Definition (Categorical Coproduct)

Let $\mathbf{C}$ be a category and let $X, Y \in \mathrm{Ob}_{\mathbf{C}}$ be objects. The *coproduct* of X and Y is:

Constituents

1. an object $Z \in \mathrm{Ob}_{\mathbf{C}}$ ("the coproduct of X and Y")
2. *injection morphisms* $\mathrm{in}_1 : X \to Z$ and $\mathrm{in}_2 : Y \to Z$

Conditions

1. For any $T \in \mathrm{Ob}_{\mathbf{C}}$ and any morphisms $f : X \to T, g : Y \to T$, there exists a *unique* morphism $\psi_{f,g} : Z \to T$ such that $f = \mathrm{in}_1 \fatsemi \psi_{f,g}$ and $g = \mathrm{in}_2 \fatsemi \psi_{f,g}$.