# transitive closure

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The *transitive closure* of a set $X$ is the smallest transitive set $\text{tc}(X)$ such that $X \subseteq \text{tc}(X)$.

The transitive closure of a set can be constructed as follows:

Define a function $f$ on $\omega$ by $f(0) = X$ and $f(n+1) = \bigcup f(n)$

$$\text{tc}(X) = \bigcup_{n<\omega} f(n)$$