## Midterm Study Guide

Professor Tanksley February 16, 2012

## 1 Arguments

For each of the following, put the argument in propositional form, then draw a truth table to prove whether it is valid or invalid.

Here's a sample truth table for you to work with:

And a 3 column one:

- 1.(a) Not both A and B.
  - ∴ Not A or not B.

**Solution**: This is one of DeMorgan's laws. VALID

A	В	Not (A and B)	Not A or Not B
T	T	F	F
T	F	T	T
F	T	T	T
F	F	T	T

2. You can go to graduate school only if you graduate from college. Therefore, if you didn't graduate from college, you didn't go to graduate school.

## **Solution:**

- (a) If A, then B. (If grad school, then graduated)
  - ... If not B, then not A. (If did not graduate, then not grad school)

Conversion VALID

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

- 3.(a) The clock is not correct.
  - ... It is not the case that it is not the case that the clock is not correct.

**Solution**: This is double negation.

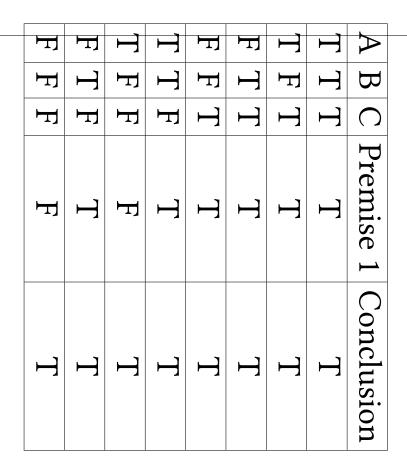
VALID

A	В	A	Not not A
T	T	T	T
T	F	T	T
F	T	F	F
F	F	F	F

- 4.(a) If we didn't eat out and go to the show, then we can go to the show or get ice cream.
  - ... If we didn't go to the show or get ice cream, then we cannot eat out and go to the show.

**Solution**: This argument is valid. But it looks like it shouldn't be!

- (a) If not (A and B), then B or C.
  - ∴ If not (B or C), then not (A and B)



- 2 Label the antecedent and consequent
- 1. If it is cold, I will not be in class.

**Solution**: Antecedent: It is cold.

Consequent: I will not be in class.

2. I'll vote for him only if he promises to lower taxes.

Solution: Antecedent: I'll vote for him.

Consequent: He promises to lower taxes.

3. Only if you are 48 inches tall can you ride the ride.

**Solution**: Antecedent: You can ride the ride.

Consequent: You are 48 inches tall.

## 3 Fill in the truth table

	1.	•		
Ŧ	F	T	T	A
F	T	F	T	В
T	Ħ	F	T	A if and only if B

			2.					
Ħ	H	L	T	F	H	T	T	$\triangleright$
Ħ	T	F	T	F	T	F	T	В
Ħ	Ħ	F	Ŧ	T	T	L	T	$\bigcirc$
T	T	T	T	T	T	T	F	If A and B, then not (C or not B BNB)

Note that  $\leftrightarrow$  is 'if and only if'.

