

**Definition** (Sum of resources). If the poset  $\mathbf{P}$  is monoidal with monoidal product  $\otimes$ , then the “*sum*” of  $n$  copies of  $\mathbf{P}$  is a design problem given by

$$\Sigma^n : (\mathbf{P}^n)^{\text{op}} \times \mathbf{P} \quad \xrightarrow{\text{Pos}} \quad \mathbf{Bool}$$

$$\langle \langle x_1, \dots, x_n \rangle^*, y \rangle \quad \longmapsto \quad (x_1 \otimes \dots \otimes x_n \leq_{\mathbf{P}} y).$$

Clearly  $\Sigma^n$  is monotone. Diagrammatically:

