

# LING 510, Lab 6

## October 21, 2013

### 1. Midterm Review

- What have we covered so far in class:
  - Set theory
  - Functions
  - Determining the truth value and truth conditions for a sentence
  - Entailment vs. implicature

#### 1.1 Set Theory Review

- Some key terms and symbols:
  - Set membership ( $\in$ )
  - Subset ( $\subseteq$ )
  - Set Union ( $\cup$ )
  - Set Intersection ( $\cap$ )
  - Set Difference ( $-$ )
  - Set Complement ( $S'$ )
  - Cardinality ( $|S|$ )

#### (1) Assume the following sets:

$A = \{\text{lion}, \{\text{elephant}\}, 4, 3\}$

$B = \{x : x \text{ is an animal}\}$

$C = \{x : x \text{ is a natural number}\}$

$D = \{\emptyset\}$

a. Are the following statements true or false? If they're false, how could we change them to make them true?

$\{\text{lion}, \{\text{elephant}\}\} \in A$

$A \subseteq (B \cap C)$

$\{\text{elephant}\} \subseteq A$

$A \subseteq (B \cup C)$

$\text{lion} \in A$

b. Write down the following sets:

a.  $A \cap B$

e.  $A \cup \emptyset$

b.  $A - B$

f.  $A \cap C$

c.  $B \cap C$

g. The set containing all the subsets of A

d.  $A \cup D$

h.  $|A|$

c. Complete the following sentences:

The empty set is a subset of \_\_\_\_\_.

Every set is a subset of \_\_\_\_\_.

Order {does / does not} matter in ordered pairs.

d. Rewrite the set  $\{\text{Elizabeth}, \text{Ilaria}\}$  in predicate notation.



## 1.2 Functions Review

- Some key terms:

<ul style="list-style-type: none"><li>• Cartesian Product (<math>\times</math>)</li><li>• Ordered tuples</li><li>• Relations</li><li>• Semantic types</li></ul>	<ul style="list-style-type: none"><li>• Function (total vs. partial)</li><li>• Domain</li><li>• Range</li></ul>
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(2) **Assume the following sets:**

$A = \{\text{Elizabeth, Andrew, Hannah}\}$

$B = \{\text{blue, green, red}\}$

Assume the following things are true in our world:

Elizabeth likes blue and green.

Andrew likes red.

Hannah doesn't like any colors.

- What is the Cartesian product  $A \times B$ ?
- Write in set notation the relation *likes* that holds in the world described above.
- What is the domain of the relation *likes*? What is its range?
- What set theoretic relation holds between your answers to (2a) and (2b)?

(3) **Describing the relation *likes*.**

- Is *likes* a function? Why or why not? If not, how could we turn it into a function?
- Write the characteristic function for *likes* using table notation.
- Schonfinkel your answer from right-to-left. Write the Schonfinkelled function in table notation.
- Write the characteristic function for Schonfinkelled *likes* using function (or predicate) notation. (e.g.,  $f : \dots$ )
- What is the semantic type of *likes*?
- Write the denotation for *likes* using our lambda notation.

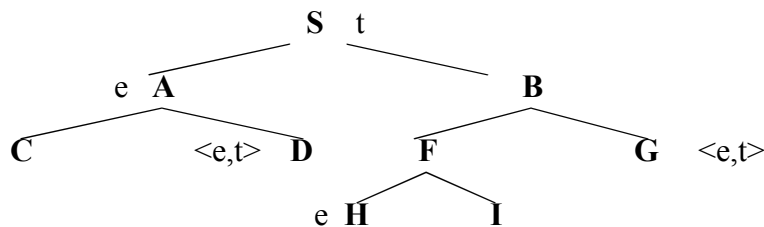


(4) **Intensions vs. extensions**

- a. What is the extension of a DP like *the president*? What is its intension?
- b. What is the extension of a sentence like *Elizabeth is talking*? What is its intension?

(5) **Figuring out semantic types of functions**

- a. Figuring out semantic types of nodes B, C, F, and H based on a syntactic structure. Don't try to figure out the denotations of each node, just figure out what the types have to be. Assume that we only have access to Function Application, first. Then, assume we have Predicate Modification too: what would be different, potentially?



