Logic Statements

(extra comments)

Suppose you have a conditional statement if the form of IF [...], THEN [...]. You want to know if this statement is valid (true) or not based off of the known validity (the truth values) of the two sub-statements. See the table below.

P	Q	$P \to Q$
T	T	T
T	F	F
F	T	T
F	F	T

Examples:

1) Consider the conditional statements ($T \to T$):
   a. If a and b are integers, then $a + 2b$ is an integer.

   In these situations, both the IF and the THEN statement are true. Notice also that we are looking at the THEN statement under the assumption of the IF statement. Here the entire conditional statement is valid (or true).

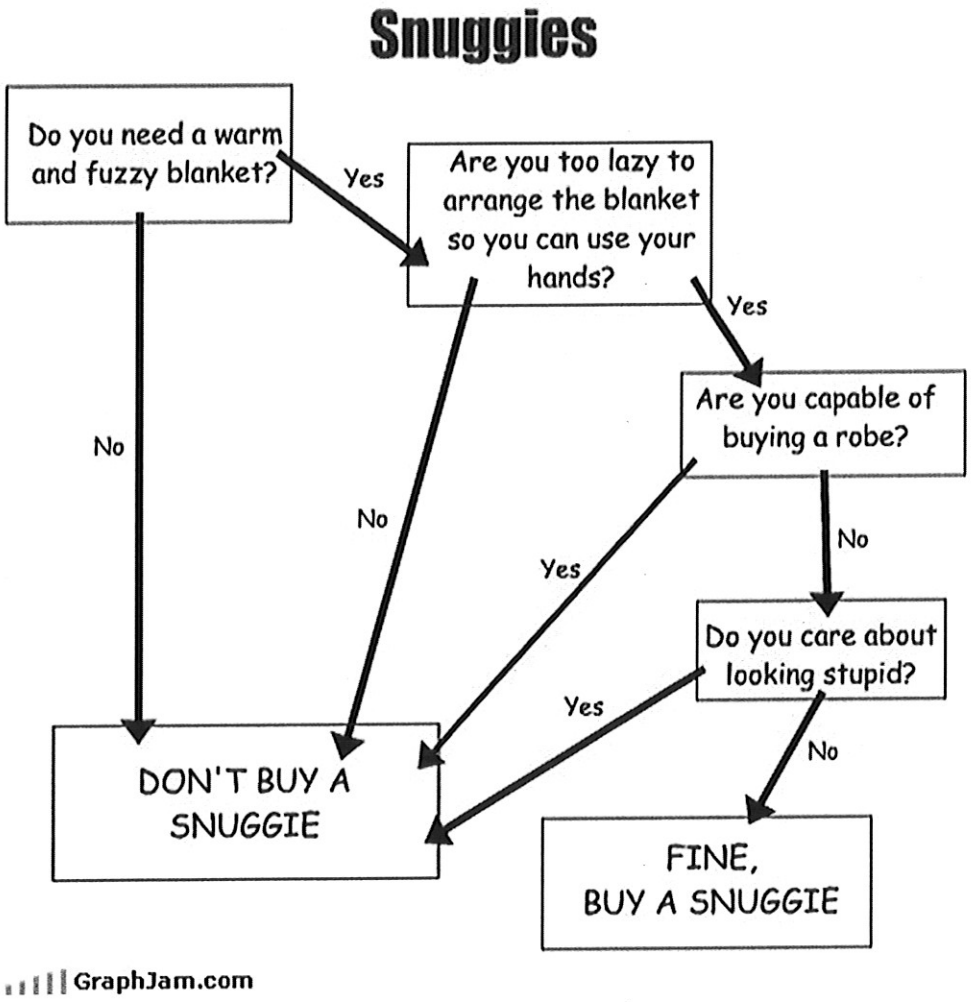
2) Consider the conditional statements ($T \to F$):
   a. If a and b are integers, then a/b is an integer.
   b. If I fall down the stairs in Fretwell, I will land in South Carolina.

   In these situations, the IF statement is true, but the THEN statement is false. Again we are looking at the THEN statement under the assumption of the IF statement. Here the entire conditional statement is not valid (or false). Specifically, we can find counterexamples. For statement (a), let $a = 1$ and $b = 2$. Obviously, $\frac{a}{b} = \frac{1}{2}$ is not an integer.

3) Consider the conditional statements ($F \to T$):
   a. If π is an integer, then πr^2 is the area of a circle.
   b. If π is an integer, then $\frac{\pi}{r}$ is the area of a circle.
   c. If I see a purple horse, I know that I am in OZ.
   d. If I am

   In these situations, the IF statement is false, but the THEN statement is either true or false. Again we are looking at the THEN statement under the assumption of the IF statement. Any time the IF statement does not occur, there really isn't a fair/accurate way to evaluate whether the two statements have any linked causality. Hence regardless of whether we know the THEN statement will occur, we're now in fantasy land because of the IF statement. In that fantasy land, may be the THEN statement will actually occur. (But there's no way to verify this in the real world.) Thus, the entire conditional statement is valid (or true). Another way to logically write the $P \to Q$ is by $\sim P \; or \; Q$ hence the truth table above.

For example, look at the flow chart below. If you answered no at the first step, there's no way to really know (by an outside verifier) whether you have access to a robe because in this situation that question won't ever come up.



[1]

[1] Found at http://www.pleated-jeans.com/2012/04/05/15-funny-flowcharts/