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

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

Alternatively:

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