

*Take for example :*

$$A = \{0,1\},$$

$$B = \{0,2\},$$

$$f(0) = a,$$

$$f(1) = f(2) = b.$$

*Then we have :*

$$f(A \cap B) = \{a\} \neq \{a,b\}$$

$$= f(A) \cap f(B).$$