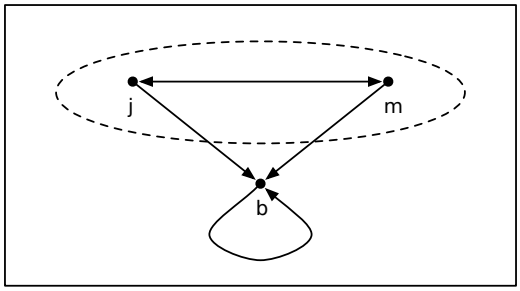
2.1 Consider the following formula:

(1) $\forall x(R(P)(x) \rightarrow P(x))$

What types must P and R have for the formula to be well formed? Assume that x is a variable of type e.

2.2 Is it possible to have type theoretic expressions A and B such that both A(B) and B(A) are well-formed? Motivate your claim.

2.3 The diagram graphically represents a model structure M= ⟨U, V⟩ with a universe consisting of John (j), Bill (b), and Mary (m). The dashed line indicates the set of students, the arrow indicates the helping relation.



Give the value assignment function V_M for the following non-logical constants:

(a) $j^*, b^*, m^* \in CON_e$

(b) $student' \in CON_{\langle e,t\rangle}$

(c) $help' \in CON_{\langle e,\langle e,t\rangle\rangle}$

2.4 Compute the denotations of the following expressions relative to the model structure from 2.3 and some variable assignment g. x is a variable of type e, and F is a variable of type ⟨e, t⟩.

(a) $[\![help'(b^*)(m^*)]\!]^{M,g} = ?$

(a) $[\![help'(b^*)]\!]^{M,g} = ?$

(b) $[\![\forall x(help'(x)(x) \rightarrow \neg student'(x)]\!]^{M,g} = ?$

(c) $[\![\forall F \exists x F(x)]\!]^{M,g} = ?$

2.5 Extend the sample grammar from the lecture with a syntax rule and a corresponding translation rule for (prenominal) adjectives, and give a corresponding entry for “blond” in the semantic lexicon. Compute a semantic representation for the sentence “a blond student works.” Beta-Reduce the result as far as possible.

2.6 The lecture slides give lambda terms for some noun phrases such as “every student” or “Bill.” Give corresponding lambda terms for the following:

(a) exactly one student

(b) every student except Mary

(c) only Bill

Note that the lambda terms should have type ⟨⟨e,t⟩, t⟩.

Give also the representation for the complex determiner “exactly one.”

To be turned in Tuesday 2012-05-10, 10:15 h

Please bring copies to the exercise session