

el.1 Relational Models

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The basic semantic concept for epistemic logics is the same as that of ordinary modal logics. Relational models still consist of a set of worlds, and an assignment that determines which **propositional variables** count as “true” at which worlds. And if we are only dealing with a single agent, we have a single accessibility relation as usual. However, if we have a multi-agent epistemic logic, then our single accessibility relation becomes a set of accessibility relations, one for each a in our set of agent symbols G .

A *relational model* consists of a set of worlds, which are related by binary accessibility relations—one for each agent—together with an assignment which determines which **propositional variables** are true at which worlds.

Definition el.1. A *model* for the multi-agent epistemic language is a triple $\mathfrak{M} = \langle W, R, V \rangle$, where

1. W is a nonempty set of “worlds,”
2. For each $a \in G$, R_a is a binary accessibility relation on W , and
3. V is a function assigning to each **propositional variable** p a set $V(p)$ of possible worlds.

When $R_a w w'$ holds, we say that w' is *accessible by a from w* . When $w \in V(p)$ we say p is *true at w* .

The mechanics are just like the mechanics for normal modal logic, just with more accessibility relations added in. For a given agent, we will generally interpret their accessibility relation as representing something about their informational states. For example, we often treat $R_a w w'$, as expressing that w' is consistent with a ’s information at w . Or to put it another way, at w , they cannot tell the difference between world w and world w' .

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Bibliography