Cantor-Schroeder-Bernstein Theorem (CSB)

A and B are two sets

You have two *injective* functions $f: A \to B$ and $g: B \to A$

CSB says you can find a *bijective* function $h: A \leftrightarrow B$

For the *finite* case this is easy:

injection $f: A \to B \Rightarrow |A| \leq |B|$

injection $g: B \to A \Rightarrow |B| \leq |A|$

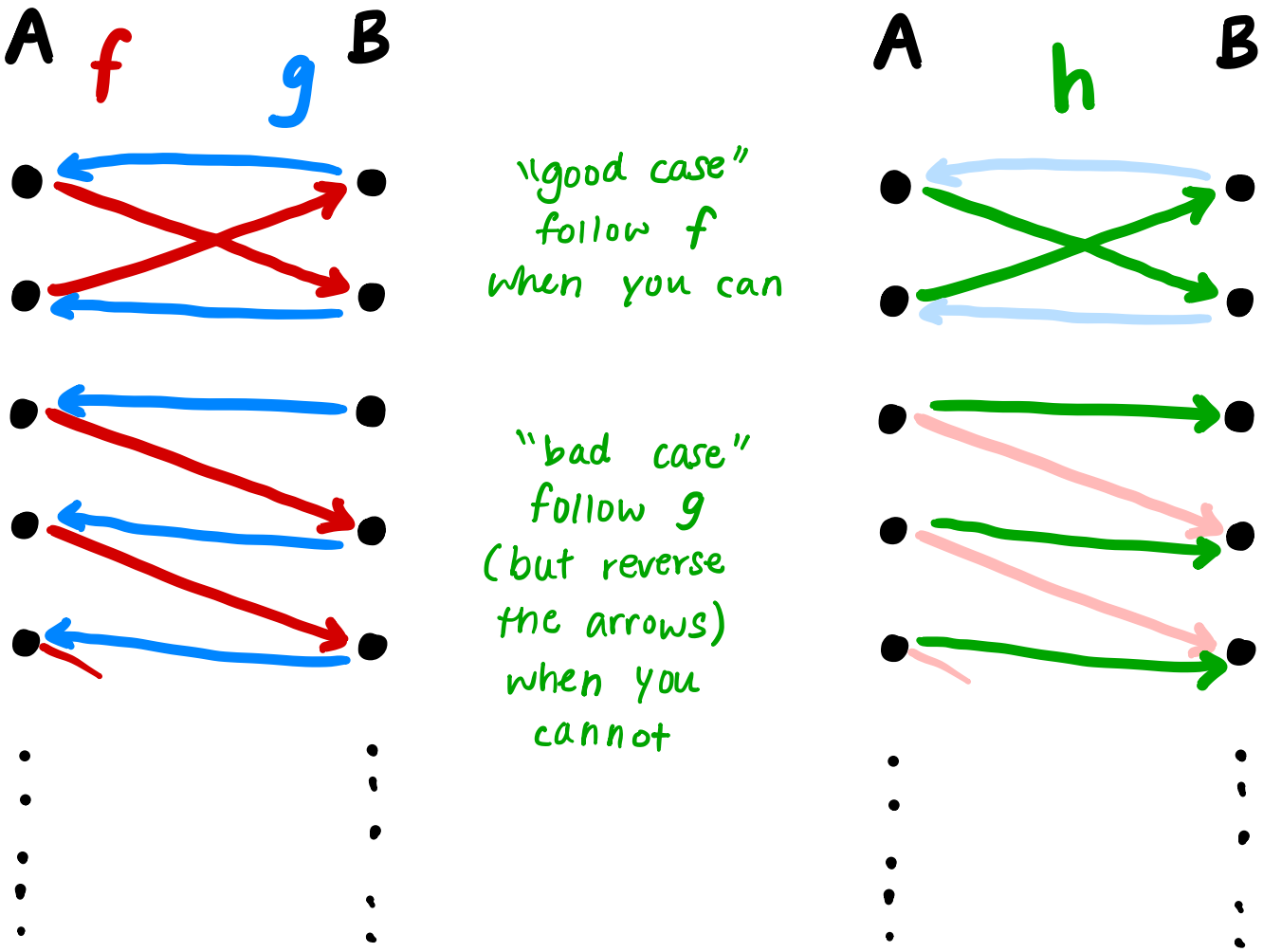
$\Rightarrow |A| = |B| \Rightarrow$ bijection $h: A \leftrightarrow B$

But for *infinite* case we don't get that because

"injection from X to Y implies $|X| \leq |Y|$" was proven by induction.

You *cannot* induct all the way to infinity

So we need to be a bit more clever for the infinite case....



☆ AoPS has a really nice *formal* proof, but you really just need the intuition which is the picture