



Figure 1: A simple model.

nml:syn:rel:  
fig:simple

## syn.1 Relational Models

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sec

The basic concept of semantics for normal modal logics is that of a *relational model*. It consists of a set of worlds, which are related by a binary “accessibility relation,” together with an assignment which determines which **propositional variables** count as “true” at which worlds.

**Definition syn.1.** A *model* for the basic modal language is a triple  $\mathfrak{M} = \langle W, R, V \rangle$ , where

1.  $W$  is a nonempty set of “worlds,”
2.  $R$  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  $Rww'$  holds, we say that  $w'$  is *accessible from*  $w$ . When  $w \in V(p)$  we say  $p$  is *true at*  $w$ .

The great advantage of relational semantics is that models can be represented by means of simple diagrams, such as the one in **Figure 1**. Worlds are represented by nodes, and world  $w'$  is accessible from  $w$  precisely when there is an arrow from  $w$  to  $w'$ . Moreover, we label a node (world) by  $p$  when  $w \in V(p)$ , and otherwise by  $\neg p$ . **Figure 1** represents the model with  $W = \{w_1, w_2, w_3\}$ ,  $R = \{\langle w_1, w_2 \rangle, \langle w_1, w_3 \rangle\}$ ,  $V(p) = \{w_1, w_2\}$ , and  $V(q) = \{w_2\}$ .

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## Bibliography