AP Computer Science | Activity 0913 | Name:
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$\sim$ mean NOT $\wedge$ means AND $\vee$ means OR

$\Rightarrow$ mean IMPLIES $\Leftrightarrow$ means IF AND ONLY IF $\oplus$ means EXCLUSIVE OR

Problem 1. Prove that $(p \Rightarrow q) \Leftrightarrow (\sim p \vee q)$ by filling out this truth table.

p	q	$p \Rightarrow q$	$\sim p$	$\sim p \vee q$	$(p \Rightarrow q) \Leftrightarrow (\sim p \vee q)$
T	**T**				
T	**F**				
F	**T**				
F	**F**				

Problem 2. Prove that $((p \vee q) \Rightarrow (p \wedge q)) \Leftrightarrow (p \Leftrightarrow q)$ by filling out this truth table.

p	q	$p \vee q$	$p \wedge q$	$(p \vee q) \Rightarrow (p \wedge q)$	$p \Leftrightarrow q$	$((p \vee q) \Rightarrow (p \wedge q)) \Leftrightarrow (p \Leftrightarrow q)$
T	**T**				**T**	
T	**F**				**F**	
F	**T**				**F**	
F	**F**				**T**	

Problem 3. Prove that $((p \vee q) \wedge \sim (p \wedge q)) \Leftrightarrow (p \oplus q)$ by filling out this truth table.

p	q	$p \vee q$	$p \wedge q$	$\sim (p \wedge q)$	$(p \vee q) \wedge \sim (p \wedge q)$	$p \oplus q$	$((p \vee q) \wedge \sim (p \wedge q)) \Leftrightarrow (p \oplus q)$
T	**T**					**F**	
T	**F**					**T**	
F	**T**					**T**	
F	**F**					**F**	