Definition. ***Category***

A category consists of a class of ***objects***

$$A, B, C, \cdots$$

and a class of ***morphisms***

$$f, g, h, \cdots$$

for which the following axioms are fulfilled:

(1) To each morphism f there exists operators called ***domain***, ***codomain*** *and denoted by*

$$dom(f),\ cod(f)$$

Each operator associates an object to f.

(2) If for two morphisms f and g we have $cod(f) = dom(g)$, then there exists a morphism named ***composition*** *of f and g which is denoted by $g \circ f$. Moreover, we have*

$$dom(g \circ f) = dom(f)$$

$$cod(g \circ f) = cod(g)$$

(3) For each object A there exists an morphism named ***identity***, *denoted by*

$$id_A$$

and that fulfills $dom(id_A) = A$ and $cod(id_A) = A$.

(4) The composition is required to be ***associative***, *that is, for any morphisms f, g, h*

$$(f \circ g) \circ h = f \circ (g \circ h)$$

given that the compositions are defined.

(5) Composing a morphism f that has $dom(f) = A$ and $cod(f) = B$ with corresponding identities, fulfills

$$id_B \circ f = f = f \circ id_A$$