Logic I
Fall 2009
Problem Set 1
Due 9/22/09

1. (5 pts. each) True or false:

T F Some argument whose conclusion is logically false is valid.

T F Every argument whose conclusion is logically true is valid.

T F No argument whose premises are logically inconsistent is valid.

T F Some invalid argument has true premises and a true conclusion.

2. Give an example of each of the following:

   (a) (5 pts.) A consistent set of English sentences with a true member and a false member.

   (b) (10 pts.) A valid but unsound argument (in English, in standard form).

   (c) (5 pts.) Two (distinct) English sentences that are logically equivalent.

3. (5 pts. each) Translate each of the following sentences into SL. Indicate which English sentences you are representing with which SL sentence letters. An example is provided in (a).

   (a) John lives in Boston and Mary lives in Medford.

   J: John lives in Boston. J & M
   M: Mary lives in Medford.

   (b) Bill will win the race if and only if Gladys either breaks a leg or has a hangover.

(c) Bill won the race because Gladys broke her leg.

(d) Neither Mary nor Frank has both a dog and a cat.

(e) Methuselah is the oldest man only if no man is older than he is.

(f) If some lawyers are dishonest but some are not, I will not tell lawyer-jokes even though people laugh at them.

4. (20 pts.) Complete the truth-tables below. Indicate the main connective.

A	B	$\sim (A \supset B)$
T	T	
T	F	
F	T	
F	F	

A	B	$(A \vee B) \supset (\sim B \supset A)$
T	T	
T	F	
F	T	
F	F	

5. (15 pts.) Let $\downarrow$ represent the English 'neither ... nor ...'. Fill in the truth-table for $A \downarrow B$. Then use only sentence letters and $\downarrow$ to provide a formula (with corresponding table entries) logically equivalent to $\sim$A. Do the same for A & B.

A	B	$A \downarrow B$	....	....
T	T			
T	F			
F	T			
F	F			

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