WiSe 2016/17 Semantics 1

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A Semantic Model

1.11.2016

Ambiguity

(found by Eser Abas)

Readings?

Type of ambiguity?

Source of the ambiguity?

Englischer Rasen
English lawn

AllDent ~ "al dente"
dentist

Ambiguity

(found by Simon Häfner)

Readings?

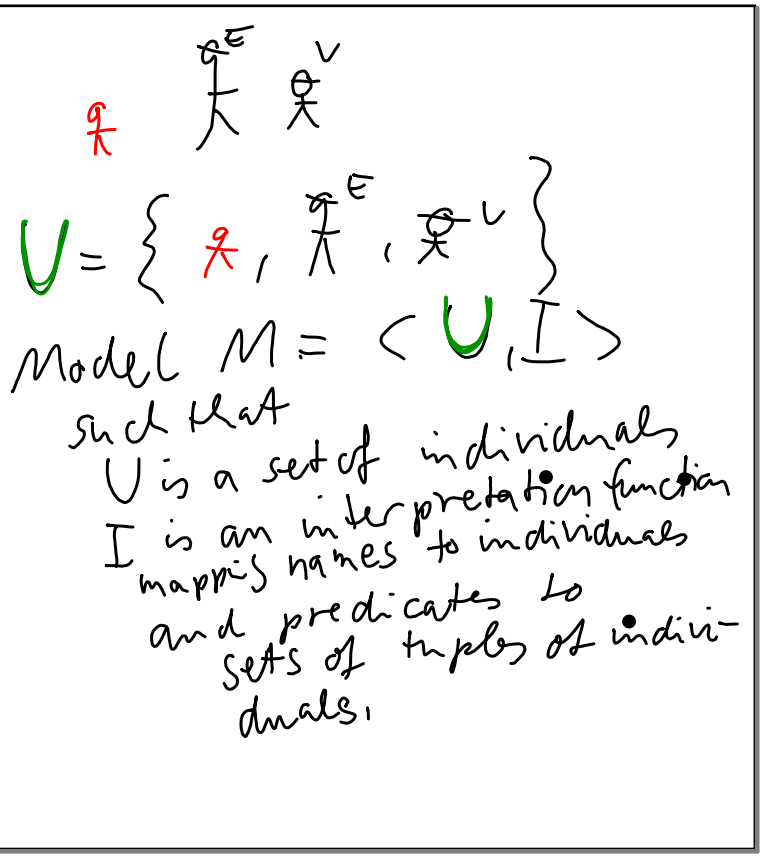
Type of ambiguity?

Source of the ambiguity?

Homework

- Work through this wiki page.
- Read Levine et al. (in prep.), Chapter 2, Section 1 [available on olat].
- Define a model and introduce the necessary name symbols and predicate symbols for our scenario with
  - > three individuals
  - > two relations
  - > two properties
- Use your model and your symbols and write down
  - > one formula that is true in your model and
  - > two formulae that are false in your model.

(p. 18: description of spy is not correct!)



Name symbols

vlad

esha

I(vlad) = 

I(esha) = 

The boy has no name!

Names:

I : Name → $\cup$

I maps names to individuals.

I is a function:

- every name is mapped to 1 ind.
  - → no name can refer to more than 1 ind.
  - → there can be individuals without name ()
  - → every name must refer to an ind.
  - → several names can refer to the same individual

$f(x) = x^2$

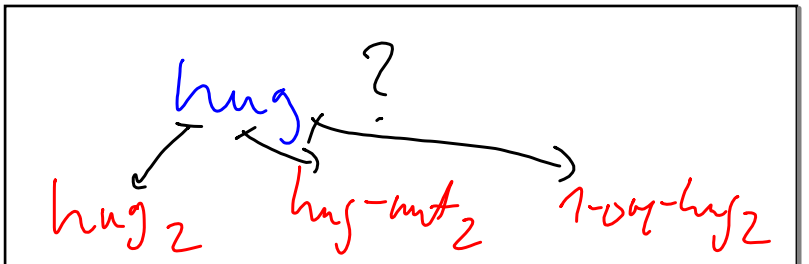
$f(2) = f(-2) = 4$

$I(\text{sister}) = I(\text{son}) =$ ~~$\{\}$~~

$I(\text{smaller\_than}_2) =$ Def. by enumeration

$= \{ \langle \cancel{\ast}, \cancel{\ast} \rangle, \langle \cancel{\ast}, \cancel{\ast} \rangle, \langle \cancel{\ast}, \cancel{\ast} \rangle \}$

