## **Definition** (Monoid). A monoid M is:

## Constituents

- 1. a set **M**;
- 2. a binary operation  $\S: \mathbf{M} \times \mathbf{M} \to \mathbf{M}$ ;
- 3. a specified element  $id \in M$ , called *neutral element*.

## Conditions

- 1. Associative law: (x ; y) ; z = x ; (y ; z)
- 2. Neutrality Laws: id  $\frac{2}{3}x = x = x \frac{2}{3}$  id

 $\forall x, y, z \in \mathbf{M};$ 

 $\forall x \in \mathbf{M}$ .