Engr 123

L2

Admin
Lots of ifs

$P \rightarrow Q$

if P then Q

≡

Propositions

P	Q	P → Q
1	1	1
1	0	0
0	1	1
0	0	1

$P \wedge Q$

$P \vee Q$

$\neg P$

P is a subset of Q.

$P \to Q$ *

if P then Q *

P implies Q *

P only if Q

Q if P

$P \to Q \equiv \neg P \vee Q$

$\equiv \neg(P \wedge \neg Q)$

$\equiv \neg Q \to \neg P$ contrapositive

$P \leftrightarrow Q \equiv (P \to Q) \wedge (Q \to P)$

P iff Q, P if and only if Q

$$P \to Q \not\equiv Q \to P$$

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and $\wedge$ conjunction

or $\vee$ disjunction

P	Q	P→Q
1	1	1
1	0	0
0	1	1
0	0	1

$P \wedge Q$

$\neg P \wedge Q$

$\neg P \wedge \neg Q$

$$(P \wedge Q) \vee (\neg P \wedge Q) \vee (\neg P \wedge \neg Q) \equiv P \to Q$$

Propositions

A proposition is either true or false.

C ≡ "Is it cold" T/F ✓

O ≡ "I am old" T/F ✓

W ≡ "What it the weather forecast today?" ✗

Am I old or is it cold?

O ∨ C

It is cold and I'm old

$$C \wedge O$$

If I am old, then it is cold

$$O \rightarrow C$$

If it is not cold, then I am not old

$$\neg C \rightarrow \neg O$$

P	Q	P∧P	P∨P	P⊻Q
1	1	1	1	0
1	0	1	1	1
0	1	0	1	1
0	0	0	0	0