Proof of 1 $\Longrightarrow$ 2.

- Let us write

$$A = \{a_1, a_2, \ldots, a_m\}, \quad B = \{b_1, b_2, \ldots, b_n\}.$$

- We are assuming that $m \leq n$.
- Define

$$f(a_i) = b_i, \quad i = 1, \ldots, m.$$

- Since the b_i are all different, f is injective.