Suppose you have a sequence that satisfies the following properties. The first term is 0, and each term is exactly the same as the one before it. Then the sequence is never going to reach 1 (or any other positive number, for that matter).

This (trivial) fact actually ends up being more powerful than you might think. The key is to take a problem and figure out what the right sequence is so the previous paragraph applies. We will discuss some problems/puzzles where this ends up being quite useful.