## Harold's Logic Cheat Sheet

15 September 2025

## **The 7 Basic Logical Symbols**

Operator	Symbol	Example	English
1) Intersection	Λ, <b>Λ</b> , Λ, Λ, Λ	p∧q	<ul> <li>Conjunction</li> <li>p and q</li> <li>p, but q</li> <li>despite the fact that p, q</li> <li>even though p, q</li> <li>although p, q</li> <li>overlap</li> </ul>
2) Union	v, <b>v</b> , ∨, ∨, ∨	p∨q	<ul> <li>Disjunction</li> <li>p or q</li> <li>inclusive or</li> <li>both combined</li> </ul>
3) Negation	¬, ¬,~	¬p	• not p
4) Conditional	$\rightarrow$ ,	p → q	<ul> <li>if p then q</li> <li>if p, q</li> <li>q if p</li> <li>p implies q</li> <li>p only if q</li> <li>q in case that p</li> <li>p is sufficient for q</li> <li>q is necessary for p</li> </ul>
5) Biconditional	$\leftrightarrow$ , $\leftrightarrow$ , $\leftrightarrow$ , $\Leftrightarrow$ , $\Leftrightarrow$	$p \longleftrightarrow q$	<ul> <li>p iff q</li> <li>p if and only if q</li> <li>p is necessary and sufficient for q</li> <li>if p then q, and conversely</li> <li>if not p then not q, and conversely</li> </ul>
6) Universal Quantifier	∀ <i>x</i> , ( <i>x</i> )	∀ <i>x p(x)</i>	<ul><li>for all</li><li>for any</li><li>for each</li></ul>
7) Existential Quantifier	ΧE	∃ <i>x p(x)</i>	<ul><li>there exists</li><li>there is at least one</li></ul>
<b>Equivalence</b> (See Biconditional)	≡, ≡, ≡	expression₁ ≡ expression₂	<ul> <li>is identical to</li> <li>is equivalent to</li> <li>is defined as</li> <li>the two expressions always have the same truth value</li> </ul>

<sup>&</sup>quot;... the structure of all mathematical statements can be understood using these symbols, and all mathematical reasoning can be analyzed in terms of the proper use of these symbols."

Source: "How to Prove It: A Structured Approach", 3<sup>rd</sup> Edition, p. 75.

# **Logical Connective Laws / Equivalences**

Law	Union Example	Intersection Example		
Identity Laws	p ∨ F ≡ p	$p \wedge T \equiv p$		
Domination, Null, or Universal Bound Laws	pVT≣T	p∧F≣F		
Idempotent Laws	p ∨ p ≡ p	$p \land p \equiv p$		
Double Negations or Involution Law	¬ ¬p ≡ p			
Negation, Complement, or	p V ¬p ≡ T	p ∧ ¬p ≡ F		
Complementary Laws	¬F≡T	¬T≡F		
Commutative Laws	p ∨ q ≡ q ∨ p	$p \land q \equiv q \land p$		
Associative Laws	(p∨q)∨r≡p∨(q∨r)	$(p \land q) \land r \equiv p \land (q \land r)$		
Distributive Laws	$p \wedge (q \vee r) \equiv (p \wedge q) \vee (p \wedge r)$	$p \lor (q \land r) \equiv (p \lor q) \land (p \lor r)$		
Uniting Laws	$(p \land q) \lor (p \land \neg q) \equiv p$	$(p \lor q) \land (p \lor \neg q) \equiv p$		
Absorption Laws	$p \lor (p \land q) \equiv p$	p ∧ (p ∨ q) ≡ p		
De Morgan's Law (Propositional Logic)	$p \lor q \equiv \neg(\neg p \land \neg q)$ $\neg(p \lor q) \equiv \neg p \land \neg q$ $(p \lor \neg q) \rightarrow r \equiv \neg r \rightarrow (\neg p \land q)$	$p \wedge q \equiv \neg(\neg p \vee \neg q)$ $\neg(p \wedge q) \equiv \neg p \vee \neg q$		
Multiplying and Factoring Laws	$(p \lor q) \land (\neg p \lor r) \equiv$ $(p \land r) \lor (\neg p \land q)$	$(p \land q) \lor (\neg p \land r) \equiv (p \lor r) \land (\neg p \lor q)$		
Consensus Laws	$(p \land q) \lor (q \land r) \lor (\neg p \land r) \equiv$ $(p \land q) \lor (\neg p \land r)$	$(p \lor q) \land (q \lor r) \land (\neg p \lor r) \equiv (p \lor q) \land (\neg p \lor r)$		
Tautology Laws (⊤)	p V (T) ≡ T p V ¬p ≡ T (True)	p ∧ (T) ≡ p		
	¬(T) = ⊥			
Contradiction Laws (⊥)	p ∨ (⊥) ≡ p	$p \land (\bot) \equiv \bot$ $p \land \neg p \equiv \bot (False)$		
	¬(⊥) ≡ T			
Exclusive Or Laws (⊕)	$p \oplus q \equiv (p \lor q) \lor \neg (p \land q)$	$p \oplus q \equiv (\neg p \land q) \lor (p \lor \neg q)$		

