel incompleteness	Equations	Invalidated(14) Validated(1)
140	Gödel incompleteness FOL	Contradictions	Invalidated(14) Validated(1)
141	Gödel incompleteness theorem	Assistant tools	Invalidated(2) Validated(2)
142	Gödel incompleteness theorem	Refutation	Invalidated(7)
143	Gödel incompleteness via two counter-examples	Refutation	Invalidated(9) Validated(2)
144	Gödel-justification logic	Refutation	Invalidated(7) Validated(2)
145	Subsets	Models	Invalidated(2)
146	Gödel-Löb	Axiom	Invalidated
147	Gödel pairing function	Axiom	Invalidated(3) Validated(1)
148	Gödel recursion	Theorem	Validated
149	Gödel-Scott on God	Theorem schema	Invalidated
150	Goldbach's conjectures	Conjectures	Invalidated
151	Graded modal logic	Frame classes	Invalidated(4) Validated(2)
152	Grassmannian (<i>recently discovered</i>)	Paradox	Invalidated
153	Hadamard gate	Theory	Invalidated(3) Validated(1)
154	Hahn-Banach	Theorem	Invalidated(5)
155	Hall	Effect	Invalidated
156	Hamiltonian quaternion	Definition	Invalidated(3)
157	Hardy's generalized paradox	Conjecture	Invalidated(6)
158	Hegel's dialectic	Method	Invalidated(6) Validated(3)
159	Heider inspired international relations theory	Theory	Invalidated(5) Validated(1)
160	Heisenberg uncertainty principle	Axiom	Invalidated(2)
161	Conjecture	Principle	Invalidated(1)
162	Replacement theorem	Axiom	Invalidated (2) Validated(3)
163	Take a picture of an electron	Principle	Invalidated(6) Validated(2)
164	Henkin cyclic algebra and first order logic	System	Invalidated(9) Validated(6)
165	Applications to logic	Axioms	Invalidated(8) Validated(6)
166	Permutation model nonrepresentable	Assertion	Invalidated(1)
167	Herbrand semantics	System	Invalidated(6)
168	Heyting algebra	Algebra	Invalidated(21)
169	Heyting-Brouwer intuitionistic logic	Systems	Invalidated(9) Validated(1)
170	Heyting logic	Idempotency	Invalidated(2) Validated(1)

No.	Name of artifact	Type of artifact	Results with instances
171	Hexagons of opposition for statistical modalities	Conjectures	Invalidated(9) Validated(1)
172	Higher-order mathematical induction	Principle	Invalidated(2) Validated(1)
173	Hilbert #10 Diophantine universal solution	Formulas	Invalidated
174	Hilbert generalization	System	Invalidated
175	Hilbert grand hotel	Paradox	Invalidated(1)
176	Hilbert / Kolmogorov intuitionistic logic	Systems	Invalidated(9)
177	Huhn 2-distributive lattice identity	Formula	Invalidated
178	Hydraulic forgiveness (confirmed)	Theorem	Invalidated(6) Validated(2)
179	Hydraulic corollary of peace	Corollary	Validated(1)
180	Ignorance of first choice	System	Invalidated
181	Imaginary numbers	Definition	Invalidated(2)
182	Imperative logic	System	Invalidated(3) Validated(4)
183	Implication combination forms from $(p \supset r) \supset r$	Theorems	Invalidated(3) Validated(16)
184	Inconsistent theory	Theorem	Invalidated
185	Extending the monad to a triad	Formulas	Invalidated
186	Kunen inconsistency	Theorem	Invalidated
187	Independence-friendly logic (Kreiselization)	System	Invalidated(2)
188	Indicative conditionals	Encyclopedia entry	Invalidated
189	Induction: Black raven (swan); Kripkenstein	System	Invalidated(3)
190	Induction: New riddle	Paradox	Invalidated (2)
191	Inequality: 'arbitrarily' vs 'sufficiently large'	Conjecture	Invalidated(2) Validated(1)
192	Infinite set theory	Theorem	Invalidated
193	Information theory: mutual information	Definition	Invalidated(4)
194	Interval logic for model checking	System	Invalidated(3)
