Very easy induction proof

Suppose $f : \mathbb{N} \to \{0, 1\}$ is defined by:

- $f(0) = 0$
- $f(n) = f(n-1)$ if $n > 0$

We wish to prove $f(n) = 0$ for all $n \in \mathbb{N}$.
Let $P(n)$ be the statement "$f(n) = 0$"
So we want to prove that $P(n)$ is true for all $n = 0, 1, 2, \ldots$.