

**Definition** (Identity design problem). For any poset  $\mathbf{P}$ , the *identity design problem*  $\text{id}_{\mathbf{P}} : \mathbf{P} \dashrightarrow \mathbf{P}$  is a monotone map

$$\begin{aligned} \text{id}_{\mathbf{P}} : \mathbf{P}^{\text{op}} \times \mathbf{P} &\rightarrow_{\text{Pos}} \mathbf{Bool}, \\ \langle p_1^*, p_2 \rangle &\mapsto p_1 \leq_{\mathbf{P}} p_2. \end{aligned}$$