195	Join-prime in lattice theory	Definition	Validated
196	Jonsson positive logic: retromorphism	System	Invalidated(3)
197	k -triangular set function logic	Definition	Validated(1)
198	Kanban cell neuron maps whole brain	Model	Invalidated(242) Validated(14)
199	Kant: falsity of syllogistic figures	Theorems	Invalidated(8) Validated(2)
200	Karpenko, S.A.	System K-L4	Invalidated(6) Validated(8)
201	King algebras on rough set concept analysis	Algebra	Invalidated(5)
202	Kleene lattices, reversible	Axiomatization	Invalidated(3) Validated(1)
203	Kramers-Kronig	Relation	Invalidated
204	Kuratowski–Zorn lemma (Zorn's lemma)	Lemma	Invalidated

No.	Name of artifact	Type of artifact	Results with instances
205	Lachlan problem solution	Problem	Invalidated(4)
206	Lambda λ -calculus and LISP	System	Invalidated(7) Validated(1)
207	Lean prover from Microsoft	System	Invalidated(3)
208	Leibniz' ontological proof	Proof	Invalidated(1) Validated(1)
209	Briefest known ontological proof of God	Proof	Validated(2)
210	Lemmon D	Axiom	Invalidated
211	van Leunen deformation field	Conjecture	Invalidated(4)
212	van Leunen lattice logic, weak modular	Theorem	Invalidated(2)
213	Liar	Paradox	Invalidated
214	Prior rendition	Paradox	Invalidated
215	Kripke rendition	Paradox	Invalidated
216	Line through a circle	Conjecture	Validated(1)
217	Linear algebra	Theorems	Invalidated(4)
218	Linear programming: Kharun-Kush-Tucker	Conditions	Invalidated(4)
219	Liouville	Theorem	Invalidated(2) Validated(1)
220	Löb original, corrected	Theorem	Invalidated(1) Validated(1)
221	Löb with Gödel incompleteness	Theorems	Invalidated(3)
222	Lonely runner	Conjecture	Invalidated(8) Validated(1)
223	Löwenheim–Skolem	Theorem	Invalidated(5)
224	Löwenheim–Skolem, Hilbert style	Metatheorem	Invalidated(4)
225	Luce model (general)	Definitions/axioms	Validated(5)
226	Łukasiewicz nightmare: $(\diamond p \& \diamond q) \rightarrow \diamond(p \& q)$	Allegation	Invalidated(4) Validated (3)
227	Łukasiewicz modal Ł4	Objections	Invalidated(8) Validated(1)
228	Lyndon interpolation and GL	Interpolation	Invalidated(8) Validated(1)
229	Majorana's 'root'	Equations	Invalidated(9)
230	Matita prover superposition	Algorithms	Invalidated (3)
231	Mereology, behavioral	System	Invalidated(2)
232	Mereotopology, distributive	Relations	Invalidated(9)
233	Metaphysics: "Something rather than nothing"	Problem	Validated(2)
234	Meth8/VŁ4 self-proof in one variable	Theorem	Validated(8)
235	Meth8 versus Prover9 via Lifshitz	Problem	Validated
236	Minkowski plane, classical set of points/cycles	Theorems	Invalidated(2) Validated(1)
237	Modal aleatoric calculus	System	Invalidated(6)
238	Modal logics: 2; 3; 4; B; D; E; K; M; T; and W	Systems	Invalidated(2) Validated(8)

No.	Name of artifact	Type of artifact	Results with instances
239	Modal GL ₂	Logic	Invalidated(8) Validated(1)
240	Modern modal logics (2): JYB4 and AR4	Axioms	Invalidated(12) Validated(17)
241	Modified divine command	Theory	Invalidated
242	Modus ponens consequent as conditional	Rule	Invalidated(3) Validated(1)
243	Molyneux's problem	Problem	Invalidated(1)
244	Moore's paradox	Paradox	Invalidated(2) Validated(1)
245	Moral absolutism impossible	Conjecture	Invalidated(3) Validated(1)
246	Relativity of moral absolutism	Conjecture	Invalidated(2) Validated(1)
247	Most	Quantifier	Invalidated(2)
248	Necessitation: K,T,4,B,D,5; D,M,S4,B,S5	Axiom	Invalidated(10) Validated(7)