- b. Figuring out semantic types based on a function written in lambda notation

- (i)  $\lambda x : x \in D_e . [ \lambda f : f \in D_{\langle e,t \rangle} . [ \lambda y : y \in D_e . f(x) \text{ next to } y ] ]$
- (iii)  $\lambda z : z \in D_e . z$

**1.3 Determining truth conditions and true values**

- **Group 1:** Show me a derivation of the truth conditions for the following sentence:

- (6) It's not the case that Alice likes Northampton.



- **Group 2:** Show me a derivation of the truth conditions for the following sentence. Use Predicate Modification.

(7) Northampton is a town in the USA

Assume that  $[[the\ USA]] = \text{the USA}$

In (7), if you could only use Function Application, what word(s) would have to have different denotations?

## 1.4 Semantic relations

- **Implicatures:** The **inferences** that participants in a conversation can draw from the literal meaning of sentences on the basis of certain *conversational principles* and certain *contextual assumptions*.

- Cooperative Principle
- Maxim of Quality
- Maxim of Quantity
- Maxim of Relevance

- **Entailments:** A entails B if it can never be the case that A is true and B is false; in other words, whenever A is true, B is true.

- **Synonymy:** A and B are synonymous if they have the same truth conditions (i.e. are true in the same circumstances)

- **Incompatibility:** A and B are incompatible if they cannot both be true at the same time.

(8) What is one way in which we can tell the difference between entailments and implicatures?

(9) Fill in the blank with the appropriate semantic relation:

a. *Sandy is 5' tall* \_\_\_\_\_ *Sandy is exactly 5' fall.*

b. *Susan has 3 children* \_\_\_\_\_ *Susan has children.*

c. *Mary had a banana muffin for breakfast* \_\_\_\_\_ *Mary had a muffin.*



d. Alice usually drinks coffee in the morning \_\_\_\_\_ Alice sometimes drinks coffee in the morning.

e. Alice usually drinks coffee in the morning \_\_\_\_\_ Alice doesn't always drink coffee in the morning.

f. Only Alan likes Mary \_\_\_\_\_ Alan likes Mary.

## 2. More fun with adjectives

### 4.1 Adjectival meanings

Our goal above was to come up with some possible denotations for **vague** adjectives, like *small* and *tall*.

Vague adjectives have a context dependent standard. In different contexts, the same individual may count as *short* and *tall*.

(10) John is a 5'5" jockey.

a. In a context where we're thinking about jockeys, John is tall.

b. In a context where we're thinking about men in general, John is short.

Vague adjectives are also **gradable**. We can compare two individuals in terms of their *tallness*, for instance. We can think of gradable adjectives as being **scales**. In (11), John and Mary both correspond to points on the scale of *tallness*. The standard of comparison  $d_{\text{std}}$  is also somewhere on that scale.

(11) John is taller than Mary.

... -----Mary----- $d_{\text{std}}$ -----John-----...  
← shorter taller →

**Questions (the second two are very live questions of interest in semantics at the moment):**

- Are all adjectives gradable?
- Do all adjectives have a context-dependent standard in the way that vague adjectives do?
- How else can adjectives be different from each other, apart from gradability and context dependence of their standard?



One way in which linguists study the semantics of words is to determine what kinds of words the word of interest can co-occur with.

Modifiers like *completely*, *slightly*, and *very* have been taken as diagnostics of particular kinds of adjectives.

What do you think about the following sentences? If you heard one of these sentences in conversation, what kind of truth conditions would you give the sentence? Is it harder to figure out the truth conditions of some of the sentences? Do some of the sentences just seem like nonsense?

- (12) a. John is completely tall.  
b. The door is completely closed.  
c. This shirt is completely red.  
d. This table is completely dirty.
- (13) a. John is slightly tall.  
b. The door is slightly closed.  
c. This shirt is slightly red.  
d. This table is slightly dirty.
- (14) a. John is very tall.  
b. The door is very closed.  
c. This shirt is very red.  
d. This table is very dirty.

#### 4.2 Intersective vs. subsective meanings of adjectives

If you have native speaker intuitions about Spanish (or have a lot of experience with the language, or have a friend you can ask), how would you characterize the truth conditions of the following sentences? How are the (a) sentences different from the (b) sentences? Do you think we should hypothesize different meanings for adjectives based on position?

- (15) a. Maria es mi vieja amiga.  
b. Maria es mi amiga vieja.
- (16) a. Guillermo es un pobre actor.  
b. Guillermo es un actor pobre.