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

## Constituents

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

- Conditions
  - 1. Associative law: (x ; y) ; z = x ; (y ; z)2. Neutrality Laws: id 3x = x = x 3 id
    - $\forall x \in \mathbf{M}$ .

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