249	Leonard Nelson's criticism of epistemology	System	Invalidated
250	von Neuman-Bernays-Gödel [NBG]	Theory	Invalidated(2) Validated(3)
251	Neutrosophic logic	Theorems	Invalidated(5)
252	Dezert-Smarandache	Theory	Invalidated(2)
253	Generalized Hegel's dialectics	Method	Invalidated(4)
254	Generalized intuitionistic, fuzzy logic	System	Invalidated(2)
255	MANET attack genetics	Algorithm	Invalidated(1)
256	Negated adjectival phrases	Lattices	Invalidated(2)
257	Neutrosophic logic: theory of everything	Theorem	Invalidated(2)
258	Neutrosophic sets	Properties	Invalidated(3)
259	Neutrosophy with dependent probability	Definitions	Invalidated(3) Validated(2)
260	Quinary	System	Invalidated(2)
261	Retract crisp set topology	Propositions	Invalidated(5)
262	Smarandache multi-space theory	System	Invalidated(5)
263	Soft lattice theory	Theorem	Invalidated(2)
264	Unification of other logics	Axioms / Rules	Invalidated(2)
265	Values as 1, 0, between 0 and 1	Designated logic	Invalidated(2)
266	Vector space on $\{-0, 0, 0 < p < 1, 1, 1+\}$	Multi-valued logic	Invalidated(3)
267	Newcomb's game	Paradox	Invalidated(2)
268	Non-deterministic logic	Completeness	Invalidated(8)
269	Nothing does not imply a non existent null set	Definition	Invalidated(7)
270	Nucleosynthesis	Definitions	Invalidated(4)
271	Optimization for complex number programming	Conjecture	Invalidated(1)
272	P=NP; 3-SAT	Conjectures	Invalidated(5)

No.	Name of artifact	Type of artifact	Results with instances
273	Paraconsistency, machine-assisted view	Axioms	Invalidated
274	Paraconsistent contradiction	Conext	Invalidated
275	Paradox refutation reduced to one variable	Method	Validated
276	Partial awareness	System	Invalidated(8) Validated(1)
277	Pauli exclusion	Principle	Invalidated(4)
278	Peano arithmetic 9, 1-8	Axioms	Invalidated(1) Validated(8)
279	PŁ4	System	Invalidated(10)
280	Playfair axiom	Axiom	Validated(1)
281	Poincaré recurrence theorem	Theorem	Invalidated(2)
282	Poison modal logic (PML)	System	Invalidated(4)
283	Karl Popper on God	Proof	Validated
284	PowerEpsilon mathematical induction	Axiom	Validated(1)
285	Pratt-Floyd-Hoare logic correctness	System	Invalidated(5)
286	Preference profiles	Algorithm	Invalidated(6)
287	Prevarieties and quasivarieties of logic	Monoids	Invalidated(4)
288	Prenex normal format	Rules	Invalidated(11) Validated(3)
289	Shortest refutation based on implication	Rules	Invalidated(2) Validated(2)
290	Prisoner's paradox	Paradox	Invalidated(3)
291	Prover9 vs Meth8 differences	System	Invalidated
292	Pure alethic modal logic	System	Invalidated(1) Validated(1)
293	Quantifiers and operators	Connectives	Invalidated(12)
294	Quantum arithmetic for repeat-until-success	Circuits	Invalidated(2)
295	Block chain	Cryptography	Invalidated(1)
296	Classical logic as completion of QL	System	Invalidated(16) Validated(6)
297	Control by observation	System	Invalidated
298	Entanglement	Conjecture	Invalidated(5)
299	Gates correspond to logical operators	Theorems	Invalidated(4) Validated(1)
300	Gates refuted	Theorems	Invalidated(8) Validated(1)
301	Gedanken experiment	Conjectures	Invalidated(8)
302	Logic	System	Invalidated(17) Validated(2)
303	Masking	Conjectures	Invalidated(5) Validated(2)
304	Probability	Axiom	Invalidated(1)
305	Probability	Rule	Invalidated(2)
306	Quaternion on classical logic	Definition	Invalidated(5)

No.	Name of artifact	Type of artifact	Results with instances
307	Simulation of Hamiltonian spectra	Operator	Invalidated(1)
