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

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

note that  $R^{\dagger}: B \to A$ , while  $R: A \to B$ .