

TD n°2

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An object A in category \mathcal{C} is called terminal when there exists exactly one morphism $C \rightarrow A$ for any object C of \mathcal{C}

1. What is a terminal object in an ordered set seen as an ordered category.
2. Describe a terminal object of **Set** and **Top** and Graph, the category graph and graph homomorphism.
3. Show that if A is terminal and $f : A \rightarrow B$ is an isomorphism then B is terminal too.
4. Suppose that A and B are terminal object in \mathcal{C} show that exists an isomorphism $A \xrightarrow{f} B$ is unique.

Correction :

1. A terminal object in an ordered set is the maximum.
2. Any singleton in **Set** or in **Top** and the graph for the category graph.
3. Let $C \in \mathcal{C}$ and g the unique morphism from C to A . Then $f \circ g$ is a morphism from C to B .
Let $h \in \text{Hom}(C, B)$, then $f \circ h \in \text{Hom}(C, A) = \{g\}$. So we have $h = f \circ g$.