Chapter 3

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1 Questions

1. Write two atomic (or basic or simple) propositions about science.

2. Write two complex propositions about politics.

3. Draw a truth table for one of your complex propositions about politics.

4. Write two propositions about popular culture that use *or*.

5. Did your above propositions both use the incusive *or*? If so, good. Now write two that use the exclusive *or-but-not-both*.

2 Some truth tables

1.

A	B	A and B
T	T	
T	F	
F	T	
F	F	

2.

A	B	C	A and B	(A and B) or C
T	T	T		
T	F	T		
F	T	T		
F	F	T		
T	T	F		
T	F	F		
F	T	F		
F	F	F		

3.

A	B	not(A and B)
T	T	
T	F	
F	T	
F	F	

4.

A	B	C	A and B	B or C	(A and B) or (B or C) BNB
T	T	T			
T	F	T			
F	T	T			
F	F	T			
T	T	F			
T	F	F			
F	T	F			
F	F	F			

5.

A	B	C	A or B BNB	B & C	not-(B & C)	(A or B BNB) or not-(B & C)
T	T	T				
T	F	T				
F	T	T				
F	F	T				
T	T	F				
T	F	F				
F	T	F				
F	F	F				

6.

A	B	C	A or B	B or C	not-(B or C)	(A or B) or not-(B or C) BNB
T	T	T				
T	F	T				
F	T	T				
F	F	T				
T	T	F				
T	F	F				
F	T	F				
F	F	F				

7.

A	B	C	((A & B) or (A & not-C)) or (not-B & not-C)
T	T	T	
T	F	T	
F	T	T	
F	F	T	
T	T	F	
T	F	F	
F	T	F	
F	F	F	

3 If, then, and only if

1. If it is raining, I'll take an umbrella.
2. If today is a class day, I'll be in class.
3. I'll be in class only if today is a class day.
4. Only if you are 18 can you see an R movie.
5. You can only pay in-state tuition if you live in-state.
6. There are easy ways to be rich, if you have no scruples.
7. You can't get to Washington unless you go through Virginia.
8. Unless you answer three questions, you can't pass this bridge.
9. You can pass this bridge if you answer three questions.
10.
11.

4 Truth tables with conditionals

1.

A	B	If A, then not B
T	T	
T	F	
F	T	
F	F	

2.

A	B	C	If (A or B), then B or C BNB
T	T	T	
T	F	T	
F	T	T	
F	F	T	
T	T	F	
T	F	F	
F	T	F	
F	F	F	

3.

A	B	C	If (A only if C), then B
T	T	T	
T	F	T	
F	T	T	
F	F	T	
T	T	F	
T	F	F	
F	T	F	
F	F	F	

4.

A	B	C	(A if and only if B) or (B & C) BNB
T	T	T	
T	F	T	
F	T	T	
F	F	T	
T	T	F	
T	F	F	
F	T	F	
F	F	F	

5 Immediate inferences

1. Write two examples that are straightforward and obvious to you.
2. Write a truth table to prove that the argument form is valid.
3. Write to examples, in standard form, that are similar, but not identical, to the argument in question. Identify how they differ from the argument in question. Draw a truth table for each to prove if they are valid or invalid.
4. Write a more complicated example.

5.1 The imediate inferences

- Conversion:

  1. 1. If A, then B.

  ∴ If not B, then not A.

- Double Negation:

  1. A.

  ∴ Not not A.

- De Morgan's Laws (there are two!):

  1. Not (A and B)

  ∴ Not A or Not B.

  1. Not (A or B)

  ∴ Not A and Not B.