## The Sixteen Logical Operations on Two Variables

#	Venn	Sym	Logical Notation(s)	Name(s)
0000		Т	0	Contradiction; falsehood; antilogy; constant 0
0001		۸	$x \wedge y$ , $xy$ , $x \& y$	Conjunction; AND
0010		5	$x \wedge \overline{y}, x \not\supset y, [x > y], x \dot{-} y$	Nonimplication; difference; but not
0011		L	x	Left projection
0100		⋷	$\bar{x} \land y, x \not\subset y, [x < y], y \dot{-} x$	Converse nonimplication; not but
0101		R	у	Right projection
0110		Ф	$x \oplus y$ , $x \not\equiv y$ , $x^{\wedge}y$	Exclusive disjunction; nonequivalence; XOR
0111		V	$x \lor y, \qquad x \mid y$	(Inclusive) disjunction; and/or; OR
1000		V	$\bar{x} \wedge \bar{y}, \overline{x \vee y}, x \nabla y, x \downarrow y$	Nondisjunction; joint denial; neither NOR
1001	O	=	$x \equiv y, \qquad x \leftrightarrow y, \qquad x \Leftrightarrow y$	Equivalence; if and only if; IFF
1010		R	$\bar{y}$ , $\neg y$ , $! y$ , $\sim y$	Right complementation; NOT
1011		C	$x \lor \bar{y}, x \subset y, x \Leftarrow y, [x \ge y], x^y$	Converse implication; IF
1100		Е	$\bar{x}$ , $\neg x$ , $!x$ , $\sim x$	Left complementation; NOT
1101		D	$\bar{x} \lor y, x \supset y, x \Rightarrow$ $y, [x \le y], y^x$	Implication; only if; if then
1110		⊼	$\bar{x} \lor \bar{y}, \overline{x \land y}, x \bar{\land} y, x \mid y$	Nonconjunction; not both and; NAND
1111		Т	1	Affirmation; validity; tautology; constant 1

Donald E. Knuth (1968). 7.1.1 Boolean Basics, *The Art of Computer Programming*, <u>Pre-fascicle OB</u>: The sixteen logical operations in two variables. See also <u>Wikipedia</u>, Truth function.

# **Logical Conditional Connective Laws**

Law or Statement	Logical Expression	Is Equivalent To (≡)	Description
Conditional Laws	p → q	$\neg p \lor q$ $\neg (p \land \neg q)$ Logical Equivalences: $p \lor q \equiv \neg p \rightarrow q$ $p \land q \equiv \neg (p \rightarrow \neg q)$ $\neg (p \rightarrow q) \equiv p \land \neg q$ $(p \rightarrow q) \land (p \rightarrow r) \equiv p \rightarrow (q \land r)$ $(p \rightarrow q) \lor (p \rightarrow r) \equiv p \rightarrow (q \lor r)$ $(p \rightarrow r) \land (q \rightarrow r) \equiv (p \land q) \rightarrow r$ $(p \rightarrow r) \lor (q \rightarrow r) \equiv (p \lor q) \rightarrow r$	Conditional, If Then, Implication
Biconditional Laws	p ↔ q	$(p \rightarrow q) \land (q \rightarrow p)$ $(p \rightarrow q) \land (\neg p \rightarrow \neg q)$ $(p \land q) \lor (\neg p \land \neg q)$ $\neg p \leftrightarrow \neg q$ $Logical Equivalences:$ $\neg (p \leftrightarrow q) \equiv p \leftrightarrow \neg q$	Bi-conditional, If and only If, iff, XNOR
Sufficient Condition	p is a sufficient condition for q	The truth of p suffices to guarar	tee the truth of q.
Necessary Condition	q is a necessary condition for p	For p to be true, it is necessary fraction $\neg q \rightarrow \neg p$	or q to be true also.
Equivalence	p ↔ q	$p \equiv q$ $p \Longrightarrow q$	Is logically equivalent to $(p \equiv \neg p)$ Is equivalent to
Contrapositive	$p \rightarrow q$	≡ ¬q → ¬p	True
Converse*	$p \rightarrow q$	<b>≢</b> q → p	False
Inverse*	$p \rightarrow q$	≢ ¬p → ¬q	False

