A **conditional statement** uses the connective: *if... then* (→)

p: Tarzan lifts weights.  
q: Tarzan sweats.  

p → q: If Tarzan lifts weights, then Tarzan sweats.

*If... then...* statements may be disguised in other forms. Two such examples are:

1) Cats do not bark.  
2) It is difficult to sleep when it is noisy.

### The Conditional Truth Table
Let p: It snows and q: I go skiing

<table>
<thead>
<tr>
<th>p</th>
<th>q</th>
<th>p → q</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Given that p, q, and r are all true, determine the truth value for each compound statement:

3)  \((p → ~q) → (~r → q)\)  
4)  \((~p → q) → (q → ~r)\)

Determine the truth value for each compound statement:

5)  \(4 = 3 + 1 → 6 > 10\)  
6)  \((p ∨ ~p) → \text{False}\)  
7)  \(1 > 2 → \text{The sun rises every day}\)

### Constructing Truth Tables

8)  \((~p ∨ q) → p\)  
9)  \((p → q) → (~p ∨ q)\)
The Negation of the Conditional as a Conjunction

p: I eat lima beans  
q: I get sick  

p → q: If I eat lima beans, then I get sick.

In words, what is the negation of the above conditional?

So, in symbols:

Truth Table:

Examples:

Writing a Conditional as a Logically Equivalent Disjunction

From above we know:

Using DeMorgan’s Law:

Using Truth Table to verify:

Thus,

1. We can rewrite any conditional as a logically equivalent disjunction using the general formula:

2. We can rewrite the negation of any conditional as a logically equivalent conjunction using the general formula: