Semantic Theory 2014 – Exercise Sheet 5

Manfred Pinkal

Exercises are due on Tuesday, June 3, 10:15 a.m.

5.1 *and* again

As noun-phrase coordinating conjunction, *and* can be translated to the follwing lambda expression (see Ex. 4.3 (d)):

$\lambda P_{\langle et, t\rangle}\lambda Q_{\langle et, t\rangle}\lambda F_{et}[P(F) \wedge Q(F)]$

Derive an FOL representation of the following sentence, using function application and β-reduction.

Every student and a professor work

Please, start from the type-logical translations of the lexical items, and do it (more or less) step by step.

5.2 Ditransitive verbs

Derive an FOL representation of the following sentence, using function application and β-reduction.

Mary [[gives Sally] a book]

Syntactic structure is indicated by brackets. Translate *Mary*, *Sally*, and *a book* to appropriate ⟨et, t⟩ expressions, assume for *give* the following translation:

$\lambda P_{\langle et, t\rangle}\lambda Q_{\langle et, t\rangle}\lambda x[Q(\lambda y[P(\lambda z.\text{give*}(z)(y)(x))])]$ (give* $\in \text{CON}_{\langle e, \langle e, \langle e,t\rangle\rangle}$)

Hint: Do not solve the exercise schematically, look carefully at the different application and reduction steps and try to understand their effect.

5.3 Negation

(a) *Bill doesn't work*

Assume that *doesn't* in sentences like (a) is a predicate modifier that converts a first-order predicate into its complement. Give a translation in terms of a lambda expression, and derive a representation for (a)

(b) *John, but not Bill works*

Treat *but not* as one basic expression, same type as *and* in Ex. 5.1. Give a translation and derive the sentence representation.

5.4 Prepositions

Do Ex. 4.2(c) again, but this time assume that the internal NP argument has the "correct" type ⟨et, t⟩. The type of the lambda expression therefore will be ⟨⟨et, t⟩,⟨et, et⟩⟩. Use in*$\in CON_{\langle e, \langle e,t\rangle\rangle}$ as the underlying FOL relation. Compute the representation of the following sentence:

Mary works in Saarbrücken

Hint: The problem is similar to the transitive-verb problem discussed in the lecture; accordingly, the translation will be structurally similar to (though not identical with) the translation of *read*.

5.5 Possessive construction

Assume that *Bill's car* has the syntactic structure *[[Bill s] car],* where the genitive marker "*s*" is treated as an independent word. Further assume that the possessive construction is an indefinite NP meaning something like "*a car that Bill has*", and take have*$\in CON_{\langle e, \langle e,t\rangle\rangle}$ to be the underlying FOL relation.

(a) Assume that the translation of the "*s*" is of type ⟨e,⟨et, ⟨et, t⟩⟩⟩, i.e., *Bill* translates to b* $\in CON_e$. Give the translation of "s" and compute the representation for the NP.

(b) Assume instead that the type of "*s*" is ⟨⟨et, t⟩,⟨et, ⟨et, t⟩⟩⟩, i.e., the immediate argument is a full NP denotation (think of *every student's car*), translate and compute the NP representation (for one of *Bill's car* and *every student's car*).