Problem Set 7

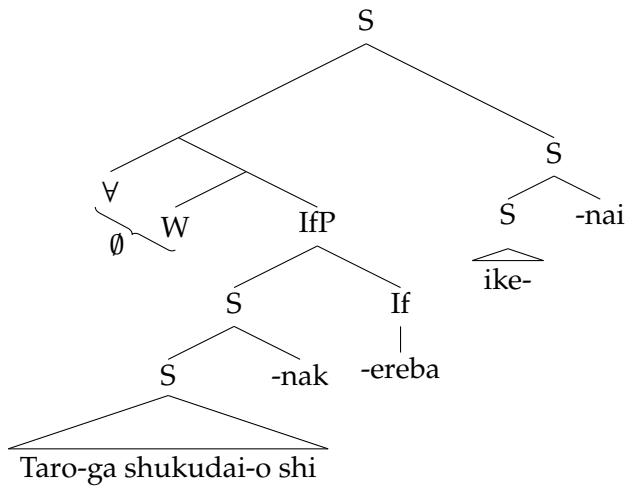
Due November 4 before class. Submit PDF on Luminus > Files > Student Submission > PS7.

Deontic necessity in Japanese:

Japanese does not have a modal verb/auxiliary for deontic necessity, like English *must* or Mandarin *bìxū*. Instead, the complex expression *nak-ereba ike-nai* is used.

(1) Taro-ga shukudai-o shi-**nak-ereba ike-nai**.
Taro-GA homework-O do-not-if acceptable-not
'Taro **must** do homework.'
Literally: 'It's **not acceptable if** Taro **doesn't** do homework.'

Use the tree here and lexicon below to compute ⟦(1)⟧. Give types, rules, and denotations for each step. Explain how this expression, *nak-ereba ike-nai*, works to communicate deontic necessity.



Recall from Lecture 9 that ∀ with domain W (all worlds) is the unpronounced modal assumed for interpreting conditionals without a modal.

Lexicon:

- $[\![\text{Taro-ga shukudai-o shi}]\!]^w$ = Do(Taro, homework, w)
- $[\![\text{ike-}]\!]^w$ = Acceptable(w) i.e. the world w is acceptable
- $[\![\text{-nak/nai}]\!]$ = $(\lambda v_t \,.\, \neg v)$
- $[\![\text{-ereba}]\!]$ = $\lambda p_{\langle s,t\rangle} \,.\, \lambda q_{\langle s,t\rangle} \,.\, \lambda w_s \,.\, p(w) \wedge q(w)$
- $[\![\forall]\!]$ = $\lambda p_{\langle s,t\rangle} \,.\, \lambda q_{\langle s,t\rangle} \,.\, \forall w\ [p(w) \rightarrow q(w)]$
- $[\![\text{W}]\!]$ = $\lambda w_s \,.\, 1$