

**Definition** (Union of design problems). Given two design problems  $f : A \multimap B$  and  $g : A \multimap B$ , their *union*  $f \vee g : A \multimap B$  is defined by

$$(f \vee g) : A^{\text{op}} \times B \rightarrow_{\text{Pos}} \mathbf{Bool}$$

$$\langle a^*, b \rangle \mapsto f(a^*, b) \vee g(a^*, b).$$