FLST WS 2014/15 – Semantics – Exercise 2

Vera Demberg

1) write down lambda expressions for the following phrases; use simple first-order-logic (FOL) for a-g.

    a) girl
    b) to sleep
    c) to chase (transitive verb)
    d) to [[give something] [to someone]]
    e) to [[give someone] something]
    f) to dress oneself
    g) to be chased by (passive)
    h) every

2) Calculate the meaning expressions of the following sentences using Lambda Calculus. Use the lambda expressions from the first task, plus assume the following vocabulary:

Mary	mary'
Bill	bill'
present	$\lambda x[present'(x)]$
a	$\lambda F \lambda P[\exists p(F(p) \wedge P(p))]$

Use FOL for a-e; f-g require HOL.

    a) [[Mary] [sleeps]].
    b) [[Mary] [[chases] [Bill]]].
    c) [[Mary] [dresses herself]].
    d) [[Mary] [[is chased by] Bill]].
    e) [[Mary] [[[gave] [Tom]] [to Peter]]]. (e.g., Tom is a baby.)
    f) [[Mary] [[likes] [[every] [present]]]].
          (tip: you need to do type-raising for chase.)

3) Give type-theoretic representations for the following NL sentences. Identify the type of the expressions based on the type set given blow, and construct a type-theoretic formula representing the sentences (like on slide 17 of Wednesday's slides). Ignore tense.

a. John likes Bill.

b. John is a student.

c. Mary owns a nice bike.

d. Bill likes an impressively thick book.

Type set from lecture:

Proper name	bill: e
Sentence	it_rains: t
One-place predicate constant:	work, student: (e,t)
Attributive adjective:	married, poor: ((e,t),(e,t))
Degree modifier:	very, relatively: (((e,t),(e,t)),((e,t),(e,t)))
Second-order predicate:	hair_colour: ((e,t),t)
Two-place relation:	like, own: (e,(e,t))

4 a) What type should "believes" have in "Peter thinks he's a bright student."?

  b) What type should "give" have in "Peter gave Mary a present."?