

Definition (Max)

$\text{Max} : \mathcal{P}\mathbf{P} \rightarrow \mathcal{A}\mathbf{P}$ is the map that sends a subset \mathbf{A} of a poset to the maximal elements of that subset (those elements $a \in \mathbf{A}$ such that $a \succeq_{\mathbf{P}} b$ for all $b \in \mathbf{A}$).
In formulas:

$$\text{Max} : \mathcal{P}\mathbf{P} \rightarrow \mathcal{A}\mathbf{P}$$

$$\mathbf{A} \mapsto \{c \in \mathbf{A} : (d \in \mathbf{A}) \wedge (d \succeq_{\mathbf{P}} c) \Rightarrow (c = d)\}.$$

Note that $\text{Max}(\mathbf{A})$ could be empty.