

Lecture 3

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* Prayer

We learned about different types of fallacy. A fallacy is a deceptive argument and is not a proper argument.

premise
↓ argument
Conclusion

A proper argument consists of one or more logical unit called proposition. A proposition is a statement that has a logical value (true/false).

"Is the flower red?" is not a proposition because it doesn't have a value of true or false.

"I am a student" is a proposition because it is either true or false.

"I don't know" is a proposition.

"I always tell lies" is not a proposition.

"Two birds in the sky" is not a proposition.

"There are two birds in the sky" is a proposition.

A proposition must make a claim and must have the structure of a complete sentence.

Logical rules are the math of logic. Let p and q be propositions.

\bar{p} (or $\sim p$ or $\neg p$) : negation of p

$p \wedge q$: p and q

$p \vee q$: p or q or both

$p \underline{\vee} q$: p or q but not both

$p \Rightarrow q$: p implies q

* Negation of a statement:

p	not p (also denoted as $\sim p$ or $\neg p$ or \bar{p})	(truth table)
T	F	
F	T	

Ex
 $p =$ I am 35.

$\bar{p} =$ I am not 35.

Ex
 $p =$ It won't rain tomorrow.

$\bar{p} =$ It will rain tomorrow.

Ex
 $p =$ If I have one million dollars, I will buy a house.

$\bar{p} =$ I have one million dollars and I don't buy a house.

* Conjunction (and).

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

* Inclusive disjunction (or)

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

truth table

* Exclusive disjunction (xor)

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

truth table

* Conditionals

p	q	$p \Rightarrow q$
T	T	T
T	F	F
F	T	T
F	F	T