lecture 2:-

$\neg p$ = operand.

operation.

5 + 3

operands.

operation.

1- Conjunction. $p \wedge q$ "," AND. Syntax $\wedge$. Semantics.

Semantics

p	q	$p \wedge q$
T	T	T
T	F	F
F	T	F
F	F	F

$p \wedge (q \wedge r)$

p	q	r	$q \wedge r$	$p \wedge (q \wedge r)$
T	T	T	T	T
T	T	F	F	F
T	F	T	F	F
T	F	F	F	F
F	T	T	T	F
F	T	F	F	F
F	F	T	F	F
F	F	F	F	F

$p \wedge (q \wedge (r \wedge s))$ HW.

Ex 5 (P4):- p = "Today is friday" q = "It is raining". find Conjunction?

$p \wedge q$ = Today is friday and. It is raining.

p = $3 < 5$

q = $3 = 5$.

$p \wedge q$ = $3 < 5 \wedge 3 = 5$ = $3 \leq 5$.

Disjunction:- $p \vee q$ "OR" "Either".

Semantics

p	q	p∨q
T	T	T
T	F	T
F	T	T
F	F	F

Implication: $p \to q$. P6

if p Then q

if p, q

p is sufficient for q.

q when p.

$p \to (q \to r)$ HW.

If (I win election) Then (I will lower taxes.)

p q

p	q	p→q
T	T	T
T	F	F
F	T	T
F	F	T

p: 2+3=6 q: It is Friday.

p→q = T

q→p = T

Bi-conditional $p \leftrightarrow q$. P9

"if p Then q & Conversly".

"p iff q".

p	q	p↔q
T	T	T
T	F	F
F	T	F
F	F	T

You can take flight iff You buy a ticket.

p: 5×4=9 q: 2+3≠6.

p→q

Implication. $p \to q$.

Converse: $q \to p$.

$q \to p$. $\neg q \to p$.

$p \to q$. $p \to \neg q$.

Converse: $q \to p$.

Inverse: $\neg p \to \neg q$.

Contrapositive: $\neg q \to \neg p$.

$p \to q$.

$p \to \neg q$.

$\neg q \to \neg p$.

$\neg(\neg q) \to \neg p$.
$q \to \neg p$.

$\neg p \to \neg q$.

$\neg p \to \neg(\neg q)$.
$\neg p \to q$.

Try to find original Implication.

→ Inverse

→ Converse

→ Contra.