308	Spin-statistics	Theorem	Invalidated(4) Validated(4)
309	Superposition as the red herring	Conjecture	Invalidated (3)
310	Superposition disproves Schrödinger cat	Conjecture	Invalidated(5) Validated(2)
311	Ternary probability of qutrit	Hypothesis	Invalidated(3)
312	Three lights experiment of qutrit	Conjecture	Invalidated(1)
313	Questions and answers	Problem	Invalidated(4) Validated(1)
314	Ramsey's theorem for the 2-color case	Theorem	Validated(2)
315	Ranjan, A.	Problem	Validated
316	Rational emotive behavior therapy (REBT/LBT)	Systems	Invalidated(16)
317	Realizability semantics for QML	Theorems	Invalidated(3)
318	Reichenbach common cause / event-splitting	Principle	Invalidated
319	Relativization (structural induction) in weighting	Method	Invalidated(1)
320	Relevance logic	System	Invalidated(7)
321	Definition in R	Model	Invalidated(2)
322	Reverse mathematics: recursive comprehension	Principle	Invalidated(10) Validated(2)
323	Measurability and computability	Theory	Invalidated(1) Validated(2)
324	Riemann: only zeroes at 0, 1/2	Hypothesis	Invalidated
325	Excluded middle	Conjecture	Invalidated(4)
326	Extended complex numbers on sphere	Operators	Invalidated(3) Validated(2)
327	Zeta function, Caceres 6	Proposition	Invalidated(4)
328	Zeta function, properties	Axioms	Invalidated(7)
329	Roman Catholic Church (RCC)	(Dogma)	Invalidated(7)
330	Canon law as noncontradictory/infallible	Theorem	Invalidated(4)
331	Erasmus contra Luther	Controversy	Validated
332	Infallibility and the Historic Church	Pius IX	Invalidated(2)
333	Invalid epiclesis with silent Holy Ghost	Canons	Invalidated(4) Validated(1)
334	Magisterium	Paul VI	Invalidated(1)
335	Primacy of the Roman See	Pius XI	Invalidated(1)
336	Sacred heart of Jesus	Pius XI	Invalidated(3)
337	Tradition above scripture	Pius IX	Invalidated(4)
338	Twelfth promise of St Alacoque	Vision	Invalidated(3)
339	Rosser's theorem on consistency	Theorem	Invalidated(6) Validated(1)
340	Rota lattice theory, distributive	Axiom	Invalidated

No.	Name of artifact	Type of artifact	Results with instances
341	Russell	Paradox	Invalidated
342	S5II+ propositional quantification	System	Invalidated
343	Sabotage modal logic (revisited)	System	Invalidated(6)
344	Sacchetti's modal logics of provability	Definition	Invalidated(1)
345	Schrödinger's cat	Paradox	Invalidated
346	Self-equilibrium	Law / Paradox	Invalidated
347	Sliding scale in law	Theorem	Invalidated(3)
348	Solovay arithmetical / semantical completeness	Theorem	Invalidated(10) Validated(2)
349	Sorites	Paradox	Invalidated
350	Special theory of relativity: Crothers refutation	Confirmation	Validated
351	Square (Łukasiewicz) and Cube (Seuren)	Systems	Invalidated(27) Validated(15)
352	Square of Opposition Meth8 Corrected	System	Validated
353	Square of Opposition Modern Revised	System	Invalidated
354	Square of Opposition	Proportions	Invalidated(3)
355	Stable set lattices	Modal operators	Invalidated(3)
356	Stone space type lattice logic model	Theory	Invalidated(2)
357	Stone-Wales rotation transform reversibility	Theorem	Invalidated(2) Validated(1)
358	Superposition of states	Principle	Invalidated(6)
359	Supply and demand	Conjecture	Invalidated(6)
360	Surveillance objectives	Subgames	Invalidated(2)
361	Symplectic vector space	Theorem	Invalidated(2)
362	Tarski's undefinability of truth	Theorem	Invalidated(2)
363	Tarski–Grothendieck set theory	Axiom	Invalidated(2)
364	Tarski–Grothendieck Metamath ax-groth	Axiom	Invalidated(7)
