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24.903  
Language & Structure III: Semantics and Pragmatics  
Spring 2003, 2-151, MW 1-2.30  
February 26, 2003  
Assignment 3, due in class on March 5

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1. Let A be an expression of type e, B of type et, C of type (et)et, and D of type (et)t. Determine whether the following expressions are well-formed, and if yes, give the type of those expressions:

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|------------|---------------|
| a. A(B)    | e. D(B)       |
| b. C(B(A)) | f. D(B)(A)    |
| c. C(B)    | g. D(C(B))    |
| d. C(B)(A) | h. C(C(B))(A) |

2. Give the types of the subexpressions marked by "?", assuming that the examples are well-formed.

- A(B), A: (e(et))t, B: ? A(B): ?
- A(B), A(B): (et)et, B: et, A: ?
- A(B)(C), A: ((et)t)(et)et, B: ?, C: ?, A(B)(C): ?
- A(B)(C), A(B)(C): et, A(B): eet, B: (et)t, A: ? C: ?
- A(B(C)) A(B(C)): e B: (et)t A: ? C: ?
- Is it possible to assign types to A, B and C in such a way that both A(B(C)) and (A(B))(C) are well-formed expressions?

3. Assume that intransitive verbs are of type et, and transitive verbs are of type eet.

- What is the type of **and** as a conjunction of intransitive verbs, as in *John [sleeps and snores]*?
  - What is the type of **and** as a conjunction of transitive verbs, as in *John [read and enjoyed] "Ulysses"*?
  - What is the type of the adverb **quickly** in a sentence like *John [walked quickly]*?
  - What is the type of the preposition **with** in the sentence *John [walked [with [Mary]]]*?
  - What are the types of **faster** and **than** in the sentence *John [walks [faster [than Mary]]]*?
- (In doing problems (3a-e) assume a binary branching structure for *and*.)

4. There are different conventions for naming types.

a. Translate the following three abbreviated type names to type names using the official convention of angled brackets:

eet, (et)et, ((et)et)(et)et

b. Translate the following three official type names to type names using the abbreviatory convention:

$\langle\langle e, t \rangle\rangle$ ,  $\langle e, \langle e, t \rangle \rangle$

$\langle\langle\langle e, t \rangle\rangle, \langle e, t \rangle\rangle$ ,  $\langle e, \langle e, \langle e, t \rangle \rangle \rangle$

$\langle\langle\langle\langle e, t \rangle\rangle, t \rangle\rangle$ ,  $\langle\langle e, t \rangle, t \rangle\rangle$ ,  $\langle e, t \rangle$