INTRODUCTION TO DYNAMIC SEMANTICS

Syllabus
(January 18, 2012)

LECTURES
M, Th 9:50 am – 11:10 am, in SEM-108

INSTRUCTOR
Professor Maria Bittner
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office: SEM-203A
office hour: M 11:15 am – 12:15 pm in SEM-203A (by appointment only)

PREREQUISITE
16:615:530 Semantics I, or permission of the instructor

COURSE DESCRIPTION & GOALS
Formal semantic analysis aims to provide insight into two basic questions:
• semantic representation:
  How can we represent the meaning of a sentence or text, in order to capture native speaker
  intuitions about truth/falsity, anaphoric dependencies, contextual felicity, coherence, etc?
• semantic composition:
  Given a desired semantic representation of a sentence or text,
  (a) what is the structural input to semantic composition — e.g. surface form or LF?
  (b) how can we represent the meaning of each elementary constituent?
  (c) given (a) and (b), how can we compose the desired semantic representation of the whole?
Semantic representation is said to be indirect if semantic values (e.g. individuals or functions) are represented by expressions of a formal logic (this course); otherwise, it is direct. If syntactic and semantic rules operate in tandem to build interpreted surface constituents out of interpreted daughter constituents, then semantic composition is direct (this course). Otherwise, it is indirect (e.g. LF-based, as in Semantics I). Semantic rules that refer to grand-daughters or beyond are non-compositional.

  Indirect representation is a matter of convenience. For complex phenomena (e.g. discourse
dynamics, as in this course), a suitable formal logic makes it possible to represent the relevant
aspects of meaning in a reader-friendly way (if the reader knows the logic). But one can always
eliminate the (reader-friendly) expressions of a formal logic in favor of the (less reader-friendly)
meta-language that specifies their semantic values (e.g. set theory plus mathematical English).
The resulting representation is direct (as in Semantics I). By the end of this course students will
be expected to be able to (i) use Predicate Logic (topics 1–2) and Dynamic Predicate Logic
(topics 3–4) to represent a fragment of English discourse, and (ii) to use that representation to
make predictions about truth in context, inference patterns, and discourse anaphora.

In contrast, whether semantic composition is direct or indirect is a substantive issue. At
present, it is also a matter of controversy too complex to resolve in this course. Instead, the goal
of this course is to introduce students to one standard method of direct interpretation, using a
typed version of the chosen logic (defined for *Predicate Logic* in topic 5, and for *Dynamic Predicate Logic* in topics 6–7) plus a *categorial grammar* (CG, as in the three fragments of English defined in topics 5–7). By the end of this course students will be expected to be able to (iii) use universal directly compositional rules of CG to build a fragment of English and translate it into *Type Logic* or (*Sorted*) *Dynamic Type Logic*.

**COURSE WEBPAGES**

- *Lecture notes* can be downloaded from the instructor’s webpage (http://www.rci.rutgers.edu/~mbittner). They will be made available under “Teaching” as the course progresses.
- Course participants will also have access to the website “16:615:531 Sem II S12” on Sakai.
  - To download *readings* click on “Resources”
  - To download or submit a *homework assignment*, click on “Assignments”.

**READINGS:**

The readings to be made available under “Resources” on Sakai include:

- CS381 Introduction to Discrete Structures [mth.webarchive]
- Barker, C. *Lambda tutorial* [barker_lambda_tutorial.webarchive]
- Steedman, M. 1996. *Surface Structure and Interpretation*. MIT, Cambridge MA. (Ch. 1–2)

**COURSE REQUIREMENTS:**

- **Final exam**
  This course does not have a final exam.

- **Assignments**
  There will be *eight* homework assignments, which will be graded on the following scale:
  
  ✓+ (outstanding: you got the basic point & the details, keep up the good work)
  ✓ (ok: you got the basic point but not the details, make sure you understand everything before the next assignment & pay more attention to get everything right next time)
  ✓– (red flag: you missed something basic, need to act immediately—redo the assignment, see the instructor, do whatever it takes to get back on track. If you recover fast, an occasional ✓– is not a big deal. But two or more ✓– in a row mean you are really lost and heading for B+ or worse).

