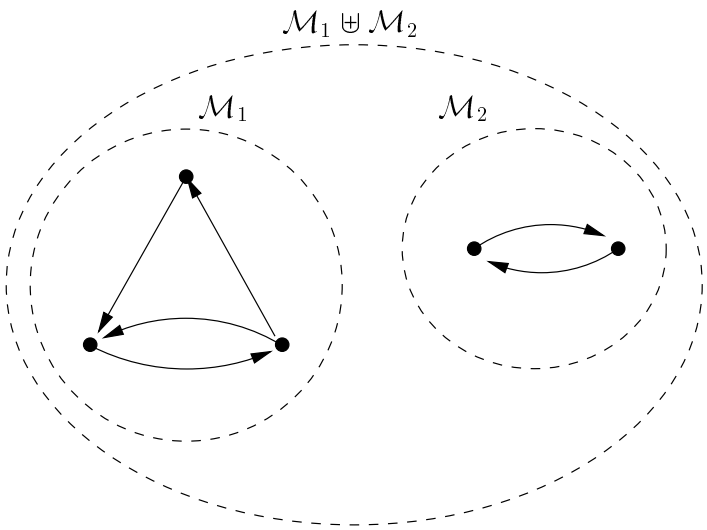
Reminder: Disjoint Unions



Definition 2.2 (Disjoint Union). We say that two models are *disjoint* if their sets of worlds are disjoint. For a family of pairwise disjoint models

$$\mathcal{M}_i = (W_i, R_i, V_i) \quad (i \in K)$$

their *disjoint union* is the model $\biguplus_{i \in K} \mathcal{M}_i = (W, R, V)$, where

- $W = \bigcup_{i \in K} W_i$;
- $R = \bigcup_{i \in K} R_i$;
- for each propositional letter p, we have $V(p) = \bigcup_{i \in K} V_i(p)$.

Proposition 2.3. Let $\mathcal{M}_i = (W_i, R_i, V_i)$, $(i \in K)$, be a family of pairwise disjoint models. For each $i \in K$ and world w of $\mathcal{M}_i$, we have

$$\mathcal{M}_i, w \leftrightsquigarrow (\biguplus_{i \in K} \mathcal{M}_i), w.$$