

**Definition** (Semigroup). A *semigroup*  $\mathbf{S}$  is:

### Constituents

1. A set  $\mathbf{S}$ ;
2. A binary operation  $\circ : \mathbf{S} \times \mathbf{S} \rightarrow \mathbf{S}$  called *composition*

### Conditions

1. Associative law

$$(x \circ y) \circ z = x \circ (y \circ z)$$

for all  $x, y, z \in \mathbf{S}$ .