

Semantic Theory 2025: Exercise 2

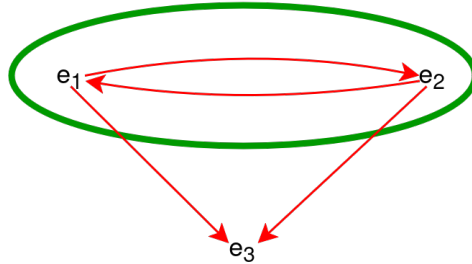
Due by: Wednesday, May 7 at 10:00 am (before class)

Question 1

Provide the derivations (type inferencing) of each of the following sentences. Brackets indicate the combinatorics, and subscripts indicate the types of (some of) the expressions—the rest must be deduced. Underlined expressions should be treated as a single term: for example, you can treat “the father of” as *the-father-of* in (a).

- a. Darth Vader_e [is_{⟨e,⟨e,t⟩⟩} [the father of [Luke]_e]]
- b. [Every student_{⟨e,t⟩}] [reads the book_e]
- c. Mark_e [is [the_{⟨⟨e,t⟩,e⟩} [[most annoying] man_{⟨e,t⟩}]]] [on_{⟨e,⟨⟨e,t⟩,⟨e,t⟩⟩} the planet_e]]

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