

**Definition** (Transpose of a relation). Let  $R \subseteq \mathbf{A} \times \mathbf{B}$  be a relation. The *transpose* (or *opposite*, or *reverse*) of  $R$  is the relation given by:

$$R^{\top} := \{\langle y, x \rangle \in \mathbf{B} \times \mathbf{A} \mid x R y\}.$$

Note that  $R^{\top} : \mathbf{B} \rightarrow \mathbf{A}$ , while  $R : \mathbf{A} \rightarrow \mathbf{B}$ .