Logic basic

Simple sentences/Logical constants

Strings of letters, digits, and underscores where the first character is a lower case letter. p *raining guate*1_01

Compound sentences

Operators

- Negation: $\neg p$
- Conjunction: $p \wedge q$
- Disjunction: $p \vee q$
- Implication: $p \Rightarrow q$
- Biconditional: $p \Leftrightarrow q$

Operator precedence

1. ()
2. $\neg$
3. $\wedge$
4. $\vee$
5. $\Rightarrow$
6. $\Leftrightarrow$

Operator truth table

p	$\neg$
1	0
0	1

p	q	p $\wedge$ q
1	1	1
1	0	0
0	1	0
0	0	0

p	q	p $\vee$ q
1	1	1
1	0	1
0	1	1
0	0	0

p	q	p $\Rightarrow$ q
1	1	1
1	0	0
0	1	1
0	0	1

p	q	p $\Leftrightarrow$ q
1	1	1
1	0	0
0	1	0
0	0	1

Logical Entailment

A set of sentences ψ *logically entails* a conclusion φ if and only if every truth assignment satisfying ψ satisfies φ We note $\psi \vDash \varphi$

Logical Concistency

A set of senteces ψ is *logically consistent* with another set of sentences φ if and only if there exists a truth assignment satisfying ψ and φ.