Definition (Max). Max : $\mathscr{P}\mathbf{P} \to \mathscr{A}\mathbf{P}$ 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:

$$\begin{aligned} \text{Max} : \mathscr{P}\mathbf{P} &\to \mathscr{A}\mathbf{P} \\ \mathbf{A} &\mapsto \{c \in \mathbf{A} : (d \in \mathbf{A}) \wedge (d \succeq_{\mathbf{P}} c) \Rightarrow (c = d)\}. \end{aligned}$$

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