Meaning, Reference and Modality
Exercises 3-4 *

Lewis (1973)

Lewis (1973, pp. 86 – 87) discusses restricted and unrestricted uses of 'idioms of existential quantification'.

Question 1: What are the consequences of adopting one or the other with respect to modal realism?

Question 2: Lewis notes that the alleged unrestricted and restricted idioms of quantification *'there are . . . '* and *'there actually exist . . . '* can be equivocated and used either way. Do you agree? Discuss some relevant examples.

Stalnaker (1976)

Stalnaker (1976, p. 69) argues that one could accept the view that a personal pronoun like 'I' is an indexical and still maintain the view that other people do not exist. What is the point that Stalnaker is trying to make here?

Frames

What first-order property do the following formulas characterize?

1. $\Box\bot$
2. $\Box\Box\bot$
3. $\Box\Box p \rightarrow \Box p$

4. $\Box(\Box p \rightarrow p)$
5. $\Box\Box p \rightarrow p$
6. $(p \vee \Box\neg q) \rightarrow \Box(p \vee \neg q)$

At the end of this set of exercises, you can find a partial solution with the frame conditions. In this way, you can still prove that the solutions are indeed correct. However, use with caution: in general, you are supposed to come up yourself with the frame conditions associated with the formulas.

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Times

Temporal Operators

Question 1: Consider Prior's temporal logic introduced in the slides. Consider the operators F and P. How can you define the following tenses based on these operators?

1. 'It had been the case that ϕ.'

2. 'It will have been the case that ϕ.'

3. 'It was going to be the case that ϕ.'

4. 'ϕ would have been the case.'

Question 2: Consider the uses of the verb 'to eat' in (1) and (2):

(1) John was eating a sandwich.

(2) John ate a sandwich.

Do you find any differences between (1) and (2)? If so, is Prior's temporal logic suitable to account for such differences? Why/Why not?

Question 3: Consider now also the operators H and G. Suppose that the temporal precedence relationship $<$ is linear (transitive, irreflexive and complete). Can you define temporal operators $A\phi$ and $S\phi$ encoding the meaning of 'always ϕ' and 'sometime ϕ'?

Temporal Frames

Which frames do (1) and (2) below define?

(1) $Gp \rightarrow Fp$

(2) $Hp \rightarrow Fp$

Partial Solutions Frames

1. $\forall x \forall y (\neg R(x, y))$
2. $\forall x \forall y \forall z (R(x, y) \rightarrow \neg R(y, z))$
3. $\forall x \forall y (R(x, y) \rightarrow \exists z (R(x, z) \wedge R(z, y)))$
4. $\forall x \forall y (R(x, y) \rightarrow R(y, y))$
5. $\forall x \exists y (R(x, y) \wedge R(y, x))$
6. $\forall x \forall y (R(x, y) \rightarrow x = y)$