

## Another Strong Induction Problem

Let  $g : \mathbb{Z}^+ \rightarrow \mathbb{Z}$  be defined by  $g(1) = 1$ ,  $g(2) = 3$ , and  $g(n) = g(n - 2)$  if  $n \geq 3$ .

For this function  $g$ :

- ▶ Write down  $g(n)$  for all  $n = 1, 2, \dots, 10$ 
  - ▶ 1, 3, 1, 3, 1, 3, 1, 3, 1, 3
- ▶ Guess a closed form solution for  $g(n)$ 
  - ▶  $g(n) = 1$  if  $n$  is odd and  $g(n) = 3$  if  $n$  is even
- ▶ What is your inductive hypothesis?
  - ▶ Let  $P(n)$  denote  $g(n) = 1$  if  $n$  is odd and  $g(n) = 3$  if  $n$  is even.
  - ▶ Our Inductive Hypothesis is that  $P(n)$  is true for all  $n, 1 \leq n \leq N$ .
  - ▶ We will try to infer that  $P(N + 1)$  is true.