Definition (Series composition). Let $\mathbf{f} : \mathbf{A} \nrightarrow \mathbf{B}$ and $\mathbf{g} : \mathbf{B} \nrightarrow \mathbf{C}$ be design problems. We define their *series composition* $(\mathbf{f} \fatsemi \mathbf{g}) : \mathbf{A} \nrightarrow \mathbf{C}$ as:

$$(\mathbf{f} \fatsemi \mathbf{g}) : \mathbf{A}^{\mathrm{op}} \times \mathbf{C} \to_{\mathbf{Pos}} \mathbf{Bool},$$
$$\langle a^*, c \rangle \mapsto \bigvee_{b \in \mathbf{B}} f(a^*, b) \wedge g(b^*, c).$$

Alternatively:

$$(\mathbf{f} \fatsemi \mathbf{g}) : \mathbf{A}^{\mathrm{op}} \times \mathbf{C} \to_{\mathbf{Pos}} \mathbf{Bool},$$
$$\langle a^*, c \rangle \mapsto \bigvee_{b_1 \leq b_2, b_1, b_2 \in \mathbf{B}} \mathbf{f}(a^*, b_1) \wedge \mathbf{g}(b_2^*, c).$$