

## Converse Relations

# Why

If x is related to y, the y is related to x, but how?

### **Definition**

If R is a relation between X and Y, then the *converse* or inverse relation of R is a relation on Y and X relating  $y \in Y$  to  $x \in X$  if and only if x R y. If  $R = R^{-1}$  then R is symmetric.

#### **Notation**

We denote the converse relation of R by  $R^{-1}$ .

### Example

Let X be the set of people and let R be a relation in X. If R is "is a father of", then  $R^{-1}$  is "is a son of". If R is "is a mother of", then  $R^{-1}$  is "is a daughter of". If R is "is a brother of", then  $R^{-1}$  is "is a brother of". The relation "is a brother of" is symmetric.

