1 Some practice with the $\lambda$-notation

Do exercise 2 on pp. 39-40 (chapter 2) of Heim & Kratzer.

2 The Theta Criterion

The Theta Criterion (or some equivalent constraint) is an important part of many syntactic theories, since it governs the linking between semantic roles and syntactic positions. A common formulation of the Theta Criterion is the one in (1).

(1) \textit{Theta Criterion}

Each argument bears one and only one $\theta$-role, and each $\theta$-role is assigned to one and only one argument.

Some questions that are not always answered in a syntax class, however, are the following: What is an argument? Where are $\theta$-roles? How are $\theta$-roles assigned? The semantic system we have been developing suggests the type-theoretic definitions of arguments and $\theta$-role assigners in (2).

(2) a. An argument $=_{\text{def}}$ a node whose denotation is an individual (type $e$).
   
b. A $\theta$-role assigner $=_{\text{def}}$ a node whose denotation is a function from individuals to things of type $\alpha$ (type $\langle e, \alpha \rangle$), where $\alpha$ is an arbitrary type.

Using these definitions, the Theta Criterion can be restated as in (3).

(3) \textit{Theta Criterion (revised)}

Each argument must be the sister of a $\theta$-assigner, and each $\theta$-assigner must be the sister of an argument.

A. Does the revised Theta Criterion follow from the system for semantic interpretation that we have developed so far if the lexicon is limited to entries like those introduced on the ‘Interpretability’ handout? In other words, do we need to state the Theta Criterion as an independent syntactic constraint, or is it simply a description of one of the consequences of the semantic system we have adopted? Justify your answer, making sure that your argumentation is clear and complete. Illustrate and explain crucial points using concrete examples and derivations.

B. Would the result change if we added additional lexical entries? (\textbf{Hint}: consider, for example, the various options for treating \textit{and} discussed in class and in Heim & Kratzer.)

C. Are there restrictions on interpretability that follow from our system and do not follow from the restated Theta Criterion?

D. Add to the system the Predicate Modification rule defined on p. 65 of Heim & Kratzer, as well as the lexical entry for \textit{the} from p. 75. How do these additions affect
your answers to the previous questions? Is (4a) interpretable by the (revised) system? What about (4b)? To deal with these examples, assume that colorless, green and idea denote expressions of type \( \langle e, t \rangle \), with meanings along the lines of (5a-c), and assume the constituent structures indicated in (4).

(4) a. 

\[
\begin{array}{c}
\text{sleeps} \\
\downarrow \\
\text{the} \\
\downarrow \\
\text{colorless} \\
\downarrow \\
\text{green} \\
\downarrow \\
\text{idea}
\end{array}
\]

b. 

\[
\begin{array}{c}
\text{sleeps} \\
\downarrow \\
\text{green} \\
\downarrow \\
\text{the} \\
\downarrow \\
\text{colorless} \\
\downarrow \\
\text{idea}
\end{array}
\]

(5) a. \[\text{[colorless]} = [\lambda x \in D_e. x \text{ is devoid of color}]\]
b. \[\text{[green]} = [\lambda x \in D_e. x \text{ is green}]\]
c. \[\text{[idea]} = [\lambda x \in D_e. x \text{ is an idea}]\]

Justify your responses by giving the compositional analyses of (4a-b). What do you think is the significance of the results?

**E.** Elaborate on the last paragraph of ch. 3, sec. 4, of Heim & Kratzer (top of p. 53), by spelling out concrete (if perhaps hypothetical) examples of the syntactic structures and evidence that the authors are alluding to.