

## 1.1: Formal Logic Truth Tables

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**Question 1.** Westley, standing with his hands behind his back, claims that he is holding a quarter in his left hand and a \$20 in his right hand. You believe he is lying. What would have to show to demonstrate that he is lying? Invent a diagram, chart or symbols to illustrate the possible scenarios.

**Question 2.** Buttercup knows whether or not Westley is lying. She promises that if Westley is lying, she will give you a cookie. Buttercup always keeps her promises. Suppose she does not give you a cookie; what can you conclude? Suppose that she gives you a cookie; what can you conclude?

**Question 3.** Camp Halcyon and Camp Placid are two summer camps with the following daily policies on pool use and cleanup duties.

Camp Halcyon's Policy: If you used the pool in the afternoon and you didn't clean up after lunch, then you must clean up after dinner.

Camp Placid's Policy: You must do at least one of the following: (a) Stay out of the pool in the afternoon, (b) clean up after lunch, or (c) clean up after dinner.

How do these policies differ? Explain your reasoning.

**Definition 1.** A statement (also known as a proposition) is a declarative statement that is either true or false, but not both.

**Examples.**

Often, a complicated statement consists of several simple statements joined together. There are five logical connectives.

<u>Name</u>	<u>Symbol</u>
and	
or	
not	
implies (if ... then)	
if and only if	

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### Truth Tables.

Truth tables are a tool we can use to establish the validity (truthness?) of a complicated statement. Each logical connective has a truth table associated to it. This allows us to say precisely what each symbol means without ambiguity.

<u><math>p</math></u>	<u><math>\neg p</math></u>
T	
F	

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**Homework.** (Due Sept 10, 2018) Section 1.1: 2

**Practice Problems.** Section 1.1: 1