Chapter 10

Evaluating Molecular Statements

Evaluating statements

The central contrast to be made here is between evaluating atomic statements (which we do by checking facts or by other means) and evaluating molecular statements, which is what this chapter is about.

Students will often breeze past exhortations in the text to 'try to imagine' something or to do some other bit of thinking along the way. I really do think they would benefit from trying to imagine situations in which the truth values of statements (2) through (10) might matter to someone. You might want to question them about such things in class, in an effort to get them to read more actively.

Logical operators and truth values

There's not much that's new in this section. We've already considered the truth values of negations, and the rules for the truth values of conjunctions and disjunctions are implicit in the meanings of those operators. These concepts are so crucial, however, that I think they warrant the focused attention they receive here.

The one thing that *is* new is the use of Parsnip trees for computing truth values. The Parsnip trees aren't new, but writing truth values above each operator or atomic statement is.

Evaluating complicated molecular statements

Here, we apply the methods presented in the previous section to molecular statements containing multiple operators, statements whose Parsnip trees are moderately complicated. If students have developed the ability to work carefully, one step at a time, through a problem, they shouldn't have much trouble with this section. They need to focus, first, on building the correct Parsnip tree, and, second, on working their way up from the atomic statements to the main operator. The latter process should be approached one node of the tree at a time, using the rules for establishing the truth values of operators (in the previous section).

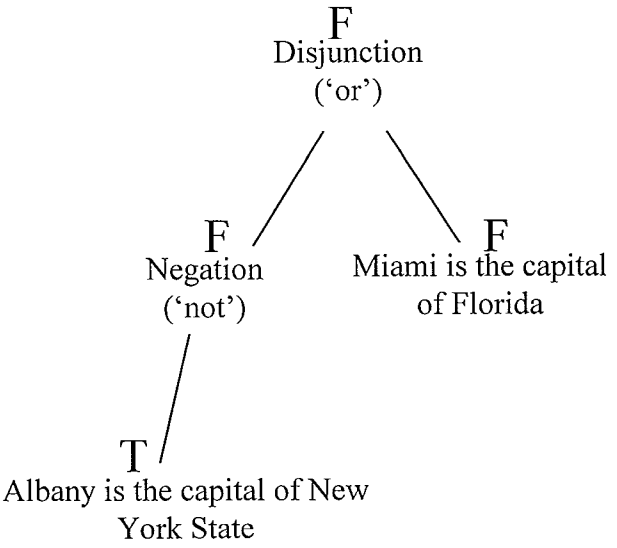
Example (14) was greatly improved by a suggestion from Mark M. Brown.

Exercises

Using the method set out in this chapter, evaluate each of the following molecular statements.

Comment: Some students seem to have a great deal of difficulty with expressions like 'using the method set out in this chapter'. I've received many questions from students on exercises like these along the lines of 'How do you want us to do this?' *Please* resist the urge to tell them how to do the exercise if they ask a question like that. Tell them to read the directions and do what they say. For that matter, you might want to preempt the whole discussion and ask them to explain what they're to do. It really should not be hard for a student to figure out what is meant by 'the method set out in this chapter'. Their future teachers and employers will owe you a debt of gratitude if you can get them to start figuring out things like this on their own.

1. Albany is not the capital of New York State, or Miami is the capital of Florida.



So the statement is false. (Recall that the truth value of the main operator is the truth value of the whole statement.)

We have truncated the PDF version of this chapter in order to minimize the number of exercise solutions visible online. The chapter continues for several more pages and provides answers for the remainder of the Chapter 10 exercises.