Relations

1 Why

We regularly define relations on a single set.

2 Definition

A **relation** between two non-empty sets A and B is a subset of $A \times B$. A relation on a single set C is a subset of $C \times C$.

We distinguish the order of the elements for the relation. This distinction is obvious when the relation is between two different sets. When it is between the same set, however, this distinction is subtle.

2.1 Notation

We denote relations with upper case capital latin letters because they are sets. Let R be a relation on A and B. We denote that $(a, b) \in R$ by aRb, read aloud as "a in relation R to b."

Often, instead of latin letters we use other symbols. For example, $\sim$, $=$, $<$, $\leq$, $\prec$, and $\preceq$.