3

9/6 (Mon) Generating Function & Relation

$f: A \to B$ $\forall a \in A, \exists_1 b \in B \ \ni f(a) = b$.

$f: A \leftrightarrow B$ $(\exists f: A \to B) \wedge (\exists f^{-1}: B \to A)$ Then

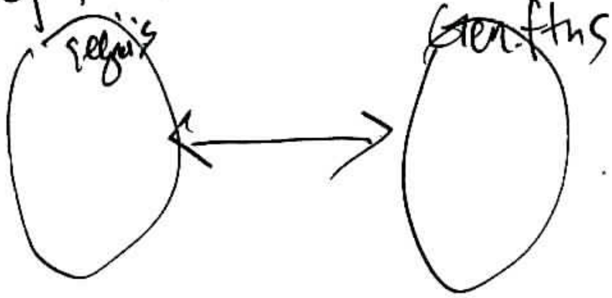
$|A| = |B|$ Card. of A and B are same.

$A \cong_f B$ A & B are isomorphic w.r.t. f.

$A, f \to B$

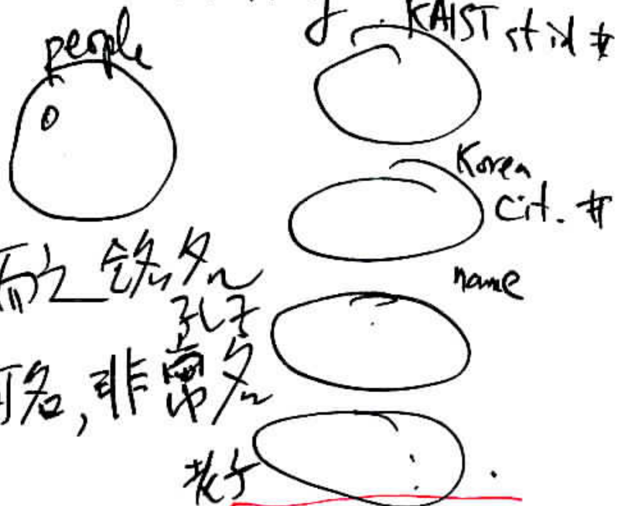
$B, f^{-1} \to A$.

Generating ftn's



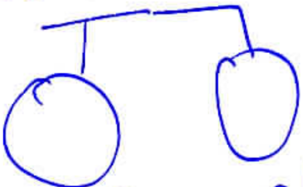
isomorphism vs equivalence

↳ naming



Sci/Eng ↔ Evolution ↔ ① 學而之 論語 (孔子)

Soci/Huma ↔ Revolution ↔ ② 名可名, 非常名 (老子)



$A \cup B = \{a \in A \vee a \in B\}$

$\bigcup_{i \in I} f(i) = \{f(a) \mid a \in I\}$

Before p10 of my TP in Chap. 8.

$f, g: A \to 2^B$ and $R: A \times A$

Input: g & R output: f

$\forall a \in A,\ f(a) = g(a) \cup \bigcup_{\substack{aRb \\ \forall b \in A}} f(b)$

↓ smallest set satisfying

$\subseteq$

recursive $f(a) = g(a) \cup f(b) \cup f(c)$

$f(b) = g(b) \cup f(d)$

$f(c) = g(c) \cup f(d)$

$f(d) = g(d) \cup \{\}$

$\therefore f(a) = g(a) \cup g(b) \cup g(c) \cup g(d)$.

($f(a) \subseteq g(a)$ — basis

$f(a) \subseteq f(b) \ \ni aRb$ — recursion)

$\Leftrightarrow$ $f(a) = \bigcup_{\substack{aR^*b \\ b \in A}} g^*(b)$ — iterative $\Rightarrow$ fixed point.