PY1003: Introduction to Logic
Example Class 2

Truth trees for Sentential Logic

SECTION A
1. "We can always use truth tables to prove whether an argument is valid or not. We don't really need any other method." Do you agree? Explain your answer.
2. What is a 'closed branch' on a truth tree? What does it mean if a branch is closed?
3. What is the main connective in a formula? Why is it important to find the main connective before applying a tree rule to a formula?
4. What is a 'branching' rule? Explain why the rule for $A \rightarrow B$ is a branching rule. (You may want to use truth tables here.)
5. The rule for (AvB) generates only two branches. But the truth table for (AvB) shows that there are *three* possible ways for (AvB) to be true. What is the explanation of this apparent discrepancy?

SECTION B
Apply tree rules to the following formulae. Then apply appropriate rules to any new formulae obtained. Continue this procedure for as long as possible.

1. $Av(B \wedge C)$

2. $(B \rightarrow C) \wedge (\neg\neg A \rightarrow \neg C)$

3. $((A \rightarrow B) \wedge (A \rightarrow \neg B)) \wedge A$

4. $(\neg\neg\neg A \wedge C)$

5. $\neg\neg(((A \wedge B) v C) v ((B \wedge C) \wedge (A v B)))$

SECTION C
Translate into Sentential and then apply tree rules as above. (Tip: if you come to a formula you don't know the rule for, try thinking of a different translation for the English sentence.)

1. The man with the moustache is a spy and should be shot.
2. It's not that I'm unhappy about it, but I'm not thrilled either.
3. If the man with the moustache is not a spy then he should not be shot.
4. If they make it to Mount Doom then Sam is a rock even though Frodo is weak and silly.

5. You're either deceitful and clever or honest and stupid, and you're not honest and you're not clever.

What is interesting about the tree for question 5?