Introduction to Formal Semantics

Tutorial Lecture 8: Intensional and Modal Logic

Nicolaie Dominik Dascalu, Dr. Volha Petukhova
Spoken Language System Group
Saarland University

29.06.22

Tutorial Overview

- **Matrices and Intension**
  Exercise 1
  Exercise 2
- **Composition and Intension**
  Exercise 3
- **De Re/ De Dicto**
  Exercises 4

Reading:

- Coppock, E., and Champollion, L. (2021). Invitation to formal semantics. Manuscript, Boston University and New York University (Ch.13). M
- Gutzmann, D. (2020). Semantik. Semantik. Einführungen in die Sprachwissenschaft. J.B. Metzler, Stuttgart (Ch.11). NM
- Von Fintel, K., & Heim, I. (2011). Intensional semantics. Unpublished Lecture Notes. NM

Discussion

Discussion

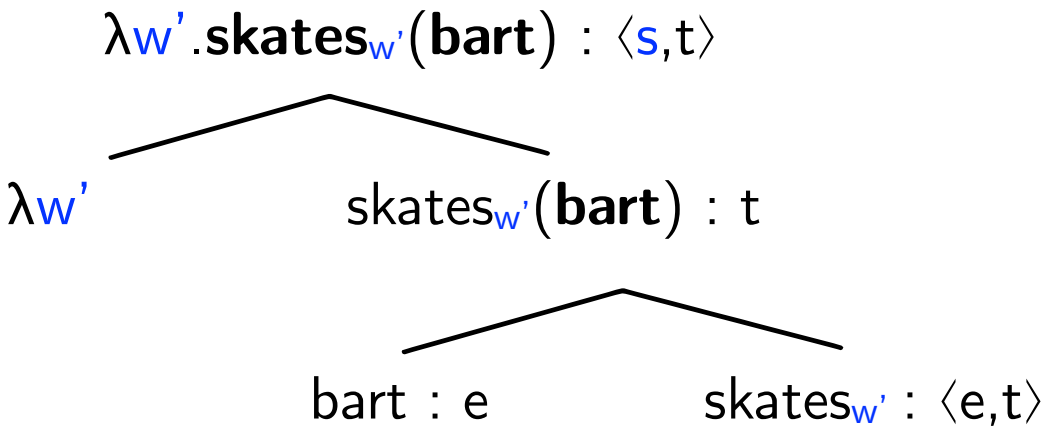
- Did you have any difficulties understanding **the main concepts**?
- Were the **exercises** difficult?
- Is there something you would like to review from **tutorial 7**?

Exercises

Exercise 1

- $[\![\text{\^{}homer}]\!] = [\ [w_1 \longmapsto 1],\ [w_2 \longmapsto 0],\ [w_3 \longmapsto 0]\ ]$
- $[\![\text{\^{}ToSkate}]\!] = [\ [w_1 \longmapsto [[\text{lisa} \longmapsto 1],[\text{bart} \longmapsto 1],[\text{homer} \longmapsto 1]],$
  $[w_2 \longmapsto [[\text{lisa} \longmapsto 1],[\text{bart} \longmapsto 1],[\text{homer} \longmapsto 0]],$
  $[w_3 \longmapsto [[\text{lisa} \longmapsto 0],[\text{bart} \longmapsto 1],[\text{homer} \longmapsto 0]]\ ]$
- $[\![\text{\^{}bart skates}]\!] = [\ [w_1 \longmapsto 1],\ [w_2 \longmapsto 1],\ [w_3 \longmapsto 1]\ ]$
- $M_{\{w1,w2,w3\}} \models \Box$ Bart skates.

