

Formal Semantics 11-723

Fall 1997

TTh 3-4.20, Cyert 279 ('Blue Room')

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Office hours: Wednesdays, 10:30-12 noon (tentative)

Course Description

This is an introductory graduate-level course on formal semantics of natural languages, emphasizing the computational challenge of constructing and manipulating suitable semantic representations of natural language expressions.

Course Objectives

- To acquire some facility in constructing and manipulating semantic representations of natural language expressions
- To develop a feel for the prospects for mechanizing these processes: the idea of *computational* semantics
- To see where and how formal semantics fits in natural language processing: interface with syntax and with pragmatics

Topics to be covered

- (1) Basics: first-order logic (Tarski's definition of satisfaction), discourse representation structures (including the rudiments of plurals and tense and aspect)
- (2) The syntax-semantics interface and compositionality: lambda abstraction, Montague grammar, syntax-driven induction (via homomorphism), Compositional DRT
- (3) Complexities of representation and inference, especially underspecification: anaphora resolution, presupposition, disambiguation (compositionality re-considered), Underspecified DRT (and connections with LFG)
- (4) The semantics-pragmatics interface and the problem of world (versus linguistic) knowledge: discourse structure, Segmented DRT

Emphasis

Commitment to a particular choice of syntactic formalism will be minimized, with the stress instead on the semantic side and the problem of constructing well-formed formulas from ill-formed (e.g. underspecified) expressions.

Reading materials

Text: Hans Kamp and Uwe Reyle, *From Discourse to Logic*, Kluwer, 1993.

Papers:

Reinhard Muskens, Combining Montague Semantics and Discourse Representation, *Linguistics and Philosophy*, 19 (2), 1996.

Uwe Reyle, Dealing with ambiguities by underspecification: construction, representation and deduction, *Journal of Semantics*, 10 (2), 1993.

Rob A. van der Sandt, Presupposition projection as anaphora resolution, *Journal of Semantics*, 9 (4), 1992.

A. Lascarides and N. Asher, Temporal interpretation, discourse relations and commonsense entailment, *Linguistics and Philosophy*, 16 (5), 1993.

And perhaps additional papers to be announced later during the semester.

Recommended:

Robin Cooper, Ian Lewin and Alan Black, *Prolog and Natural Language Semantics: Notes for AI3/4 Computational Semantics*, 1993.

(<ftp://ftp.cogsci.ed.ac.uk/pub/cooper/comp-sem.ps.gz>)

This is especially good for the computational side. The emphasis on semantic evaluation rather than inference is, however, somewhat misplaced, given the uncomputability of satisfaction relative to infinite models (indispensable for establishing completeness).

Bob Carpenter, *Type-Logical Semantics*, MIT Press.

(<http://macduff.andrew.cmu.edu/books/tls/index.html>)

Very impressive. But a bit heavy on the lambda's — the price for establishing compositionality within a Montague-categorial grammar framework. (Contrast to emphasis stated above.)

Course requirements and evaluation

Assignments will have either a theoretical (formal logic) or practical (Prolog) bent, depending on the background and interests of the class (as well as the availability of suitable software). The requirements, in any case, consist of

- (1) Four problem sets. (Due dates to be announced at least two weeks beforehand.)
- (2) Take-home “final” due December 8.

$$\text{Grade} = 40\% \text{ final} + 60\% \text{ three highest problem sets}$$

This means you could ace the class by turning in only three problem sets and the final. Your chances might be better if you do all the work, however, especially since the final may cover anything treated during the semester.

Grading will be done on a curve (allowing for the possibility that everyone gets an A, should everyone do well).

Schedule

The topics mentioned will be covered roughly in the order they are listed.