## Week 4

- Set and function notation
- Quantifiers as relations between sets; Negative Polarity Items (NPIs)

Next:

- Propositional logic, logical connectives

**Exercise** (from Heim & Kratzer pages 9–10)

Consider the following equations. Are they always true, never true, or true under specific circumstances? Under what circumstances?

(1) a. $\{a\} = \{b\}$

b. $\{x : x = a\} = \{a\}$

c. $\{x : x \text{ is green}\} = \{y : y \text{ is green}\}$

d. $\{x : x \text{ likes } a\} = \{y : y \text{ likes } b\}$

e. $\{x : x \in A\} = A$

True or false:

$\{z : z \text{ read two books}\} \subseteq \{z : z \text{ read three books}\}$

(2) $every(A)(B) = 1$ iff $A \subseteq B$ returns the truth value for “Every A is B.”

(3) $some(A)(B) = 1$ iff $A \cap B \neq \emptyset$ returns the truth value for “Some A is B.”

(4) $no(A)(B) = 1$ iff $A \cap B \neq \emptyset$ returns the truth value for “No A is B.”

**Exercise:** Take a quantifier in a sentence of the form "Quantifier A B." For example, in "Every student is sleeping," the quantifier is "every," A = "student," and B = "is sleeping." Define the truth conditions of "Quantifier A B" in terms of the sets $A$ and $B$. (We ignore number morphology and agreement here.)

1. a
2. two
3. more than two
4. more than half
5. most
6. not all
7. the (singular)
   ex: 'the dog'
8. the (plural)
   ex: 'the dogs'

**Answers:**

| | | | |
|---|---|---|---|
| (5) | $every(A)(B) = 1$ | iff | $A \subseteq B$ |
| (6) | $a/some(A)(B) = 1$ | iff | $A \cap B \neq \emptyset$ |
| (7) | $no(A)(B) = 1$ | iff | $A \cap B = \emptyset$ |
| (8) | $two(A)(B) = 1$ | iff | $\mid A \cap B \mid \ \geq 2$ |
| (9) | $more\text{-}than\text{-}two(A)(B) = 1$ | iff | $\mid A \cap B \mid \ > 2$ |
| (10) | $most(A)(B) = 1$ | iff | $\mid A \cap B \mid \ > \ \mid A \setminus B \mid$ |
| (11) | $not\ all(A)(B) = 1$ | iff | $A \setminus B \neq \emptyset$ |
| (12) | $the_{\mathrm{sg}}(A)(B) = 1$ | iff | $\mid A \mid \ = 1$ and $A \subseteq B$ |