

## Why simple induction can fail

Let  $F : \mathbb{Z}^+ \rightarrow \mathbb{Z}$  be defined by

- ▶  $F(1) = 1$  and  $F(2) = 0$
- ▶  $F(n) = F(n - 2)$  if  $n > 2$

Suppose  $P(n)$  is the statement  $F(n) = n \pmod{2}$ .

Base cases are fine ( $n = 1, n = 2$ ).

Does  $P(n) \rightarrow P(n + 1)$ ?

Let  $n \geq 2$  and assume  $P(n)$  is true.