$= \{ \langle x, y \rangle \mid x \text{ is smaller than } y \}$ Def. by characterization

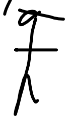


$I(\text{hug}_2) = \{(x,y) \mid x \text{ hugs } y\}$

$I(\text{hug-mutually}_2) = \{(x,y) \mid x \text{ and } y \text{ mutually hug}\}$

$I(\text{one-way-hug}_2)$

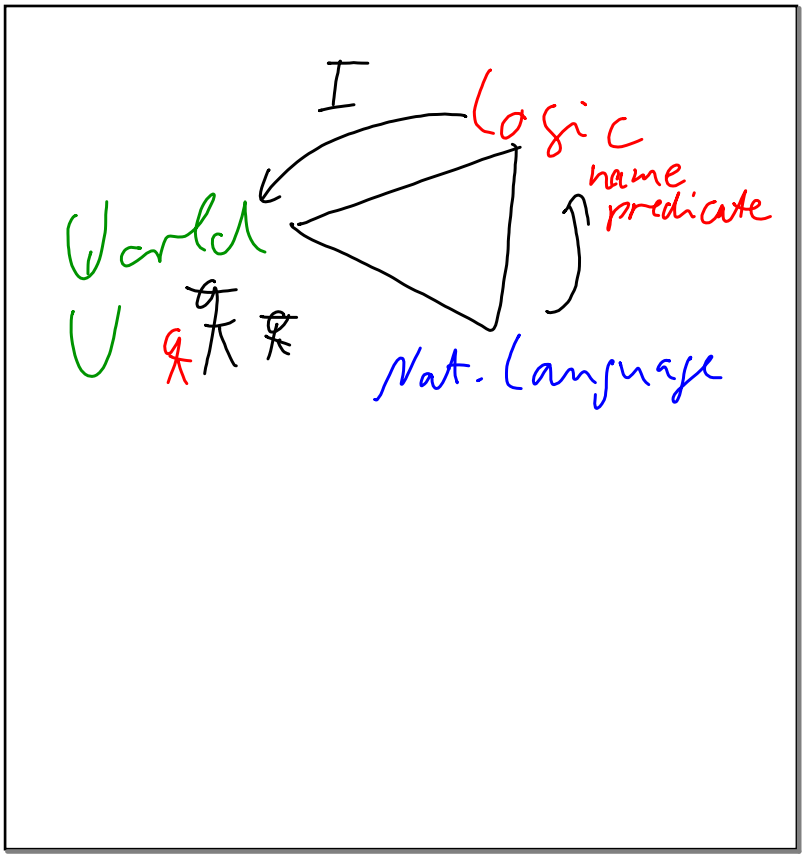
$= \{ \langle x, y \rangle \mid x \text{ hugs } y \text{ but } y \text{ doesn't hug } x \}$

