Definition (Semicategory). A semicategory C is:

Constituents

- 1. A collection $Ob_{\mathbf{C}}$ whose elements are called *objects*.
- 2. For every pair of objects X, Y in $\mathsf{Ob}_{\mathbf{C}}$, there is a set $\mathsf{Hom}_{\mathbf{C}}(X;Y)$, elements of which are called *morphisms*. We write

$$f: X \to_{\mathbf{C}} Y$$

to indicate

$$f \in \operatorname{Hom}_{\mathbf{C}}(X;Y)$$
.

3. For every three objects X, Y, Z in $Ob_{\mathbb{C}}$ there is a composition map

$$\S_{X,Y,Z}$$
: $\operatorname{Hom}_{\mathbf{C}}(X;Y) \times \operatorname{Hom}_{\mathbf{C}}(Y;Z) \to \operatorname{Hom}_{\mathbf{C}}(X;Z)$

Conditions

1. Associativity: it holds that

$$\frac{f: X \to Y \quad g: Y \to Z \quad h: Z \to W}{(f \ \S \ g) \ \S \ h = f \ \S \ (g \ \S \ h)}$$