

**Definition** (Identity design problem). For any poset  $A$ , the *identity design problem*  $\text{id}_A : \textcolor{green}{A} \dashrightarrow \textcolor{red}{A}$  is a monotone map

$$\begin{aligned} \text{id}_A : \textcolor{green}{A}^{\text{op}} \times \textcolor{red}{A} &\xrightarrow{\text{Pos}} \mathbf{Bool}, \\ \langle \textcolor{green}{a}_1^*, \textcolor{red}{a}_2 \rangle &\mapsto \textcolor{green}{a}_1 \leq_A \textcolor{red}{a}_2. \end{aligned}$$