



## Commutative Operations

### 1 Why

We introduce language for the case in which an operation does not depend on the order in which it operates.

### 2 Definition

An operation *commutes* if the result of two elements is the same regardless of their order.

#### 2.1 Notation

Let  $A$  be a non-empty set and let  $+: A \times A \rightarrow A$  be an operation. If  $+$  commutes, then

$$a + b = b + a$$

for all  $a, b \in A$ .