Definition (Trace of a design problem)**.** Given a design problem $f : C \times A \nrightarrow C \times B$, we can define its *trace* $\mathrm{Tr}^{C}_{A,B}(f) : A \nrightarrow B$ as follows:

$$\mathrm{Tr}^{C}_{A,B}(f) : A^{\mathrm{op}} \times B \to_{\mathbf{Pos}} \mathbf{Bool}$$

$$\langle a^*, b \rangle \mapsto \bigvee_{c \in C} f(\langle a^*, c \rangle, \langle b^*, c \rangle).$$