

SHEAVES IN GEOMETRY AND LOGIC

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1 Categorical Preliminaries

A **category** \mathbf{C} consists of a collection of **objects**, a collection of **morphisms** and four operations; two of these operations associate with each morphism f of \mathbf{C} its **domain** $\text{dom}(f)$ or $d_0(f)$ and its **codomain** $\text{cod}(f)$ or $d_1(f)$, respectively, both of which are objects of \mathbf{C} . The other two operations are operation which associates with each object C of \mathbf{C} a morphism 1_C (or id_C) of \mathbf{C} called the **identity morphism** of C and an operation of \mathbf{C} s.t. $d_0(f) = d_1(g)$ another morphism $f \circ g$. These operations are required to satisfy the following axioms

1. $d_0(1_C) = C = d_1(1_C)$
2. $d_0(f \circ g) = d_0(g), d_1(f \circ g) = d_1(f)$
3. $1_D \circ f = f, f \circ 1_C = f$
4. $(f \circ g) \circ h = f \circ (g \circ h)$

In an arbitrary category \mathbf{C} , a morphism $f : C \rightarrow D$ in \mathbf{C} is called an **isomorphism** if there exists a morphism $g : D \rightarrow C$ s.t. $f \circ g = 1_D$ and $g \circ f = 1_C$