Phi 270 Foo test 3

Analyze the sentences below in as much detail as possible *using connectives*; that is, you *should not* identify components that are individual terms (or predicates or functors). Present the result in *both symbolic and English notation*. Be sure that the unanalyzed components of your answer are complete and independent sentences; also try to respect any grouping in the English.

1. If it rains, you will get wet if you're outside
   answer

2. Al missed breakfast only if he overslept
   answer

Use derivations to check whether each of the entailments below holds. You may use detachment and attachment rules. If an entailment fails, present a counterexample that divides an open gap.

3. A → (B → C) ⇒ (A → ¬ C) → (A → ¬ B)
   answer

4. A → B ⇒ ¬ A ∧ B
   answer

Analyze the sentence below in as much detail as possible. In this case you *should* identify components that are individual terms, predicates, or functors. Be sure that the unanalyzed components of your answer are independent (in particular, that none contains a pronoun whose antecedent is in another).

5. Unless Al is the file's owner, the system didn't let him open it
   answer

Expand the following sentence in all possible ways on each of the terms appearing in it (i.e., you need not use vacuous abstraction).

6. Tabc
   answer

Use a derivation to show that the entailment below holds. You may use detachment and attachment rules.

7. A → Ra(fb), Rb(fa) → Ga ⇒ A → (¬ Gb → ¬ a = b)
   answer

Phi 270 Foo test 3 answers

1. it will rain → you will get wet if you're outside
   it will rain → (you will get wet ← you will be outside)
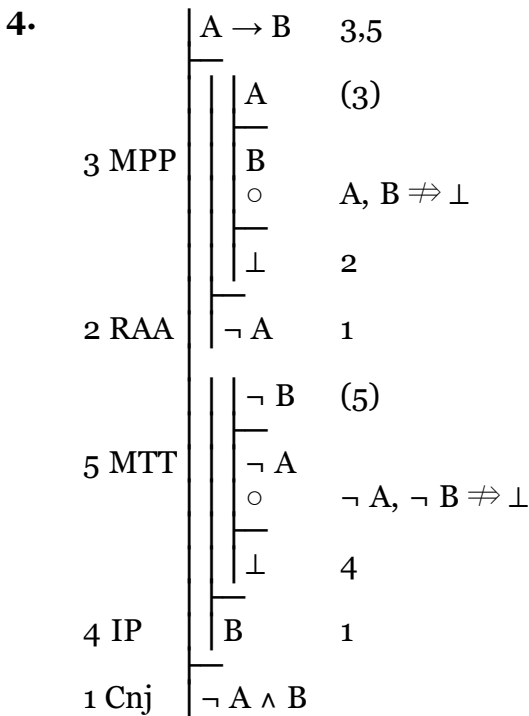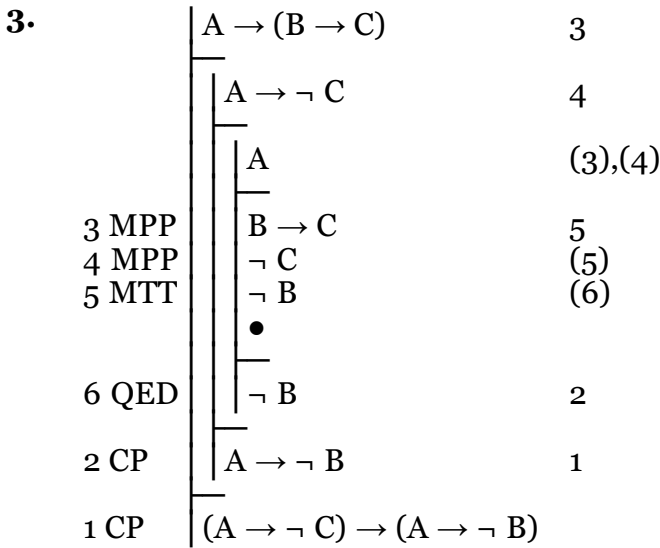 $$R \to (W \leftarrow O) \ [\textit{or:} \ R \to (O \to W)]$$
   if R then if O then W

   O: you will be outside; R: it will rain; W: you will get wet

2. ¬ Al missed breakfast ← ¬ Al overslept

¬ M ← ¬ O [*or:* ¬ O → ¬ M)]

if not O then not M

M: Al missed breakfast; O: Al overslept

3.

$$A \to (B \to C) \qquad 3$$

$$A \to \neg C \qquad 4$$

$$A \qquad (3),(4)$$

3 MPP	$B \to C$	5
4 MPP	$\neg C$	(5)
5 MTT	$\neg B$	(6)
	•	
6 QED	$\neg B$	2
2 CP	$A \to \neg B$	1
1 CP	$(A \to \neg C) \to (A \to \neg B)$	

4.

$$A \to B \qquad 3,5$$

$$A \qquad (3)$$

3 MPP	B	
	○	A, B $\not\Rightarrow$ ⊥
	⊥	2
2 RAA	¬ A	1
	¬ B	(5)
5 MTT	¬ A	
	○	¬ A, ¬ B $\not\Rightarrow$ ⊥
	⊥	4
4 IP	B	1
1 Cnj	¬ A ∧ B	

A	B	$A \to B$ / ¬ A ∧ B			
T	T	T	F	F	divides 1st gap
F	F	T	T	F	divides 2nd gap

5. ¬ Al is the file's owner → the system didn't let Al open the file

¬ Al is the file's owner → ¬ the system let Al open the file

¬ Al = the file's owner → ¬ [_ let _ open _] the system Al the file

¬ a = [_'s owner] the file → ¬ Lsaf

¬ a = of → ¬ Lsaf

L: [_ let _ open _]; a: Al; f: the file; o: [_'s owner]; s: the system

6. $[Txbc]_x a$

$[Taxc]_x b$

$[Tabx]_x c$

7.

	A → Ra(fb)	
	Rb(fa) → Ga	4
	A	
	Ra(fb)	(5)
	¬ Gb	(6)
	a=b	a-b, fa-fb
	●	
5 QED=	Rb(fa)	4
	Ga	(6)
	●	
6 Nc=	⊥	4
4 RC	⊥	3
3 RAA	¬ a=b	2
2 CP	¬ Gb → ¬ a=b	1
1 CP	A → (¬ Gb → ¬ a=b)	