Definition (Design Problem)

A design problem (DP) is a tuple $\langle \mathbf{F}, \mathbf{R}, \mathbf{d} \rangle$, where $\mathbf{F}$, $\mathbf{R}$ are posets and $\mathbf{d}$ is a monotone map of the form

$$\mathbf{d} : \mathbf{F}^{\mathrm{op}} \times \mathbf{R} \to_{\mathbf{Pos}} \mathbf{Bool}.$$

We will also use the notation $\mathbf{d} : \mathbf{F} \nrightarrow \mathbf{R}$ for design problems, in order to emphasize how we think of them as morphisms. This will be explained below.