1 Variables and assignment functions

Read chapter 5 of H&K, and do the two exercises on p. 112 and p. 115. For the exercise on p. 112, when they say “prove (12)”, they mean do the derivation of its truth conditions showing that you end up with “=1 iff Joe wrote Barriers”. Be sure to state the rule/assumption that licenses each step in the derivations that these exercises ask you to complete.

Also, when doing these exercises, assume the version of Predicate Abstraction that we formulated in class, which is repeated below. This is essentially the same as the version on p. 114 of (my edition of) H&K, varying only in the way that we annotate the modified assignment function ($g[i \to x]$ instead of $a^{x/i}$).

1. **Predicate Abstraction**
   
   If $\alpha$ is a constituent with daughters $\beta_i$ and $\gamma$, where $\beta$ is a $wh$-relative operator or such indexed $i$ ($i$ a natural number), then for any variable assignment $g$, $[\alpha]^g = \lambda x \in D_e.[\beta]^g[i \to x]$.

2 Long distance movement in relative clauses

A well-known syntactic fact about $wh$-movement in relative clauses is that the $wh$-pronoun can move quite far: as shown by the examples in (2), an indefinite number of intervening clauses can separate the $wh$-word from its base position.

(2)  
   a. the book $[CP$ which$\_1$ Kim likes $t_1]$
   b. the book $[CP$ which$\_1$ I think $[CP$ that Kim likes $t_1]]$
   c. the book $[CP$ which$\_1$ I think $[CP$ that Lee said $[CP$ that Kim likes $t_1]]$
   d. the book $[CP$ which$\_1$ I think $[CP$ that Lee said $[CP$ that Pat believes $[CP$ that Kim likes $t_1]]]]$

Research in syntax has convincingly shown that $wh$-movement is cyclic: when a $wh$-word moves out of a clause, as in the examples above, it must first stop in the specifier of CP. Syntactic theory also tells us that each instance of movement should leave a trace behind, which means that the structure of e.g. (2c) is really (4) (on the next page; to keep things as simple as possible, I am only providing category labels for the CP and S (= TP) nodes).

1. Show that our system as it stands will fail to derive an interpretation for the relative clause structure in (4). Explain in clear and precise terms what goes wrong, showing exactly where the semantic derivation crashes.

2. Propose a solution to this problem, and show how it works by illustrating how you derive the right interpretation for the relative clause in (4). Your solution may either syntactic or semantic, but you should fully explore the consequences of your proposal for the set of hypotheses about the syntax-semantics interface that we have built up so far.
For the purpose of this assignment, assume that the complementizer *that* is semantically vacuous (or is not present in the representation that gets interpreted), and that sentence embedding verbs like *say* and *think* are of type \(\langle t, \langle e, t \rangle \rangle\), and have interpretations along the lines of (3).

(3) \[\lambda p \in D_t.[\lambda x \in D_e.x \text{ says/thinks that } p = 1]\]

(This is actually wrong — if you see why, feel free to suggest an alternative — but it is close enough to right for the purposes of this assignment.)

(4) \[
\begin{array}{c}
\text{the} \\
\text{book} \\
\text{which}_1 \\
\text{S} \\
\text{I} \\
\text{think} \\
\text{CP} \\
t_1 \\
\text{C'} \\
\text{that} \\
\text{S} \\
\text{Lee} \\
\text{said} \\
\text{CP} \\
t_1 \\
\text{C'} \\
\text{that} \\
\text{S} \\
\text{Kim} \\
\text{likes} \\
t_1
\end{array}\]