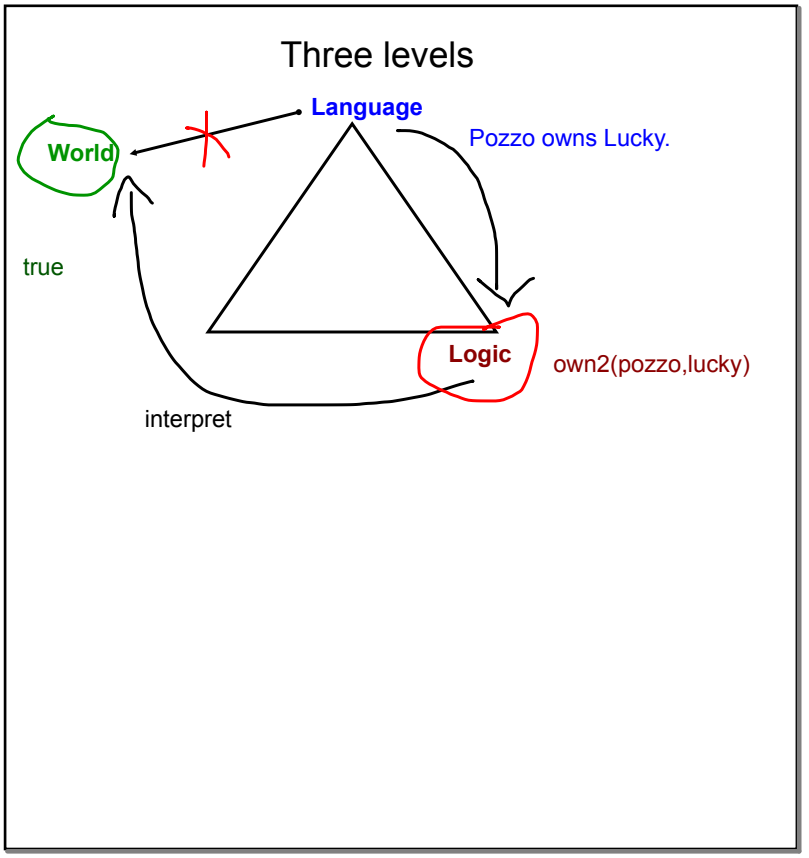
$= \{ \langle$  ,  $\rangle \}$

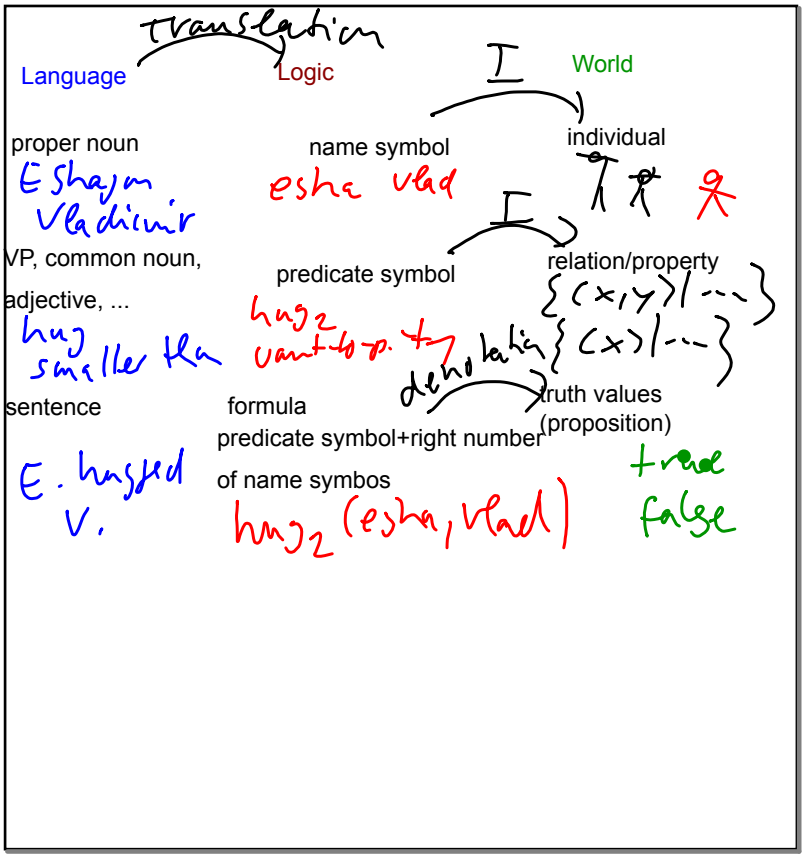
$I(\text{want-to-pass-time}_1)$

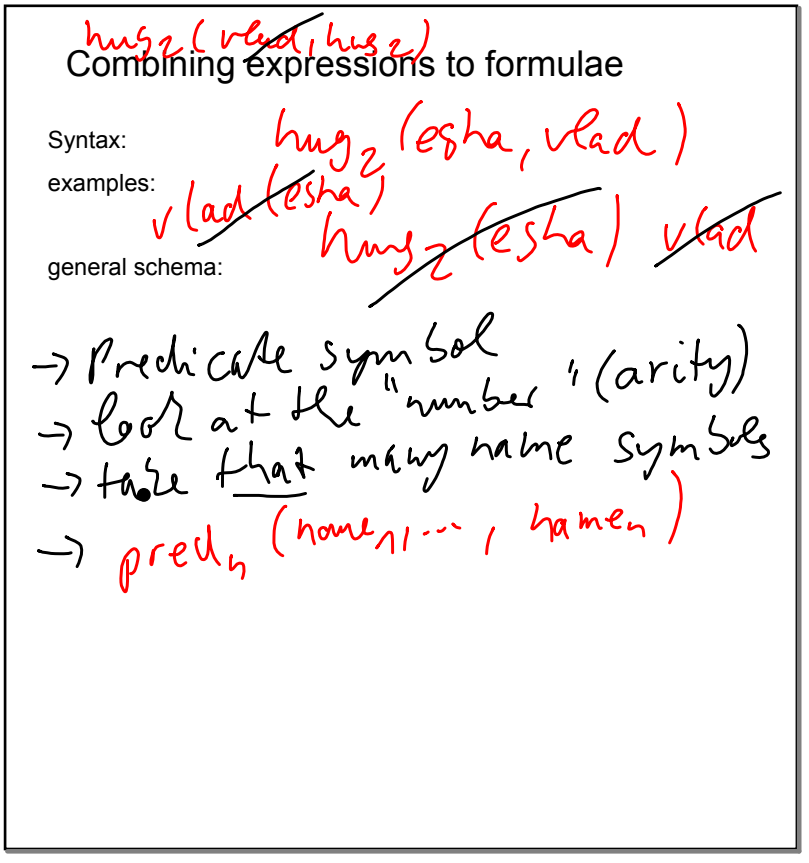
$= \{ \langle x \rangle \mid x \text{ wants to pass time} \}$

