Core logic homework 2, Andreas van Cranenburgh 0440949.

Exercise 5

In formalization 1 it is not possible to distinguish between old and new sheep, thus it is not possible to define an explicit 'mother of' relation. It can be defined implicitly but in this case multiple 'mother of' relations are possible for each possible birth relation.

To formalize "10% of all sheep die of old age" I would choose the second formalization because it is more explicit. The additional information would not change this.

Given an explicit birth cycle model <P, R, S0, S1, B, W, O>,
besides a birth relation there is also a subset 'old age' A of S0, such that the cardinality of A is 10% of the cardinality of S0. After the cycle the new members of S0 will be the difference between S0 and A, and members of A are excluded from giving birth.

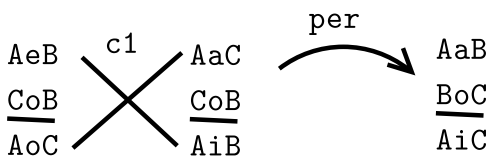
We consider shepherd John, who is the only shepherd and owns one black sheep and nine white sheep. A birth and old age cycle passes and five new sheep are born, but the black sheep is selected to be part of A, and ceases to exist after the cycle. Now the statement "no owner owns only white sheep" is false, since John has become a counter-example to this claim.

I would again choose the same explicit formalization when presented with the additional information that 25% of sheep giving birth dies, because the same reasons still apply. Explicit definitions are easier to work with.

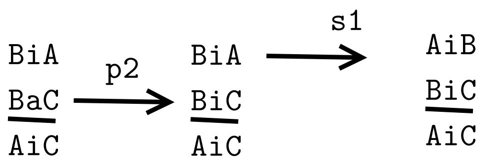
Given a birth and old age model as defined before, we define the set mothers M as: M = {x | <x, y> in R}. A subset M' of M, such that the cardinality of M' is 25% that of the cardinality of M, is selected. Now after each cycle the new members of S0 will be the difference of S0 and M'.

Exercise 6

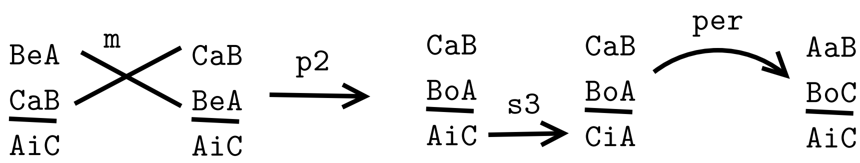
'Hecodo'




'Gisipi'




'Hemapis'




Exercise 7

Suppose o := <o_1, ..., o_n> is a B_BCDF-proof of M
Suppose o_1 is not of the form c_i:

- The s-rules don't change the copula, so if M has two particular premises, then so does s_i(M)
- The p-rule make universal premises particular, but our premises are already particular.
- The m-rule and per-rules don't change the copula, so our premises are still particular.

As a consequence if o_1 is not of the form c_i, then there can be no B_BCDF-proof of M, because none of Barbara, Celarent, Darii and Ferio have two particular premises.

Suppose o_1 is indeed of the form c_i:
There are two cases to consider. If the conclusion is universal then it will be made into a particular premise. In this case the previous argument applies: none of the four perfect moods has two particular premises.

If the conclusion is particular then it will be made into a universal premise, along with a universal conclusion, because either of the two particular premises will become the conclusion. Looking at the four perfect moods reveals that none of them are of the form universal, particular : universal.

Exercise 8

1) Sentences are translated into a context-free and timeless perspective so as to avoid modal puzzles.

2) No, eg.:

"First of all, Aristotle analyzes time as the number of change with respect to the before and after ([3d]D11, esp. 220a24-5). Without dwelling on this point, it is sufficient to note that (as evidenced by (11')) the Smullyan-esque approach requires one to analyze change in terms of time, and not the other way around as Aristotle would have it."

Furthermore, although Aristotle did approve of rephrasing expressions, he did not consider them to refer to the same objects. Hence the article states:

"Thus he considered, but did not adopt, a Smullyanesque response to a problem about sameness."

3) People can be identified as spatio-temporal worms but when branching futures are considered it is more appropriate to identify people with "hydras", whose branches reflect possible futures, instead of having a single timeline as with worms.