# Rules of Inference with Propositions

Rule Name	Rule Logic	Example
Hypothesis	Givens. First lines of a proof.	It is raining today. You live in McKinney, Texas.
Therefore	÷	Therefore. In conclusion.
Modus Ponens	$\begin{array}{c} p \\ \underline{p \to q} \\ \therefore q \end{array}$	It is raining today. If it is raining today, I will not ride my bike to school. Therefore, I will not ride my bike to school.
Modus Tollens	$ \begin{array}{c} \neg q \\ \underline{p \to q} \\  \vdots \neg p \end{array} $	If Sam studied for his test, then Sam passed his test. Sam did not pass his test. Therefore, Sam did not study for his test.
Addition, Generalization	$\frac{p}{\therefore p \vee q}$	It is raining today. Therefore, it is either It is raining today or snowing today or both.
Simplification, Specialization	$\frac{p \wedge q}{\therefore p}$	It is rainy today and it is windy today. Therefore, it is rainy today.
Conjunction	$\frac{p}{q} \\ \therefore p \wedge q$	Sam studied for his test. Sam passed his test. Therefore, Sam studied for his test and Sam passed his test.
Hypothetical Syllogism, Transitivity	$ \begin{array}{c} p \to q \\ \underline{q \to r} \\ \therefore p \to r \end{array} $	If you are mad then you will yell. If you yell then you will wake the baby. Therefore, if you are mad then you will wake the baby.
Disjunctive Syllogism, Elimination	$\frac{p \vee q}{\frac{\neg p}{\therefore q}}$	Sam studied for his test or Sam took a nap. Sam did not study for his test. Therefore, Sam took a nap.
Resolution	$ \begin{array}{c c} p \lor q \\ \neg p \lor q \\ \hline \therefore q \lor r \end{array} $	Your shirt is red or your pants are blue. Your shirt is not red or your pants are blue. Therefore, your pants are blue or your shoes are white.
Proof by Division into Cases	$ \begin{array}{c} p \lor q \\ p \to r \\ \underline{q \to r} \\ \vdots r \end{array} $	It is raining or it is Monday. It is raining so it is wet. It is Monday so it is wet. It is wet.
Contradiction Rule	$\frac{\neg p \to F}{\therefore p}$	If it is not raining is a false statement, then it is raining.

# **Logical Predicates**

Definition	Logical Expression	Is Equivalent To (≡)	Plain English		
Universe of Discourse	U	All possible inputs in a given range	<ul><li>Universe of Discourse</li><li>Universal Set</li><li>Universe</li></ul>		
Domain of Discourse	D	All possible inputs in a given range	<ul><li>Domain of Discourse</li><li>Universe of Discourse</li></ul>		
Proposition or Logical Statement	p: "Roxy is a mammal"	ρ	<ul><li>Must be True or False</li><li>Cannot be a question</li><li>Cannot be a command</li></ul>		
Predicate	P(x): "x is a mammal"	P(x)	<ul> <li>A logical statement whose truth value is a function of one or more variables</li> <li>Truth depends upon the input variable x</li> <li>P(x) ≠ a number</li> <li>P(5) is a proposition</li> </ul>		
Example Statements	$q: \forall x \in \mathbb{D}, P(x):$ "x is a mammal"	"For all x in the domain of discourse, P(x) is a mammal."	<ul> <li>Is either True or False</li> <li>A quantified predicate turns it into a logical statement</li> </ul>		
	T(x, y)	"x is a twin of y."	Predicate with two input variables		
Truth Set (Single Free Variable)	T = P(x)	$T = \{a \mid P(a)\}$ $T = \{a \in A \mid P(a)\}$ $a \in T$	The set of all values of x that make the statement $p(x)$ true		
variablej	Example:	$P(x_1)$ , $P(x_2)$ , and $P(x_3)$ are True			
	T = P(x, y)	$\{(a, b) \in A \times B \mid P(a, b)\}$ $(a, b) \in T$	Cross product truth set		
Truth Set (Ordered Pair)	Examples:	$\{(p, n) \in P \times \mathbb{N} \mid \text{the person p ha} $ $\{(p, c, n) \in P \times C \times \mathbb{N} \mid \text{the perso years}\}$	rson p has lived in the city c for n		

