

Ambiguity of English

"I shot an elephant in my pajamas. How he got in my pajamas, I'll never know."

--Groucho Marx

I must enthusiastically recommend this person with no qualifications whatsoever.

I would urge you to waste no time in making this person an offer. ^{logic, on the other hand, is completely precise.}

You will be very lucky if you can get this person to work for you.

Proposition: statement either true or false

$$3+4=7$$

$$1+1=3$$

prop.

π is a rational number.

Today is Friday.

not prop

Go to your room.

How are you?

prop

The Steelers will win the Superbowl.

Vanilla is the best ice cream.

p : Sam is poor.

q : Sam is happy.

Conjunction:

$p \wedge q$

Compound prop.

"p and q"

Sam is poor and Sam is happy.

Truth table

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

$T \equiv \text{true}$
 $F \equiv \text{false}$

Sam is poor, but he is happy: $p \wedge q$

Disjunction: $p \vee q$ "p or q"

Sam is poor or Sam is happy.

r : The patient has high blood pressure.

t : The patient has a history of migraines

$r \vee t$

r	t	r v t
F	F	F
F	T	T
T	F	T
T	T	T

"I'm going to the game today or I am going shopping."

Inclusive Or: true if both or either of props are true.

Exclusive Or: if exactly one of the props is true.

Negation: $\neg q$

"Not q"

"OR" (for us)
= inclusive OR.

"Sam is not happy."

"It is not the case that Sam is happy."

q	$\neg q$
F	T
T	F

Exclusive or $p \oplus q$.

p	q	$p \oplus q$
F	F	F
T	F	T
F	T	T
T	T	T F