Take Home II, Part 1
To be handed in by March 17 by 1.30pm

EXERCISE 1. In handout p. 36, we saw that a quantifier like every, some, no, etc., denotes a relation between two sets A and B of individuals, as expressed in (1a-b). For the sake of the exercise, consider each of the bold-face expressions in (2)-(6) as a unit forming a complex quantifier. Spell out their denotations in (2’)-(6’).

(1) a. $[[\text{every}]]^w = \{ <A,B>: A \subseteq B \}$
b. $<A,B> \in [[\text{every}]]^w$ iff $A \subseteq B$

(2) Most but not all professors visited Alabama.
(3) Between eight and fifteen professors visited Alabama.
(4) An even number of professors visited Alabama.
(5) More female than male professors visited Alabama.
(6) Everybody but professors visited Alabama.
a. ‘Everybody except for all professors visited Alabama.’

(2’) $[[\text{most-but-not-all}]]^w = \{ <A,B>: \ldots \}$
(3’) $[[\text{between-eight-and-fifteen}]]^w = \{ <A,B>: \ldots \}$
(4’) $[[\text{an-even-number-of}]]^w = \{ <A,B>: \ldots \}$
(5’) $[[\text{more-female-than-male}]]^w = \{ <A,B>: \ldots \}$
(6’) $[[\text{everybody-but}]]^w = \{ <A,B>: \ldots \}$
EXERCISE 2. To deal with QuNPs in non-subject position, one possible avenue is to enrich the semantic rules, as in line A in handout p.38-39. According to this approach, besides the rule(s) for quantifiers in subject position on p. 37 (main text or footnote), we would need rules for quantifiers in second level of embedding that would generate scope ambiguities. For example, we would need one rule for every$_{2}$level-narrow to generate reading (7) and one for every$_{2}$level-wide to generate reading (8).

(6) Exactly-two students admire every professor.

(7) every$_{2}$level-narrow:
  a. exactly-two >> every$_{2}$level-narrow: ‘There are exactly two students x such that, for every professor y, x admires y.’
  b. Scenario: Kevin and Jessica admire all professors, but no other student does.

(8) every$_{2}$level-wide:
  a. every$_{2}$level-wide >> exactly-two: ‘For every professor y, there are exactly two (possibly different) students x such that x admires y.’
  b. Scenario: The professors in this scenario are Robin, Aravind and Maribel. Robin is admired by Tom and Jonny and by no other student. Aravind is admired by Alexis and Elwin and by no other student. Maribel is admired by Alexis and Steve and by no other student.

Your task is to formulate the appropriate two rules, following the steps below:
  i. Spell out the truth-conditions of (7) and (8) in (9) and (10) in set-theoretic notation.
  ii. Formulate the rule for every$_{2}$level-narrow in (11) and for every$_{2}$level-wide in (12) assuming that the Determiner in subject position will be exactly-two.
  iii. Formulate the rule for every$_{2}$level-narrow in (13) and for every$_{2}$level-wide in (14) that will generate the desired scopes no matter what QuNP is in subject position.

(9) \[ [\text{exactly-two students admire every$_{2}$level-narrow professor}]^w = 1 \text{ iff } \ldots \]

(10) \[ [\text{exactly-two students admire every$_{2}$level-wide professor}]^w = 1 \text{ iff } \ldots \]

(11) \[ [[\text{exactly-two N1'}} V_{tr} [\text{every$_{2}$level-narrow N2'}]]^w = 1 \text{ iff } \ldots \]

(12) \[ [[\text{exactly-two N1'}} V_{tr} [\text{every$_{2}$level-wide N2'}]]^w = 1 \text{ iff } \ldots \]

(13) \[ [[\text{QuNP} V_{tr} [\text{every$_{2}$level-narrow N2'}]]^w = 1 \text{ iff } \ldots \]

(14) \[ [[\text{QuNP} V_{tr} [\text{every$_{2}$level-wide N2'}]]^w = 1 \text{ iff } \ldots \]
EXERCISE 3. Translate the following sentences into Predicate Logic (PrL), breaking them down into atomic predicates as much as possible. Subindices on QuNPs and pronouns indicate that the pronoun should refer back to the QuNP. [If sentence is ambiguous, give as many PrL translations as readings it has.]

(15)

a. Mary likes every cat.

b. Mary introduced Sue only to John.

c. Mary has a dog that barks when it (=the dog) is hungry.

d. John sent a present to Martin.

e. Amy sent a letter to each candidate.

f. Every girl\textsubscript{1} that visited all her\textsubscript{1} relatives was-satisfied.

g. Tony interviewed a candidate that no student liked.

h. If no student likes any candidate, then some professors will-worry.

i. If you don’t answer question A or question B, you will-be-in-trouble.

j. John met a representative from every country you did (=meet a representative from).
EXERCISE 4. Assume, for simplicity, the syntactic structure in (16), where TENSE dominates the rest of the sentence. The goal of this exercise is to define the semantic rules in (17)-(19) that combine each tense with the rest of the sentence. To this end, assume that each predicate has, besides its usual participants, a temporal argument slot, as exemplified in (20) for like. Time points (or time intervals) are ordered by the precedence relation ≤, defined in (21), and there is a designated temporal variable, \( t_0 \), that refers by default to the utterance time. Finally, do the semantic computation, step by step, of the tree in (16) with PAST.

(16) John likes / liked / will like Paul.

(17) \[ \text{[[PRES S]]} = 1 \text{ iff} \]

(18) \[ \text{[[PAST S]]} = 1 \text{ iff} \]

(19) \[ \text{[[FUT S]]} = 1 \text{ iff} \]

(20) \[ \text{[[like]]} = \{ <x,y,t>: x \text{ likes } y \text{ at time } t \} \]

(21) For any two time points (or time intervals) \( t \) and \( t' \):

\[ t < t' \text{ iff } t \text{ temporally precedes } t'. \]

E.g.: \( t \) is the interval December 2004 and \( t' \) is the interval February 2005.

\[1\text{ We could of course have TENSE lower than the NPsu and above VP. You are encouraged to try the latter structure by yourself. Here we will assume (16) for simplicity.} \]