1 Modality

Consider the following model, in which the worlds are \{\bullet_1 \ldots \bullet_{10}\} and the propositions \(p, q, r, t, s, u\) are indicated by labeled circles:

Additional assumptions:

- Modal base: \(f(\bullet_2) = \{s, (W - r)\}\)
- Ordering source: \(g(\bullet_2) = \{p\} = \{\bullet_2, \bullet_3, \bullet_6, \bullet_7\}\)

\[\bullet_2 \leq_{g(\bullet_2)} \bullet_5\]
\[\bullet_3 \leq_{g(\bullet_2)} \bullet_5\]
\[\bullet_6 \leq_{g(\bullet_2)} \bullet_5\]
\[\bullet_7 \leq_{g(\bullet_2)} \bullet_5\]

the \(p\) worlds are all equal with regard to \(g(\bullet_2)\)

Your tasks:

i. Finish this equation: \(\bigcap f(\bullet_2) = \)

ii. Kratzer defines \(p\) as a human necessity in world \(w\) with respect to modal base \(f\) and ordering source \(g\) iff, for all \(u \in \bigcap f(w)\) there is a \(v \in \bigcap f(w)\) such that \(v \leq_{g(w)} u\) and for all \(z \in \bigcap f(w)\), if \(z \leq_{g(w)} v\), then \(z \in p\). Is \(p\) a human necessity in \(\bullet_2\) given \(f\) and \(g\)?

iii. Is \(t\) a human necessity in \(\bullet_2\) given \(f\) and \(g\)?
2 Simple necessarily

For our first intensional fragment, I formulated the following meaning for necessarily:

\[[\text{necessarily}]^{M,g} = \text{the function } P \text{ such that, for all } p \in D_t, P(p) = \emptyset \text{ if } p \subset W, \text{ else } p\]

Revise this denotation using a Kratzerian modal base so that it expresses simple necessity.

3 Attitude predicates

The function Dox is defined as follows:

\[\text{Dox} = \text{the function } B \text{ such that, for all } d \in D_e \text{ and } \odot \in W, B(d, \odot) = \{p : d \text{ believes } p \text{ in } \odot\}\]

Use this function to formulate a semantic lexical entry for believe.

4 Intensionality and quantification

Assume that the phrase the governor of California denotes a function in \(D_{(s,e)}\). Informally:

\[[\text{the-CA-gov}]^{M,g} = \text{the function } I \text{ such that, for all } \odot \in D_s, I(\odot) = \text{the governor of California in } \odot\]

To make this concrete, assume also that \(W = \{\odot_{2005}, \odot_{2016}\}\), where \(\odot_{2016}\) is the actual world, and that \[[\text{the-CA-gov}]^{M,g}(\odot_{2005}) = \text{Arnold Schwarzenegger}\) and \[[\text{the-CA-gov}]^{M,g}(\odot_{2016}) = \text{Jerry Brown}\). Now suppose that John believes the governor of California is Arnold Schwarzenegger. Suppose also that John is listening to Jerry Brown (the actual governor of California) talk on the radio. Provide a logical translation of (B) that comes out true in this scenario in \(\odot_{2016}\), and one where it comes out false in this scenario in \(\odot_{2016}\). Give the truth conditions associated with your translation, using Dox as you defined it in question 4.

(B) John believes that the governor of California is talking.

Notes:

- You needn’t provide the full compositional analysis, though you are welcome to do that.
- You needn’t worry about whether, as an empirical matter, the sentence has both readings. We’ll discuss the empirical part of this in class.

5 A question from you

Articulate your own question about an aspect of the Hacquard handbook chapter that is not covered on the handout ‘Introduction to modality’, and answer your question. The goal should be a question that could have been included on this assignment, one that would encourage a careful re-reading of some parts of Hacquard’s text or the associated concepts.