

lec # 3:- Implication. $P \rightarrow Q$

Converse: $Q \rightarrow P$

Inverse: $\neg P \rightarrow \neg Q$

Contrapositive. $\neg Q \rightarrow \neg P$.

Ex 9:-
p8 "the hometeam^P wins whenever it is^Q raining".

Let p = the hometeam wins.
 q = It is raining.

$q \rightarrow p$.

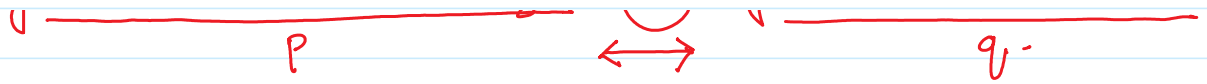
Converse: $p \rightarrow q$:- if the hometeam wins then it is raining.
Inverse: $\neg q \rightarrow \neg p$:- if it is not raining then hometeam do not win.
Contrapositive: $\neg p \rightarrow \neg q$:- - - - - - HW.

Question 1 Sessional.

Double Implication.

	\longleftrightarrow		P	Q	$P \leftrightarrow Q$
1) IFF.			T	T	T
2) p is necessary & Sufficient for q.			T	F	F
			F	T	F
3) if p then q & Conversely.			F	F	T

"You can take the flight" \longleftrightarrow "You buy an air ticket"
P (IFF) Q



Precedence.

$$(P \vee \neg q) \rightarrow (P \wedge q).$$

1) \neg

2) \wedge

3) \vee

4) \rightarrow

5) \leftrightarrow

P	q	$\neg q$	$P \vee \neg q$	$P \wedge q$	$(P \vee \neg q) \rightarrow (P \wedge q)$
T	T	F	T	T	T
T	F	T	T	F	F
F	T	F	F	F	T
F	F	T	T	F	F

Applications of Propositional Logic.

- 1- System Specification.
- 2- Logic Puzzles.
- 3- Searching.

System Specification.

Contradiction.

Ex 15
p12: ① "the diagnostic msg is stored in buffer or it is retransmitted".

② "the diagnostic msg is not stored in buffer".

③ "If the diagnostic msg is stored in the buffer then it is retransmitted".

① $P \vee q = T$ X.

② $\neg P = T$ X

③ $P \rightarrow q = T$ X

↓

P	q	$P \vee q$
T	T	T
T	F	T
F	T	T
F	F	F

from ② $P = F$ ④ X

from ④ & ① $q = T$ ⑤

P	$\neg P$
T	F
F	T

from (2) $p = F$ (4) \wedge
 from (4) & (1) $q = T$ (5)
 from (3) put (4) & (5)

$F \rightarrow T = T$.
 Holds.

p	$\neg p$
T	F
F	T

p	q	$p \rightarrow q$
T	T	T
T	F	F
F	T	T
F	F	T

Ex 16 :- "The diagnostic msg is not transmitted".
 P12

$$p \vee q = T \quad \text{--- (1)}$$

$$\neg p = T \quad \text{--- (2) X}$$

$$p \rightarrow q = T \quad \text{--- (3)}$$

$$\neg q = T \quad \text{--- (4) X.}$$

$$\text{from (2) } p = F. \quad \text{--- (5)}$$

$$\text{from (4) } q = F \quad \text{--- (6)}$$

$$\text{put (5) \& (6) in (1) } p \vee p = T$$

$p = T$ which is not the case.

Hence Inconsistent.

Ex 49-54. Th Edition. HW.
 P20.

Quiz # 1:-

30-08-2023.

"Jawad is happy or he is hungry".

"Jawad is not happy".

Amroha

"If Zawad is happy then he is ~~angry~~."

"Zawad is hungry".

Determine Zawad Status "happy" or "hungry"?

A handwritten red scribble, possibly a signature or initials, located in the top left corner of the page. It consists of several connected, irregular strokes.