Exercise 1



Exercise 2

(6) ... is Spiderman.

a. $([\![\text{ }]\!]^{M,g} = [\![\text{ }]\!]^{M,g})(w_1) = ?$

b. $([\![\text{ }]\!]^{M,g} = [\![\text{ }]\!]^{M,g})(w_2) = ?$

c. $([\![\text{ }]\!]^{M,g} = [\![\text{ }]\!]^{M,g})(w_3) = ?$

d. $([\![\text{ }]\!]^{M,g} = [\![\text{ }]\!]^{M,g})(w_4) = ?$

w1 = marvel comics, w2 = marvel Sony universe, w3 = marvel sony universe, w4 marvel cinematic universe

Exercise 2

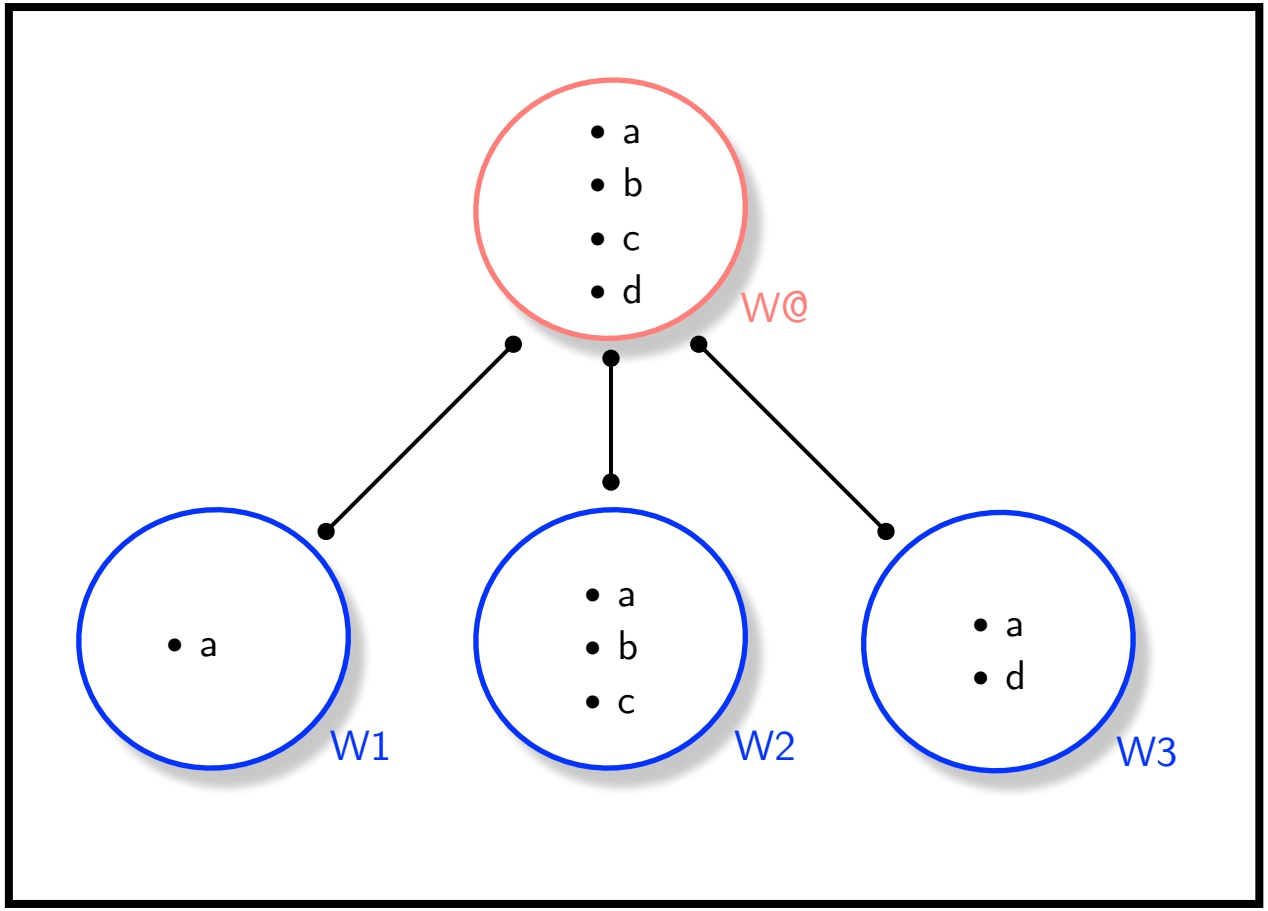
(6)

$$\downarrow[\![\text{a}]\!] \qquad \downarrow[\![\text{b}]\!] \qquad \downarrow[\![\text{c}]\!] \qquad \downarrow[\![\text{d}]\!]$$

