0.1 Natural Transformations

$$\mathcal{C} \underset{G}{\overset{F}{\Downarrow \eta}} \mathcal{D}$$

η is a natural transformation $\forall C \in obj(\mathcal{C})$ we have a morphism

$$F(C) \xrightarrow{\eta_C} G(C)$$

such that given $f : A \to B$ in $\mathcal{C}$

$$\begin{array}{ccc} F(A) & \xrightarrow{\eta_A} & G(A) \\ {\scriptstyle F(f)}\downarrow & & \downarrow{\scriptstyle G(f)} \\ F(B) & \xrightarrow{\eta_B} & G(B) \end{array}$$

We also have the identity: $\mathcal{C} \underset{F}{\overset{F}{\Downarrow 1_F}} \mathcal{D}$

Composition and communitivity work here too!

Exponential of Categories of Categories: $\mathcal{D}^{\mathcal{C}}$ -wow-