Picking maxima and minima

Four commonly encountered functions are max, min, argmax, and argmin. Each one is fairly intuitive.

1 max **and** min

The max function returns the largest element of a set.

Example 1.
Let $S := \{-5, 7, 23\}$. Then $\max(S) = \max(\{-5, 7, 23\}) = 23$. Some authors just write $\max(-5, 7, 23)$ instead of $\max(\{-5, 7, 23\})$.

In most cases, max is used with numbers. But the function can be generalized to any structure that is a linear order.

Example 2.
Consider **2**, the lattice with $F < T$. Then $\max(\{F, T\}) = T$.

Note that the order must be a linear order. With weak partial orders that aren't also linear orders, max may not be defined for all cases.

Example 3.
Consider a case hierarchy with Nom $\leq$ Acc and Nom $\leq$ Gen, but Acc and Gen are unordered with respect to each other. Then $\max(\{\text{Acc}, \text{Gen}\})$ is undefined.

The opposite of max is min. It returns the smallest member of a set.

Example 4.
While $\max(\{-5, 7, 23\} = 23$, $\min(\{-5, 7, 23\} = -5$. And assuming $F < T$, $\min(\{T, F\}) = F$.

2 argmax/argmin

will be added at a later point