Semantic Theory 2014 – Practice Exam

Manfred Pinkal

You have 120 minutes to do this exam. Please number every sheet of paper that you submit, and note the total number of sheets on the first page. You may not use any additional materials beyond those we distribute together with this exam. Please do not use pencils!

You can achieve a total of 100 points in this exam. In order to pass, you must get at least 50 points.

Good luck!

1. Minor Questions

(a) Which types must constants A, B, and C have in the following type-theoretic expressions?

(1) $\lambda x.A(x)(x) \wedge B(A)(x)$

(2) $\exists x.C(A(x))$

Assume that x is a variable of type e. Note that constant A should have the same type in (1) and (2).

(b) The following application of the beta reduction rule is invalid:

$\lambda x[\forall y\ like(x)(y)](y) \Leftrightarrow \forall y\ like(y)(y)$

What is going wrong? Explain!

(c) Give the three possible representations for sentence (3) (ignoring tense, and using go-up as representation of the verb).

(3) Jack and Jill went up a hill.

(d) Which are the four verb classes in Vendler's aspectual verb classification? Give an example for each of them.

2. Type Theory

Consider the following sentence and its syntactic structure:

An unknown person robbed a bank.

$[_S [_{NP} [_{DET}$ An$] [_{N'} [_{ADJ}$ unknown$] [_N$ person$]]]$
$[_{VP} [_V$ robbed$] [_{NP} [_{DET}$ a$] [_N$ bank$]]]]$

(a) Give appropriate type-theoretic translations for the five words occurring in this sentence, and specify the type of each expression. The translation of "unknown" should use the constant know* of type ⟨e, ⟨e, t⟩⟩.

(b) Derive the semantic representation for the sentence, using basic composition rules and beta reduction. If you are not able to find a reasonable lambda term for "unknown," you may use unknown' as translation for this part of the problem.

3. Cooper Storage

Consider the following sentence and its (slightly simplified) syntactic structure.

Every student believes that a professor works.

$[_S [_{NP}$ Every student$] [_{VP} [_V$ believes that $[_S [_{NP}$ a professor$] [_{VP}$ works$]]]]$

The sentence has three scope readings.

(a) Compute one semantic representation for this sentence using the Nested Cooper Storage technique in which "a professor" takes scope over "believe." Assume that "believes that" translates into believe' of type ⟨t, ⟨e, t⟩⟩. For the other expressions, assume the usual representations.

(b) Question (a) asks for one reading of the sentence. Please indicate how the other two readings can be derived by sketching at which level you apply which rule (storage, retrieval, or application).

4. Event Semantics

(11) Bill read a book in the library.

(12) $[_S [_S [_S$ Bill $[_{VP}$ read $[_{NP}$ a book $]]] [_{PP}$ in the-library $]]$ PAST$]$

(13) $[_S [_S$ Bill $[_{VP}$ read $[_{NP}$ a $[_{N'}$ book $[_{PP}$ in the-library $]]]]]$ PAST$]$

(a) Give event-semantic (Davidsonian) target representations for readings (12) and (13) of Sentence (11).

(b) Assume that "Bill" and "the-library" are of type e. Give appropriate type-logical semantic representations for the PAST operator and the lexical expressions "read", "a", and "in", in terms of lambda expressions; use read* and in* as underlying relations.

(c) Give a Neo-Davidsonian representation of the target representation of (12), using “Agent” and “Patient” as semantic roles.

5. DRT

Two possible DRSes for the following sentence can be obtained through DRS construction.

A professor doesn’t own a book.

(a) Give these DRSes.

(b) Why is it exactly two DRSes (not just one, not more than two)? Explain.

(c) Compute the truth conditions for one of the DRSes.

6. Accessibility in DRT

(1) *A professor doesn’t own a book. He buys it.*

(2) *A professor doesn’t own Moby Dick. He buys it.*

(a) According to the construction rules of DRT, there is no way to derive an admissible DRS for Text (1). Explain, why!

(b) For Text (2), a DRS can be derived. Give this DRS, and explain the difference to Text (1).