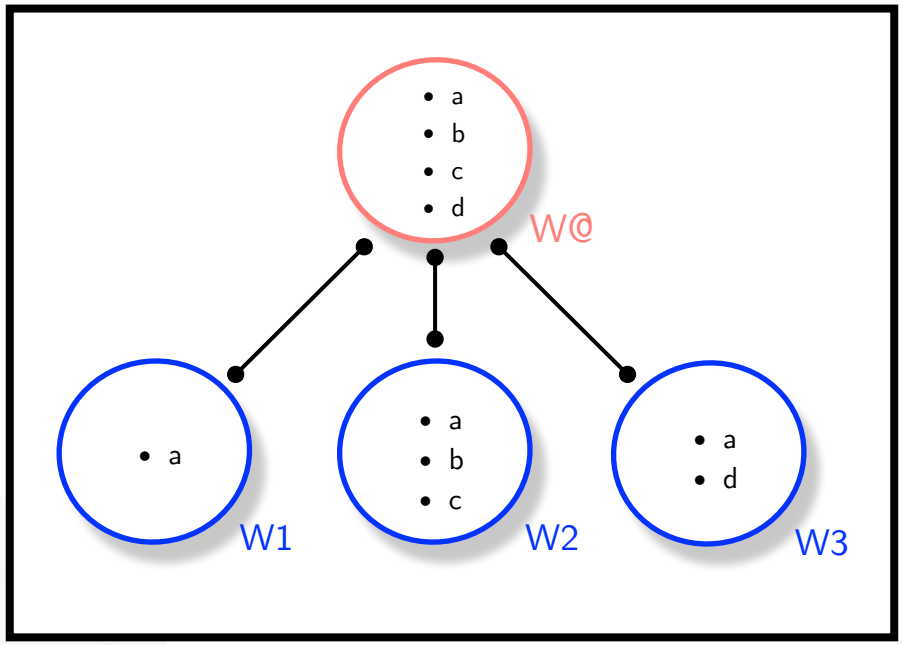
$$\begin{bmatrix} w_1 \mapsto 1 \\ w_2 \mapsto 1 \\ w_3 \mapsto 1 \\ w_@ \mapsto 1 \end{bmatrix} \quad \begin{bmatrix} w_1 \mapsto 0 \\ w_2 \mapsto 1 \\ w_3 \mapsto 0 \\ w_@ \mapsto 1 \end{bmatrix} \quad \begin{bmatrix} w_1 \mapsto 0 \\ w_2 \mapsto 1 \\ w_3 \mapsto 0 \\ w_@ \mapsto 1 \end{bmatrix} \quad \begin{bmatrix} w_1 \mapsto 0 \\ w_2 \mapsto 1 \\ w_3 \mapsto 1 \\ w_@ \mapsto 1 \end{bmatrix}$$

w1 = marvel comics, w2 = marvel Sony universe, w3 = marvel sony universe, w4 marvel cinematic universe

Exercise 2



Exercise 2



(6)