# **Logical Quantifiers**

Definition	Logical Expression	ls Equivalent To (≡)	Plain English
Universal Quantifier (∀)	$\forall x \ P(x)$ $\forall x \in P(x)$ $\forall x \in \mathbb{D}, \ P(x)$ $\forall x, \ if \ x \ is \ in \ \mathbb{D}$ $then \ P(x)$	"For all $x$ in the domain, $P(x)$ is true" $\forall x \in A \ P(x) \equiv \forall x \ (x \in A \rightarrow P(x))$ For the finite set domain of discourse $\{a_1, a_2,, a_k\},\ \forall x \ P(x) \equiv P(a_1) \land P(a_2) \land \land P(a_k)$	<ul> <li>for all</li> <li>all elements</li> <li>for each member</li> <li>any</li> <li>every</li> <li>everyone</li> <li>everybody</li> <li>everything</li> <li>x could be anything at all</li> </ul>
Existential Quantifier (3)	$\exists x P(x)$ $\exists x \in P(x)$ $\exists x \in \mathbb{D}, P(x)$	"There exists x in the domain, such that $P(x)$ is true"  For the finite set domain of discourse $\{a_1, a_2,, a_k\}$ , $\exists x P(x) \equiv P(a_1) \lor P(a_2) \lor \lor P(a_k)$ $P(x) \neq \emptyset$	<ul> <li>there exists an x</li> <li>there is</li> <li>some</li> <li>someone</li> <li>somebody</li> <li>at least one value of x</li> <li>there is at least one x</li> <li>it is the case that</li> <li>the truth set is not equal to Ø</li> </ul>
Uniqueness Quantifier (∃!)	∃! <i>x P(x)</i>	there is a unique x in $P(x)$ such that $\exists x (P(x) \land \neg y (P(y) \land y \neq x))$ $\exists x (P(x) \land \forall y (P(y) \rightarrow y = x))$ $\exists x \forall y (P(y) \leftrightarrow y = x)$ $\exists x P(x) \land \forall y \forall z ((P(y) \land P(z)) \rightarrow y = z)$	<ul> <li>unique</li> <li>there is a unique x</li> <li>there exists exactly one</li> <li>there is exactly one x such that P(x)</li> </ul>
Negated Existential Quantifier	- [∃x P(x)] - [∀x P(x)]	$\forall x \neg P(x)$ $\exists x \neg P(x)$	<ul><li>nobody</li><li>no one</li><li>not one</li><li>there does not exist</li></ul>
Order of Precedence	<ol> <li>Quanti</li> <li>Logical</li> <li>Logical</li> <li>Logical</li> </ol>	hesis () NOT (¬) fiers (∀, ∃) AND (∧)	Applied Left to Right  Example: $\forall x P(x) \land Q(x) \equiv (\forall x P(x)) \land Q(x)$

