Definition (Properties of a relation). Let $\mathbb{R} \subseteq \mathbb{A} \times \mathbb{B}$ be a relation. \mathbb{R} is: 1. *Surjective* if for all $y \in \mathbb{B}$ there exists an $x \in \mathbb{A}$ such that $\langle x, y \rangle \in \mathbb{R}$;

2. Injective if for all $\langle x_1, y_1 \rangle$, $\langle x_2, y_2 \rangle \in \mathbb{R}$ it holds: $y_2 = y_2 \Rightarrow x_1 = x_2$;

3. Defined-everywhere if for all $x \in A$ there exists an $y \in B$: $\langle x, y \rangle \in R$;

4. Single-valued if $\forall \langle x, y_1 \rangle, \langle x_2, y_2 \rangle \in \mathbb{R}$ it holds: $x_1 = x_2 \Rightarrow y_1 = y_2$.