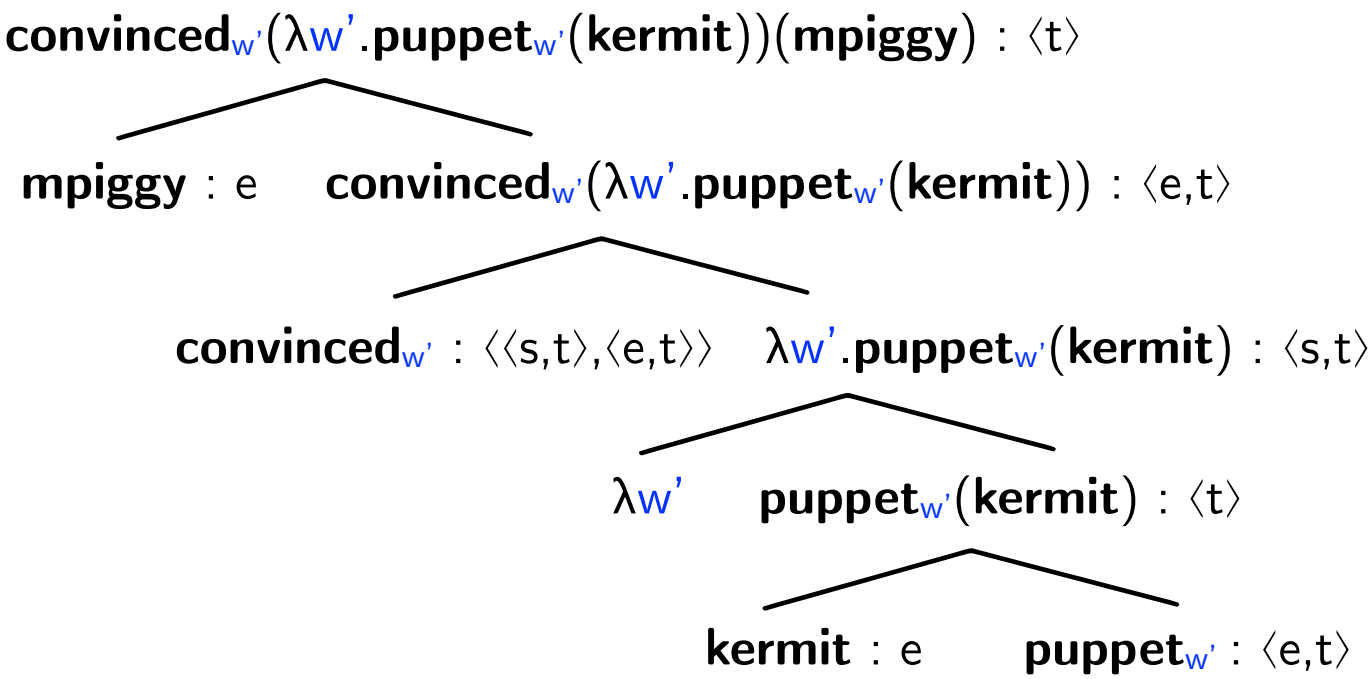
a. $M_{\{w@,w1,w2,w3\}} \models \Box$ Peter Parker is Spiderman

b. $M_{\{w@,w2\}} \models \Diamond$ Toby Maguire is Spiderman

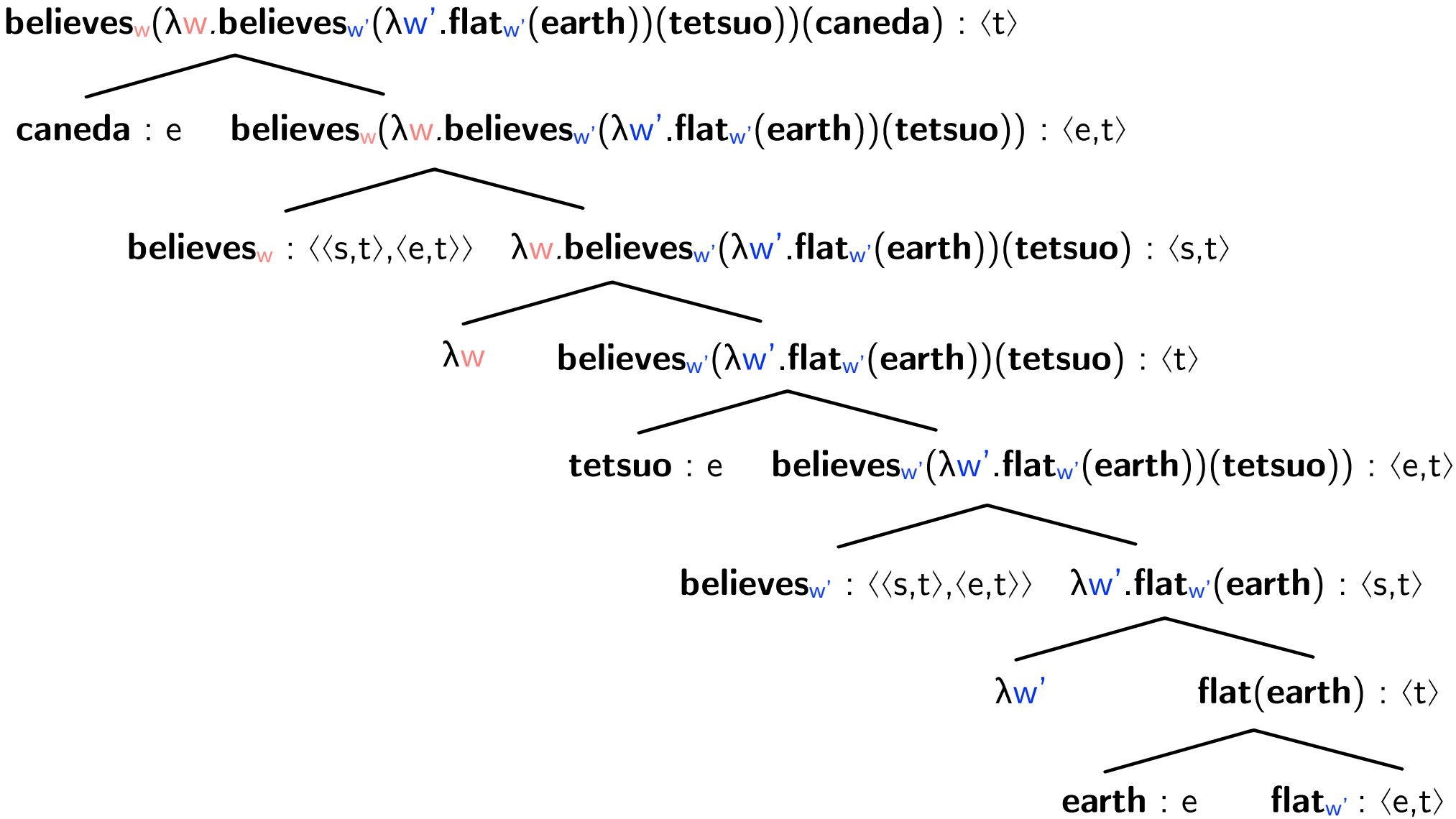
c. $M_{\{w@,w2\}} \models \Diamond$ Andrew Garfield is Spiderman

