

Mathematical Induction

CS 202

Epp, chapter 4

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How do you climb infinite stairs?

- Not a rhetorical question!
- First, you get to the base platform of the staircase
- Then repeat:
 - From your current position, move one step up

Let's use that as a proof method

- First, show $P(x)$ is true for $x=0$
 - This is the base of the stairs
- Then, show that if it's true for some value n , then it is true for $n+1$
 - Show: $P(n) \rightarrow P(n+1)$
 - This is climbing the stairs
 - Let $n=0$. Since it's true for $P(0)$ (base case), it's true for $n=1$
 - Let $n=1$. Since it's true for $P(1)$ (previous bullet), it's true for $n=2$
 - Let $n=2$. Since it's true for $P(2)$ (previous bullet), it's true for $n=3$
 - Let $n=3$...
 - And onwards to infinity
- Thus, we have shown it to be true for *all* non-negative numbers