365	Tarski's planar Euclidean R-geometry	System	Invalidated(8) Validated(2)
366	Three-valued, bivalent logic VL3	System	Validated(10)
367	Time as God	Conjecture	Validated(2)
368	Time as coexisting past, present, future states	Conjecture	Invalidated(3)
369	Time as tense via converse implication (EQT)	Conjecture	Validated(1)
370	Topological manifold transition	Function	Invalidated(1)
371	Topological T ₀ -space	Differ modality	Invalidated(3)
372	Totherian sets	Theory	Invalidated (5)
373	Translation invariance of superposition calculus	Property	Invalidated(2)
374	Triangle inequality	Conjecture	Validated(1)

No.	Name of artifact	Type of artifact	Results with instances
375	Trivial proofs for a troll	Conjectures	Validated(3)
376	Turing halting problem	Problem	Invalidated(2) Validated(1)
377	Twin paradox	Paradox	Invalidated(2)
378	Two-sided page	Paradox	Invalidated(5) Validated(1)
379	Unanswered logic questions	Conjectures	Invalidated(2) Validated(1)
380	Unfalsifiability	Conjecture	Invalidated(2) Validated(2)
381	Unification of simple symmetrical modal logics	Type	Invalidated(2)
382	Universal finite set	Theorem	Invalidated(2)
383	Universal network	Operator	Invalidated(5)
384	Universal logic VL4	Logic	Validated
385	Veblen (corrected)	Axiom	Invalidated(1) Validated(1)
386	Vector conjectue for two points implying a third	Conjecture	Validated(1)
387	Verilog / VHDL hardware logic	Connectives	Invalidated(36)
388	Veronoï regions (with "nonempty sets")	Definition	Invalidated
389	Vickrey auction	Theorem	Invalidated(10) Validated(2)
390	Vietoris space modal operators	Definitions	Invalidated(2)
391	VL4 theorems for S5	Theorems	Invalidated(8)
392	Vongehr's shift rendering QM "natural"	Paradigm	Invalidated(2) Validated(3)
393	W (K4W)	Theorem	Invalidated
394	Well ordering property	Axiom	Invalidated
395	Wittgenstein's ab-notation	System	Invalidated(3)
396	X-homology on manifolds in topology	Axiom	Invalidated(1)
397	Yalcin logic	Axioms	Invalidated(2)
398	Yinyang	System	Invalidated(1) Validated(3)
399	Zadeh first operators on fuzzy logic	System	Invalidated(5)
400	Historical assumptions	Axioms	Invalidated(4) Validated(1)
401	Resolution and symmetry in Z-numbers	Definitions	Invalidated(2)
402	Zermelo-Fraenkel constructive (CZF)	Axioms	Invalidated(9) Validated(1)
403	Zermelo-Fraenkel (ZFC):	(Axioms)	Invalidated(25) Validated(2)
404	Shortest refutation of 9 axioms	Axioms	Invalidated(10)
405	ZFC Choice	Axiom	Invalidated
406	ZFC Empty set	Axiom	Invalidated
407	Shortest refutation	Axiom	Invalidated(3)
408	ZFC Extensionality	Axiom	Invalidated(1) Validated(1)

No.	Name of artifact	Type of artifact	Results with instances
409	ZFC Extensionality (another rendition)	Axiom	Invalidated(1)
410	ZFC Infinity	Axiom	Invalidated(2)
411	ZF INF	Axiom	Invalidated
412	ZFC Pairing	Axiom	Invalidated
413	ZFC Power set	Axiom	Invalidated
414	ZFC Regularity or foundation	Axiom	Invalidated
415	ZFC Schema of replacement	Axiom	Invalidated
416	ZFC Specification	Axiom	Validated
417	ZFC Union	Axiom	Invalidated
418	ZFC Well ordering	Axiom	Invalidated(2)
419	ZF Law of excluded middle: infinite set	Axiom	Invalidated(2)
420	ZF supremum and infimum	Definitions	Invalidated(3)
421	ZFC ⁰ : schemas of comprehension, replacement	Axioms	Invalidated(2)
422	Zero and three in arithmetic	Theorems	Validated(9)
423	Zero knowledge proof	Theorem	Invalidated
424	Zeroth law of thermodynamics	Theorem	Invalidated(3) Validated(2)