

# Semantic Theory 2025: Exercise 2

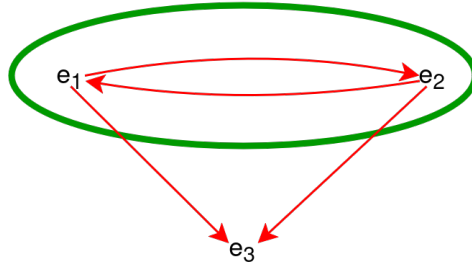
Due by: Wednesday, May 7 at 10:00 am (before class)

## Question 1

Derive the types of the underlined expressions in the following sentences. The subscripts indicate the types of the relevant expressions. Also provide the (simplified) logical form you assume for the sentences.

- a. [Darth Vader]<sub>e</sub> [is [the father of] [Luke]<sub>e</sub>]
- b. [Every [student] <sub>$\langle e,t \rangle$</sub> ] [reads [the book]<sub>e</sub>]
- c. Mark<sub>e</sub> [is [the <sub>$\langle \langle e,t \rangle, e \rangle$</sub> ] [most annoying] man <sub>$\langle e,t \rangle$</sub> ]] [on <sub>$\langle e, \langle \langle e,t \rangle, \langle e,t \rangle \rangle$</sub> ] [the planet]<sub>e</sub>]

## Question 2



The diagram above graphically represents a model structure  $M = (U_M, V_M)$  with a universe consisting of three entities:  $U_M = \{e_1, e_2, e_3\}$ . The interpretation function  $V_M$  describes the first-order property “tall” (indicated by the green circle) and the two-place relation “to see” (indicated by the red arrows).

**2.1** Give the type-theoretic denotation of the interpretation function  $V_M$  for the following non-logical constants, using functions (rather than sets) when appropriate:

- a.  $tall \in \text{CON}_{\langle e,t \rangle}$
- b.  $see \in \text{CON}_{\langle e, \langle e,t \rangle \rangle}$

**2.2** Compute the type-theoretic denotations of the following expressions relative to the given model structure  $M$  and some arbitrary variable assignment  $g$ . Here,  $x, y$  are variables of type  $e$ , and  $F$  is a variable of type  $\langle e, t \rangle$ .

a.  $\llbracket see(y) \rrbracket^{M, g[y/e_2]} = ?$

b.  $\llbracket \forall x (\neg \exists y (see(y)(x)) \rightarrow \neg tall(x)) \rrbracket^{M, g} = ?$

c.  $\llbracket \forall F \exists x (F(x)) \rrbracket^{M, g} = ?$