## **Quantifier Laws**

Definition	Logical Expression	Is Equivalent To (≡)	Plain English	
Abbreviation	$\exists x (x \in A \land \neg P(x))$	$\exists x \in A \neg P(x)$	Simplification	
Expanding Abbreviation	$\forall x \in A P(x)$	$\forall x (x \in A \to P(x))$	Complication	
Quantifier Negation	∀x ¬ <i>P(x)</i>	¬∃x <i>P(x)</i>	<ul> <li>nobody's perfect</li> </ul>	
Quantifier Negation Laws	-∀x <i>P(x)</i>	∃x ¬ <i>P(x)</i>	<ul><li>not everyone is perfect</li><li>someone is imperfect</li></ul>	
<b>Conditional Law</b>	$x \in A \rightarrow P(x)$	x ∉ A ∨ <i>P(x)</i>	$p \rightarrow q \equiv \neg p \lor q$	
Subset Negation Law	x ∈ A	¬(x ∉ A)	Swap ∈ with ∉, or vice versa	
De Morgan's Law (Quantifier Negation)	$\neg \forall x \ P(x) \equiv \exists$ $\neg \exists x \ P(x) \equiv \forall$ $\neg \forall x \ \forall y \ P(x, y) \equiv \exists$ $\neg \forall x \ \exists y \ P(x, y) \equiv \exists$ $\neg \exists x \ \forall y \ P(x, y) \equiv \forall$	De Morgan's Law for single and nested quantifiers		
	¬∃x ∃y <i>P(x, y)</i> ≡ ∀ ∀x ∀y	<i>x ∨y ¬P(x, y)</i> ∀y ∀x	for all objects x and y,	
	∃x ∃y ∃y ∃x		there are objects x and y such that	
Nested / Multiple- Quantified Statements	∀x ∃y <i>P(x, y) ≢</i> ∃	False Counterexample for x, y $\in \mathbb{Z}$ : $\forall x \exists y (x + y = 0) \equiv \text{True}$ $\exists x \forall y (x + y = 0) \equiv \text{False}$		
	¬(∀x ∃y <i>P(x, y)</i> )	∃x ∀y ¬ <i>P(x, y)</i>	Negation of multiply-quantified	
	¬(∃x ∀y <i>P(x, y)</i> )	∀x ∃y ¬ <i>P(x, y)</i>	statements	
Moving Quantifiers	$\forall x (P(x) \to \exists y  \forall x \exists y (P(x) \to \exists y )$	You can move a quantifier left if the variable is not used yet		

## **Quantifier Logic Examples**

Action Logical Statement		Plain English
Everyone	∀x ∀y <i>P(x, y)</i>	<ul><li>everyone <did something=""></did></li></ul>
210.70.10	NOTE: includes (x = y)	to everyone
Everyone Else	$\forall x \ \forall y \ (x \neq y) \rightarrow P(x, y)$	<ul><li>everyone <did something=""></did></li></ul>
Everyone cise	NOTE: excludes (x = y)	to everyone else
Compone Flee	$\forall x \exists y ((x \neq y) \land P(x, y))$	<ul><li>everyone <did something=""></did></li></ul>
Someone Else	NOTE: excludes (x = y)	to someone else
Evently One	$\exists x (P(x) \land \forall y ((x \neq y) \rightarrow \neg P(y))) \equiv$	<ul> <li>exactly one person <did< li=""> </did<></li></ul>
Exactly One	∃! <i>x P(x)</i>	something>
No One	¬∃x <i>P(x)</i>	<ul><li>no one <did something=""></did></li></ul>

## **Valid Quantifier Formulas**

Α		В
$\forall x (P(x) \land Q(x))$	≡	$(\forall x P(x) \land \forall x Q(x))$
$\exists x (P(x) \land Q(x))$	$\rightarrow$	$(\exists x P(x) \land \exists x Q(x))$
$\forall x (P(x) \lor Q(x))$	<b>←</b>	$(\forall x P(x) \lor \forall x Q(x))$
$\exists x (P(x) \lor Q(x))$	Ξ	$(\exists x P(x) \lor \exists x Q(x))$
$\forall x \ (P(x) \to Q(x))$	←	$(\exists x \ P(x) \to \forall x \ Q(x))$
$\exists x \ (P(x) \to Q(x))$	≡	$(\forall x \ P(x) \to \exists x \ Q(x))$
∀x ¬ <i>P</i> ( <i>x</i> )	≡	¬∃x <i>P(x)</i>
∃x ¬ <i>P</i> (x)	≡	¬∀x <i>P(x)</i>
∀x ∃y <i>T(x, y)</i>	<b>←</b>	∃y ∀x <i>T(x, y)</i>
∀x ∀y <i>T(x, y)</i>	Ξ	∀y ∀x <i>T(x, y)</i>
∃x ∃y <i>T(x, y)</i>	Ξ	∃y ∃x <i>T(x, y)</i>
$\forall x (P(x) \lor R)$	≡	$(\forall x P(x) \lor R)$
$\exists x (P(x) \land R)$	≡	$(\exists x P(x) \land R)$
$\forall x (P(x) \to R)$	=	$(\exists x \ P(x) \to R)$
$\exists x \ (P(x) \to R)$	$\rightarrow$	$(\forall x \ P(x) \to R)$
$\forall x (R \to Q(x))$	≡	$(R \rightarrow \forall x \ Q(x))$
$\exists x (R \to Q(x))$	$\rightarrow$	$(R \rightarrow \exists x \ Q(x))$
∀x R	<b>←</b>	R
∃x <i>R</i>	$\rightarrow$	R

**Note**: The above formulas are valid in classical <u>first-order logic</u> assuming that *x* does not occur free in *R*.

