Homework 4

LING 255

Due: March 6, 2008

1. THE ASSIGNMENT

For each of the following sentences (trees appear on the next page), either:

- Write out a step-by-step derivation that shows what interpretation the sentence receives (and indicate whether that interpretation is correct), *or*
- Indicate clearly why such a derivation is not possible without changing the theoretical assumptions laid out in the next section.

(1) Every bearded student shaves.
(2) Every student who is bearded shaves.
(3) Every student likes the president of Penn.
(4) The president of Penn likes every student.

2. THE THEORETICAL ASSUMPTIONS

2.1. Meanings

⟦**every**⟧ $\lambda P : P \in D_{\langle e, t\rangle} . \lambda Q : Q \in D_{\langle e, t\rangle} . \{x \mid P(x) = \text{TRUE}\} \subseteq \{y \mid Q(y) = \text{TRUE}\}$
⟦**the**⟧ $\lambda P : P \in D_{\langle e, t\rangle}$ and P is a singleton set . the only $x \in D_e$ such that $P(x) = \text{TRUE}$

⟦**president**⟧ $\lambda x : x \in D_e . \lambda y : y \in D_e .$ y is a president of x
⟦**likes**⟧ $\lambda x : x \in D_e . \lambda y : y \in D_e .$ y likes x

⟦**bearded**⟧ $\lambda x : x \in D_e .$ x is bearded
⟦**shaves**⟧ $\lambda x : x \in D_e .$ x shaves
⟦**student**⟧ $\lambda x : x \in D_e .$ x is a student

⟦**Penn**⟧ the University of Pennsylvania

who, **is**, **of**: semantically vacuous, and can be ignored.

2.2. Composition Rules

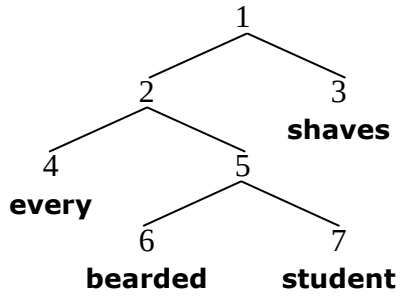
Function Application (Rule #1 of Interpretation)
If a node M has daughters D_1, D_2, and D_1 is a function that can take D_2 as an argument, then ⟦M⟧ = ⟦D_1⟧(⟦D_2⟧)

Predicate Modification (Rule of Interpretation #2)
If a node M has daughters D_1, D_2 , and ⟦D_1⟧ and ⟦D_2⟧ both have the semantic type ⟨*e*, *t*⟩, then ⟦M⟧ = [$\lambda x : x \in D_e$. TRUE iff ⟦D_1⟧(*x*) = TRUE and ⟦D_2⟧(*x*) = TRUE].

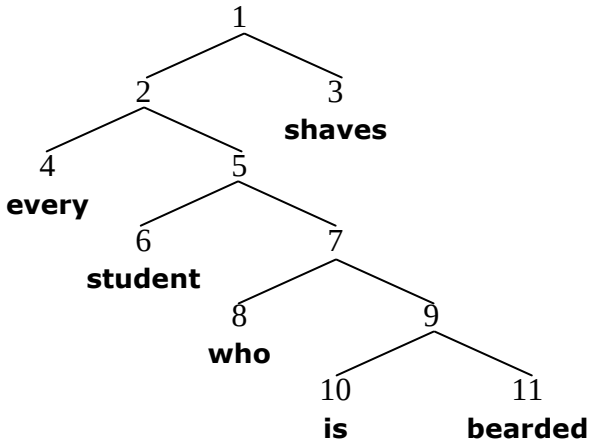
Vacuous Meaning (Rule of Interpretation #3)
If a node M has daughters D_1, D_2 , and D_1 is vacuous, then ⟦M⟧ = ⟦D_2⟧.

2.3. Trees

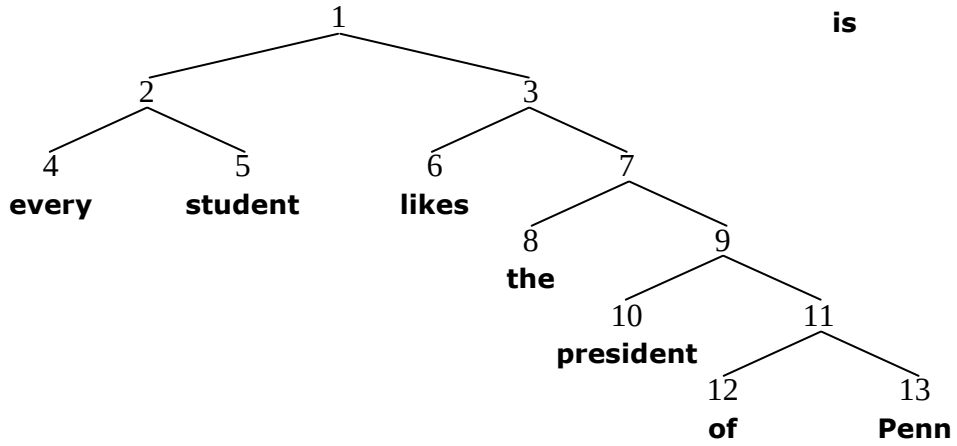
(1)



(2)



(3)



(4)