Definition (Cartesian product of sets). Given two sets $\mathbf{A}, \mathbf{B}$, their *cartesian product* is denoted $\mathbf{A} \times \mathbf{B}$ and defined as

$$\mathbf{A} \times \mathbf{B} = \{\langle x, y \rangle \mid x \in \mathbf{A} \text{ and } y \in \mathbf{B}\}.$$