IN5100:
Pathway Logic: Executable Models of Biological Networks

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As always, try to understand the main concepts. In particular, no (non-trivial) background in biology is assumed.

Curriculum (pensum)

The curriculum is given by:

1. The paper: S. Eker, M. Knapp, K. Laderoute, P. Lincoln, and C. Talcott, *Pathway Logic: Executable Models of Biological Networks.* Proc. Fourth International Workshop on Rewriting Logic and Its Applications, 2002, Electronic Notes in Computer Science 71, Elsevier, 2002. `https://www.sciencedirect.com/science/article/pii/S1571066105825332?via%3Dihub` .

2. The slides on *Bio-Pathway Logic* by José Meseguer, available from the course web page.

3. Slides from whoever will present this in class.

4. (Just a quick view of) the slides *Pathway Logic: Using Rewriting Logic to Understand How Cells Work* by Carolyn Talcott. Presented at the International School on Rewriting 2021. Available at `https://dalila.sip.ucm.es/isr2021/slides/Talcott.pdf`.

Of course, we do not want to be experts in systems biology. What you should know and understand in particular include:

- What is happening in general, and, in particular, why could this be useful in biology?

- Understand how cells and proteins are modeled in rewriting logic. Essentially, given a drawing, what would be corresponding Maude term be (from 2002 paper).

- That is, what are the sorts `Enclosure`, `Soup`, `Dish`, etc.

- What is the term on (almost) top of page 150?

- Understand what happens in rules `410....`, `438....`, and `757....`

- Understand/draw the structure of the state `q14`.

- What is search used for in the paper?

- Understand broadly what the proposition `prop1` denotes.

- Understand what they want to achieve with the model checking command on page 154.

- Why could/could not this done with search?

- As for Carolyn Talcott's slides, read them quickly and for a quick overview of the Pathway Logic project. No detailed questions will be asked from these slides. Get the broad picture.