  The class schedule below indicates when the assignments (*H1–8*) will be posted (on Sakai) and due (on Sakai). *Late* assignments will not be accepted (either on Sakai or in class).
TENTATIVE CLASS SCHEDULE (to be revised if and when necessary)

Th 1/19. Introduction

• Part I: Indirect semantic representation

TOPIC 1. Discourse reference in PL
  Read: Karttunen 1976
Th 1/26. From PL translation to truth. H1 (posted by 1/26 7pm, due Sa 1/28 7pm)
  Read: CS381 Introduction to Discrete Structures [mth.webarchive]: Propositional Logic
M 1/30. Solution to H1.

TOPIC 2. Quantification in PL
Th 2/2. Solution to H1 ctd. Referential v. quantified np's.
  Read: CS381 Introduction to Discrete Structures [mth.webarchive]: Predicate Logic
M 2/6. Referential v. quantified np's in PL. H2 (posted by 2/6 7pm, due W 2/8 7pm)
  Read: CS381 Introduction to Discrete Structures [mth.webarchive]: Set Theory
Th 2/9. Solution to H2

TOPIC 3. Anaphora in DPL
  Read: G&S 1990: sec. 1–2
Th 2/16. Anaphora in DPL. H3 (posted by 2/16 7pm, due Sa 2/18 7pm)
  Read: G&S 1990: sec. 3.1–3.3
M 2/20. Solution to H3. Entailment and equivalence in DPL.

TOPIC 4. Quantification in DPL (∼ DRT)
Th 2/23. Implication and quantification in DPL.
  Read: G&S 1990: sec. 3.4–3.5
M 2/27. Referential v. quantified np's in DPL.
  Read: G&S 1990: sec. 4.1
Th 3/1. Donkey anaphora in DPL. H4 (posted by 3/1 7pm, due Sa 3/3 7pm)
  Read: G&S 1990: sec. 4.2
M 3/5. Solution to H4. From DPL to Discourse Representation Theory (DRT)
  Read: Kamp 1981

• Part II: Direct semantic composition

TOPIC 5. English in CG+TL
  Read: Chris Barker’s lambda tutorial [barker_lambda_tutorial.webarchive]
SPRING BREAK 3/10–3/18
M 3/19. Syntax and semantics of TL.
Th 3/22. Categorial grammar. English in CG + TL. H5 (posted by 3/22 7pm, due Sa 3/24 7pm)
  Read: Baldridge 2002: Ch. 2.1–2.2
  Read: Steedman 1996: pp. 1–24
Th 3/29. Coordination and quantification in CG + TL
**TOPIC 6.** English in CG + DL
M 4/2. *Dynamic Type Logic* (DL)
   Read: Muskens 1996:I-II
Th 4/5. Syntax and semantics of DL. **H6** (posted by 4/5 7pm, due Sa 4/7 7pm)
   Read: Muskens 1996:III
M 4/9. Solution to **H6**.
   Read: Muskens 1996:IV–V
Th 4/12. English in CG + DL. **H7** (posted by 4/12 7pm, due Sa 4/14 7pm)
   Read: Muskens 1995:1–3
M 4/16. Solution to **H7**.
   Read: Muskens 1995:4–5

**TOPIC 7.** English in CG + DLₐₜ
Th 4/19. Nominal and temporal anaphora. 4-sorted DL (DL₃).
   Read: Partee 1973, Webber 1988
M 4/23. English in CG + DL₃
   Read: Muskens 1995:6–7
Th 4/26. Temporal ontology and temporal reference. 5-sorted DL (DL₄)
   Read: Moens & Steedman 1988
M 4/30. English in CG + DL₄. **H8** (posted by 4/30 7pm, due Su 5/6 7pm)