$= \{ \langle$  $\rangle , \langle$  $\rangle \}$


I
Logic
name
predicate
World
Nat. Language


Three levels
Language
Pozzo owns Lucky.
World
true
Logic
own2(pozzo,lucky)
interpret


translation
Language
Logic
I
World
proper noun
name symbol
individual
Eshajm
Vladimir
esha vlad
I
VP, common noun,
adjective, ...
predicate symbol
relation/property
{(x,y)/...}
{(x)/...}
hug smaller than
hug2 want to go to
denotation
sentence
formula
truth values
(proposition)
predicate symbol+right number
of name symbos
E. hugged V.
hug2(esha, vlad)
true
false


hug2(vlad, hug2)
Combining expressions to formulae
Syntax:
examples:
general schema:
hug2(esha, vlad)
vlad(esha)
hug2(esha) vlad
→ Predicate symbol
→ look at the "number" (arity)
→ take that many name symbols
→ pred_n(name_1, ..., name_n)

Combining expressions into formulae

Semantics: $[\![\ldots]\!]$: denotation! $[\![\quad]\!]$

Formulae are true or false.

smaller-than2 (vlad, estra)

$[\![\text{vlad}]\!] = I(\text{vlad})$

$[\![\text{smaller-than2}]\!] = I(\text{smaller-than2})$

$[\![\text{smaller-than2}(\text{vlad}, \text{estra})]\!] = \text{true}$ iff ... "truth conditions"

$[\![\text{smaller-than2}(\text{vlad}, \text{estra})]\!] = \text{true}$

if and only if (= iff)

$\langle [\![\text{vlad}]\!], [\![\text{estra}]\!] \rangle$ is in $[\![\text{smaller-than2}]\!]$

iff $\langle I(\text{vlad}), I(\text{estra}) \rangle$ is in $I(\text{smaller-than2})$

iff $\langle \text{Vx}, \text{Ky} \rangle$ is in $\{(x,y) \mid x \text{ is smaller than } y\}$

since this is the case, $[\![\text{smaller-than2}(\text{vlad}, \text{estra})]\!] = \text{true}$

Recipe for atomic formulae

1. Take a predicate symbol.
2. Look at its arity (i.e. the little number subscript)
3. Take the number of name symbols that correspond to the arity.
4. Write down: predicate-symbol_n(name1, ..., name_n)

Interpreting formulae: Denotation function

[[...]] depends on the model M = < U, I >

Denotation of a name:

Denotation of a predicate symbol:

Denotation of an atomic formula:

Computing the truth value of an atomic formula

1. Determine the truth conditions
2. Evaluate them with respect to our model.

Step 1: Determine the truth conditions

[[homeless1(estragon)]] = true if and only if (iff)

iff
iff
iff

Step 2: Evaluate them in our model

Sim(a. – –\

For next week

- Our literary scenario: see the links in the wiki: https://www.lexical-resource-semantics.de/wiki/index.php/Semantics_1,_WiSe_2016/17_(Sailer)
- ~~Read Levine et al., Chapter 2, Section 2.~~
- Atomic formulae: Using your model from this week's homework,
  - > Give 2 atomic formulae (one true, one false)
  - > ~~Give 2 statements with 1 connective each. (Use differe~~nt ~~connectives!)~~
  - > Provide the step-by-step computation of the truth of your 2 atomic formulae.
- For the computation, watch the videos on the wiki page.
- ~~Find 2 naturally occuring uses of "and" combining two se~~ntences. I~~s there an extra-meaning in addition to requiring both s~~entences to ~~be true?~~