



# Ordered Pairs

## 1 Why

We speak of objects composed of elements from different sets.

## 2 Definition

Let  $A$  and  $B$  be non-empty sets. Let  $a \in A$  and  $b \in B$ . An **ordered pair** is the set  $\{\{a\}, \{a, b\}\}$ . The **cartesian product** of  $A$  and  $B$  is the set of all ordered pairs.

We observe that two pairs are equal if they have equal elements in the same order. The ordered causes If  $A \neq B$ , the ordering causes the cartesian product of  $A$  and  $B$  to differ from the cartesian product of  $B$  with  $A$ . If  $A = B$ , however, the symmetry holds.

### 2.1 Notation

We denote the ordered pair  $\{\{a\}, \{a, b\}\}$  by  $(a, b)$ . We denote the cartesian product of  $A$  with  $B$  by  $A \times B$ , read aloud as “A cross B.” In this notation, if  $A \neq B$ , then  $A \times B \neq B \times A$ .