LaTeX for Peter

Peter Schaefer

Freshman Fall

Contents

1 Logic

1.1 Propositions and Logical Operations

Proposition: a statement that is either true or false

Some examples include: "It is raining today", "$3 \cdot 8 = 20$".

However, not all statements are propositions:"open the door"

Name	**Symbol**	**alternate name**
NOT	$\neg$	negation
AND	$\wedge$	conjunction
OR	$\vee$	dijunction
XOR	$\oplus$	exclusive or

p	q	$\neg p$	$p \wedge q$	$p \vee q$	$p \oplus q$
T	T	F	T	T	F
T	F	F	F	T	T
F	T	T	F	T	T
F	F	T	F	F	F

XOR is very useful for encryption and binary arithmetic.

1.2 Evaluating Compound Propositions

p : The weather is bad.

q : The trip is cancelled.

r : The trip is delayed.

then

$p \wedge q$: The weather is bad *and* the trip is cancelled

$p \vee q$: The weather is bad *or* the trip is cancelled

$p \wedge (q \oplus r)$: The weather is bad *and* either the trip is cancelled *or* delayed

Order of Evaluation $\neg$, then $\wedge$, then $\vee$, but parenthesis always help for clarity.

1.3 Conditional Statements

1.4 Logical Equivalence

1.5 Laws of Propositional Logic

1.6 Predicates and Quantifiers

1.7 Quantified Statements

1.8 DeMorgan's law for Quantified Statements

1.9 Nested Quantifiers

1.10 More Nested Quantifiers

1.11 Logical Reasoning

1.12 Rules of Inference with Propositions

1.13 Rules of Interence with Quantifiers