Definition (Disjoint union of sets). The *disjoint union* (or sum) of sets $\mathbf{A}$ and $\mathbf{B}$ is

$$\mathbf{A} + \mathbf{B} = \{\langle 1, x \rangle \mid x \in \mathbf{A}\} \cup \{\langle 2, y \rangle \mid y \in \mathbf{B}\}.$$