Definition (Initial and terminal object). Let $\mathbf{C}$ be a category and let $X \in \mathbf{C}$ be an object. We say that X is an *initial object* if, for all $Y \in \mathbf{C}$, the hom-set $\mathrm{Hom}_{\mathbf{C}}(X;Y)$ has exactly one element. We say that X is a *terminal object* if, for all $Z \in \mathbf{C}$, the hom-set $\mathrm{Hom}_{\mathbf{C}}(Z;X)$ has exactly one element.