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

$$\begin{aligned} \mathrm{id}_{\mathbf{A}} : \mathbf{A}^{\mathrm{op}} \times \mathbf{A} &\to_{\mathbf{Pos}} \mathbf{Bool}, \\ \langle a_1^*, a_2 \rangle &\mapsto a_1 \leq_{\mathbf{A}} a_2. \end{aligned}$$