### **Invalid** Quantifier Formulas

Α		В	Counterexample
$\exists x (P(x) \land Q(x))$	<b>↓</b>	$(\exists x P(x) \land \exists x Q(x))$	$D = \{a, b\}, M = \{P(a), Q(b)\}$
$\forall x (P(x) \lor Q(x))$	<b>†</b>	$(\forall x P(x) \lor \forall x Q(x))$	$D = \{a, b\}, M = \{P(a), Q(b)\}$
$\forall x \ (P(x) \to Q(x))$	1	$(\exists x \ P(x) \to \forall x \ Q(x))$	$D = \{a, b\}, M = \{P(a), Q(a)\}$
∀x ∃y <i>T(x, y)</i>	$\rightarrow$	∃y ∀x <i>T(x, y)</i>	$D = \{a, b\}, M = \{T(a, b), T(b, a)\}$
$\exists x (P(x) \rightarrow R)$	←	$(\forall x \ P(x) \to R)$	$D = \emptyset, M = \{R\}$
$\exists x \ (R \to Q(x))$	<b>↓</b>	$(R \to \exists x \ Q(x))$	D = Ø, M = Ø
∀x R	<b>↑</b>	R	D = Ø, M = Ø
∃x <i>R</i>	←	R	$D = \emptyset, M = \{R\}$

**Note**: if empty domains are not allowed, then the last four implications above are in fact valid.

## **Logical Truth Tables**

р	q	Conjunction (AND)	NAND ⊼	Disjunction (OR) V	NOR ▽	<b>XOR</b>	XNOR  ⊙	Negation (NOT) ¬P
F	F	F	Т	F	Т	F	Т	
F	Т	F	T	Т	F	Т	F	Т
T	F	F	T	Т	F	T	F	F
Т	Т	Т	F	Т	F	F	Т	

р	q	Material Implication (If Then) →	Biconditional (Iff) ↔	Tautology (True) ⊤	Contradiction (False)
F	F	T	Т	Т	F
F	T	T	F	Т	F
T	F	F	F	T	F
Т	Т	T	Т	Т	F

## **Blank Truth Tables**

Inputs			Output			
р	q	r	s	Х	у	Z
F	F	F	F			
F	F	F	T			
F	F	Т	F			
F	F	Т	Т			
F	T	F	F			
F	T	F	Т			
F	T	Т	F			
F	T	T	T			
Т	F	F	F			
Т	F	F	Т			
Т	F	Т	F			
Т	F	Т	Т			
Т	T	F	F			
T	T	F	T			
Т	T	T	F			
T	T	T	T			

Inputs			Output	
р	q	r	Х	у
F	F	F		
F	F	Т		
F	T	F		
F	T	Т		
Т	F	F		
Т	F	Т		
Т	Т	F		
Т	Т	Т		

Inp	uts	Output
р	q	х
F	F	
F	T	
Т	F	
Т	Т	

#### Sources

- <u>SNHU MAT 230</u> Discrete Mathematics, zyBooks.
- https://byjus.com/maths/set-theory-symbols/
- https://en.wikipedia.org/wiki/List of logic symbols
- <a href="https://en.wikipedia.org/wiki/Truth\_function#Table\_of\_binary\_truth\_functions">https://en.wikipedia.org/wiki/Truth\_function#Table\_of\_binary\_truth\_functions</a>
- https://nokyotsu.com/qscripts/2014/07/distribution-of-quantifiers-over-logicconnectives.html
- Donald E. Knuth (1968). 7.1.1 Boolean Basics, The Art of Computer Programming, Pre-fascicle
   OB: The sixteen logical operations in two variables.

#### See Also

- Harold's Logic Cheat Sheet
- Harold's Logic (Philosophy) Cheat Sheet
- Harold's Sets Cheat Sheet
- Harold's Boolean Algebra Cheat Sheet
- Harold's Proofs Cheat Sheet