Three Lectures on Hybrid Logic
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This course introduces hybrid logic, a form of modal logic in which it is possible to name worlds (or times, or computational states, or situations, or nodes in parse trees, or people - indeed, whatever it is that the elements of Kripke Models are taken to represent. The course has three major goals. The first is to convey, as clearly as possible, the ideas and intuitions that have guided the development of hybrid logic. The second is to teach something about hybrid deduction and its completeness theory, and to make clear the crucial role played by the basic hybrid language and the Henkin construction. The third is to give you a glimpse of more powerful hybrid systems beyond the basic language, notably languages using the downarrow binder and explicit quantification over nominals.

Here is the lecture plan:

Lecture 1: From modal logic to hybrid logic

Lecture 2: Hybrid deduction

Lecture 3: Stronger systems

I won't be presuming any particular background in hybrid (or indeed, modal) logic, but I will be assuming a certain "logical maturity". As background reading I would like to suggest the following:

- "Representation, Reasoning, and Relational Structures: a Hybrid Logic Manifesto", by Patrick Blackburn, *Logic Journal of the IGPL*, 8(3), 339-625, 2000. *(An easy introduction to the topic)*
- Section 7.4, Hybrid Logic, pages 434-445 of *Modal Logic*, by Patrick Blackburn, Maarten de Rijke and Yde Venema. Cambridge Tracts in Theoretical Computer Science, 53, Cambridge University Press, 2001 *(This covers basic completeness theory for the basic language)*
- "Hybrid Logic", by Carlos Areces and Balder ten Cate, Handbook of Modal Logic, edited by Blackburn, van Benthem and Wolter, 2007, pages 821-868, Elsevier. *(An advanced introduction to the topic)*
- "Contextual Validity in Hybrid Logic", by Patrick Blackburn and Klaus Frovin Jørgensen., *Proceedings of CONTEXT 2013, Lecture Notes in Artificial Intelligence (LNAI) 8175, pages 185-198*, 2013. *(An example of more recent work)*