Discrete Mathematics: Conjunction and Disconjunction

Conjunction Symbol
$\wedge$ means "And"

Example: $p \wedge q$ means "p and q"
If "p" stands for "2 is less than 5"
"q" stands for "2 is greater than 0"
"$p \wedge q$" means "2 is less than 5 And 2 is greater than 0"
For this example: $p \wedge q$ have Truth Value = T

Example 2:
If we switch the 'q' statement to '2 is greater than 7'
The truth value of 'q' is F
Then, the truth value of "$p \wedge q$" is F

Truth Table For "$p \wedge q$"

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

"$p \wedge q$" are T only when both "p" and "q" are T
Any other case of "$p \wedge q$" is F

Discrete Mathematics: Disjunction

Disjunction Symbol
"$\vee$" means "Or"

"$p \vee q$" means "p Or q"

Example
"p" means "Grass is Green"
"q" means "Snow is Black"
"$p \vee q$" means "Grass is Green OR Snow is Black"

The truth value of "$p \vee q$" is T just in case either the truth value of "p" is T or the truth value of "q" is T
Otherwise, the truth value of "$p \vee q$" is F

Example 2
If "p" now means "Grass is White"
q stays the same
Now the truth value of "p" is F and the truth value of "q" is F, then the truth value of "$p \vee q$" is F

Truth Table for "$p \vee q$"

p	q	$p \vee q$
T	T	T
T	F	T
F	T	T
F	F	F

Discrete Mathematics ; Conditional

Symbol for Implication / Conditional
→ or $p \to q$ means "If p then q"
also means "p implies q"

Example
"p" means "A bagel cost $2"
"q" means "A bagel cost more than $1"
"$p \to q$" means "If a bagel cost $2 then a bagel cost more than $1."
$p^T \to q^T$ then "$p \to q$" is T

The truth value of "$p \to q$" is F just in case the truth value of "p" is T and the truth value of "q" is F
$T \to F$
Otherwise the truth value of "$p \to q$" is T

The only time "$p \to q$" is F is when "$T \to F$"
All other times its true (T)

Example 2:
If "p" means "A bagel does not cost $2"
"p" is F
Then only time $p \to q$ is F is when $T \to F$
then we can conclude $p \to q$ is T

Truth Table for "$p \to q$"

p	q	$p \to q$
T	T	T
T	F	F
F	T	T
F	F	T