d. $M_{\{w@,w3\}} \models \Diamond$ Tom Holland is Spiderman

Exercise 3.1


convinced$_{w'}$(λw'.puppet$_{w'}$(kermit))(mpiggy) : ⟨t⟩
mpiggy : e
convinced$_{w'}$(λw'.puppet$_{w'}$(kermit)) : ⟨e,t⟩
convinced$_{w'}$: ⟨⟨s,t⟩,⟨e,t⟩⟩
λw'.puppet$_{w'}$(kermit) : ⟨s,t⟩
λw'
puppet$_{w'}$(kermit) : ⟨t⟩
kermit : e
puppet$_{w'}$: ⟨e,t⟩

Exercise 3.2


believes$_w$(λw.believes$_{w'}$(λw'.flat$_{w'}$(earth))(tetsuo))(caneda) : ⟨t⟩
caneda : e
believes$_w$(λw.believes$_{w'}$(λw'.flat$_{w'}$(earth))(tetsuo)) : ⟨e,t⟩
believes$_w$: ⟨⟨s,t⟩,⟨e,t⟩⟩
λw.believes$_{w'}$(λw'.flat$_{w'}$(earth))(tetsuo) : ⟨s,t⟩
λw
believes$_{w'}$(λw'.flat$_{w'}$(earth))(tetsuo) : ⟨t⟩
tetsuo : e
believes$_{w'}$(λw'.flat$_{w'}$(earth))(tetsuo)) : ⟨e,t⟩
believes$_{w'}$: ⟨⟨s,t⟩,⟨e,t⟩⟩
λw'.flat$_{w'}$(earth) : ⟨s,t⟩
λw'
flat(earth) : ⟨t⟩
earth : e
flat$_{w'}$: ⟨e,t⟩

Exercise 4.1

(1) John believes miss America is bald.

a. [λx.Bel(w,john(w), λw_1.Bald(w_1,x))](m($w_@$))

b. Bel[w,john(w), λw.Bald(w,m(w))]

- De Re: a specific *e' (..., x)* at a specific *w' (w, x)* is *Bald*.
- De Dicto: whoever *m* is at a given *w*, is *Bald*.
  The speaker has no specific entity in mind. It's just an informative account.

Exercise 4.2

(2) Chris is confident that someone will pass the exam.

a. [Con(chris, ^∃x[PassExam(x)]) **De Dicto**

b. ∃x[x ∧ Con(chris,^[PassExam(x)]) **De Re**

Conclusion

If you need further help or have additional questions, please contact us.

Thank you all
for the kind
attention!