Lemma. Let $\mathbf{A}$ be any set. Its powerset $\mathscr{P}\mathbf{A}$, with the relation of inclusion, is a poset. View this poset as a category (this means there is a single morphism $\mathbf{S}_1 \to \mathbf{S}_2$ if and only if $\mathbf{S}_1 \subseteq \mathbf{S}_2$). For any two objects $\mathbf{S}_1, \mathbf{S}_2 \in \mathscr{P}\mathbf{A}$, their categorical product exists and is given by $\mathbf{S}_1 \cap \mathbf{S}_2 \in \mathscr{P}\mathbf{A}$.