Semantic Theory 2022: Exercise sheet 3

1.1   Translate the following English words into lambda expressions:

a. blond$_{\langle\langle e,t\rangle,\langle e,t\rangle\rangle}$ (As in the sentence: "Luke is a <u>blond</u> Jedi"; try to come up with an expression that uses blond$^*_{\langle e,t\rangle}$ as the underlying first-order predicate)

b. on$_{\langle e,\langle\langle e,t\rangle,\langle e,t\rangle\rangle\rangle}$ (As in the sentence: "Padmé lives <u>on</u> Naboo")

c. only$_{\langle e,\langle\langle e,t\rangle,t\rangle\rangle}$ (As in the sentence: "<u>Only</u> Luke defeated Darth Vader")

1.2   Translate the following sentences into expressions of Typed Lambda Calculus, assuming the syntactic structure indicated by the brackets. Use function application and lambda conversions to arrive at the simplest possible expressions. (Note: interpretation of the expressions is not required!)

a. Padmé lives [on Naboo].

b. [Luke [and Darth Vader]] fight.

c. [Only Luke] [is a [blond Jedi]].

Use the translations for *blond*, *on*, and *only* from exercise 1.1. If you didn't find a good interpretation, you can simply use: blond', on', only'. In addition, use the following lexical entries:

- Padmé$_e$, Naboo$_e$, Luke$_e$, Darth Vader$_e$ $\mapsto$ p', n', l', d'

- live$_{\langle e,t\rangle}$, Jedi$_{\langle e,t\rangle}$, fight$_{\langle e,t\rangle}$ $\mapsto$ live', jedi', fight'

- and$_{\langle e,\langle e,\langle\langle e,t\rangle,t\rangle\rangle\rangle}$ $\mapsto$ $\lambda x.\lambda y.\lambda P(P(x) \wedge P(y))$

- is-a$_{\langle\langle e,t\rangle,\langle e,t\rangle\rangle}$ $\mapsto$ $\lambda F.F$