24.973 Advanced Semantics
Spring 2009

1. Clarification of last week's discussion

(1) $[\![\text{children must go to school}]\!]^w = 1$ iff
$\forall w'$: w' is accessible to w $\rightarrow$ children go to school in w'
$\downarrow$
w' is accessible to w iff w' is compatible with the laws in w

(2) What should the law book in w say?
(a) 'Children go to school'
(b) 'Children must go to school'

2. Memorizing the theory

(3) $[\![\text{John must pay a fine}]\!]^w = 1$ iff
$\forall w'$: w' is accessible to w $\rightarrow$ John pays a fine in w'
$\downarrow$
w' is accessible to w iff (a) John parked in the driveway in w' and (b) there is no w'' such that John parked in the driveway in w'' and w'' satisfies more laws of w than w'

(4) Definition 1
Let P be a set of propositions. We write $\ulcorner w' <_P w \urcorner$ to mean that w' satisfies more propositions in P than w does.
$w' <_P w$ iff $\{p \in P \mid p \text{ is true in } w\} \subset \{p \in P \mid p \text{ is true in } w'\}$

(5) Definition 2
Let W be a set of worlds, P a set of propositions, $MAX_P(W) =_{def} \{w \in W \mid \neg\exists w' \in W: w' <_P w\}$
$P = \{p, q, r\}$
$W = \{w_1, w_2, w_3, w_4, w_5, w_6\}$
$w_1 \models p$ $w_4 \models p, q$
$w_2 \models q$ $w_5 \models q, r$
$w_3 \models r$ $w_6 \models p, r$
$\rightarrow MAX_P(W) = \{w_4, w_5, w_6\}$

(6) Definition 3
Let f(w) be the set of worlds compatible with what is known in w, and let g(w) be the set of laws in w
$\rightarrow$ $[\![\, \textbf{[must f g]}\ \phi\textbf{]}\,]\!]^w = 1$ iff $\forall w' \in MAX_{g(w)}(f(w))$: $[\![\phi]\!]^{w'} = 1$

(7) $g(w) = \{A = \neg\text{parking}, B = \text{parking} \rightarrow \text{paying}\}$
$f(w) = \{w' \mid \text{john parks in } w'\}$
$W = \{w_1, w_2, w_3, w_4\}$

(8) $w_1 = park(j), pay(j)$ $w_1 \models B$
$w_2 = park(j), \neg pay(j)$ $w_2 \models$
$w_3 = \neg park(j), pay(j)$ $w_3 \models A, B$
$w_4 = \neg park(j), \neg pay(j)$ $w_4 \models A, B$

(9) $MAX_{g(w)}(f(w)) = MAX_{g(w)}(\{w_1, w_2\}) = \{w_1\}$

(10) $[\![[\text{John must pay}]]\!]^w = [\![[[\text{must f g] John pay}]]\!]^w = 1$ iff $\forall w' \in MAX_{g(w)}(f(w))$: $[\![\text{John pay}]\!]^{w'} = 1$

<u>3. Epistemic vs. circumstantial modality</u>

(11) John can run 5 miles

(12) a. ∃w' compatible with what we know in w, John runs 5 miles in w'
→ John can run 5 miles, but he is too lazy to
b. ∃w' compatible with what we know in w about John's physique, he runs 5 miles in w'
→ 'John can run 5 miles' can be false even if John does run 5 miles
c. ∃w' such that John has the same physique in w' as he does in w, he runs 5 miles

<u>4. Samaritan paradox</u>

(13) we ought to help the victim

(14) One-factor theory
a. There is a unique victim x in w s.t. ∀w' compatible with the moral rules in w, we help x in w'
→ the moral rules dictate that the actual victim is to be helped under any circumstance
b. ∀w' compatible with the moral rules in w, there is a unique victim x such that we help x in w'
→ the moral rules dictate that there be a victim
c. ∀w' compatible with the moral rules where there is a unique victim x, we help the victim in w'
→ given the moral rules in w, the sentence is trivially true

(15) Two-factor theory
∀w' such that there is a unique victim in w' and w' satisfies as many moral rules of w as any other world where there is a unique victim, we help the unique victim in w'

(16) Prediction of two-factor theory
[we [ought f_1 g_1] to help the victim] → [there [ought f_1 g_1] to be a victim]

(17) Solution
$[\![[\text{ought f g] p}]\!]^w \neq \#$ only if $f(w) \not\subseteq p$