8/31 제 2 강 Infinite sets & Few Terminologies in Formal Language Theory (FLT)

Infinite sets.

Bijective function $A \overset{f}{\leftrightarrow} B$ $\quad \underset{\text{onto}}{\overset{1:1}{\rightarrow}} \equiv \leftrightarrow$

$A \times B \overset{def}{=} \{(a,b) \mid a \in A, b \in B\}$ — ordered pair 순서쌍

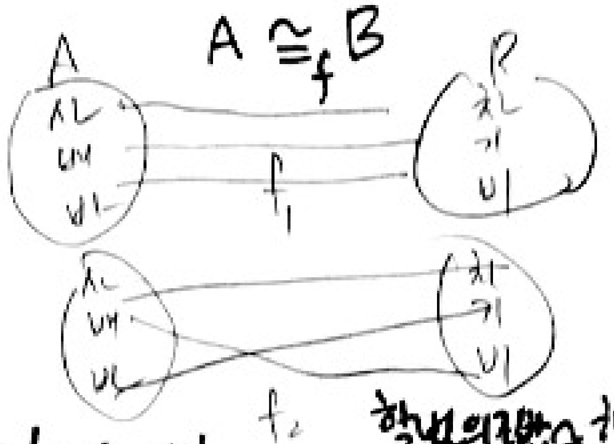
$|A| = |B|$ vs $A = B \equiv (A \subseteq B) \wedge (B \subseteq A)$

~~$|A| \cong_f |B|$~~ $A \cong_f B$

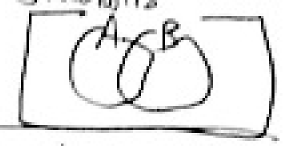
A = {사과, 배, 바나나} B = {치킨, 기차, 자동차}

~~$A \subseteq B$~~ $|A| = |B|$.

$A \cong_f B$



Two set A and B
① subset ?
② (gud), $A \cap B = \emptyset$
③ disjoint $A \cap B = \emptyset$
$A \cap B = \emptyset$
④ Otherwise



학부의 집합은 하나씩 f 짝을 찾는 집합

x predicate logic
coq

· countable : subset $\mathbb{N}_0$
- finite
- countably infinite → countable

uncountable ≡ uncountably infinite

cardinality of infinite sets

$\mathbb{N}_0 \neq \mathbb{N}_1 \quad \mathbb{N}_0 \supset \mathbb{N}_1$ but $\mathbb{N}_0 \cong_f \mathbb{N}_1$

$\mathbb{N}$ Def. Natural #
i) $0 \in \mathbb{N}$
ii) $n \in \mathbb{N} \Rightarrow n+1 \in \mathbb{N}$

Def $\Sigma^* \overset{def}{=} \Sigma^0 \cup \Sigma^1 \cup \Sigma^2 \cup \ldots$

Let Σ be a finite set. where $\left(\Sigma^0 \overset{\Delta}{=}_B \{\varepsilon\} \quad \ldots \text{Basis} \right.$
$\left. \Sigma^i \overset{\Delta}{=}_R \Sigma^{i-1} \cdot \Sigma \ldots \text{recursion} \right)$

Ex1 $\Sigma = \{a, b, c, \ldots, z\}$
Ex2 $\Sigma = \{0, 1\}$

예) $\{0,1\}^* = \{\varepsilon, 0, 1, 00, 01, 10, 11, 000, 001, \ldots, 111, 0000, \ldots\}$ — infinite union of finite binary strings

Thm Σ^* is countable ! — 숙제 1 : 위의 Thm을 증명하시오. (유한 이진수)

Cantor Diagonal Arguments

무한이진수는 countable 하지 않다. (무한이진수 $\in \{0,1\}^*$?)

— 김상현 다음시간에 5분동안 증명한다!

2) Formal Language Theory Let Σ be a vocabulary.

alphabet 어휘.. → a finite set of symbols (atom) 원자.

기본문자

문자 ∈ 기본문자 (어휘)

	$a \in \Sigma$	Σ
	symbol	vocabulary
sequencing	$x \in \Sigma^*$	$L \subseteq \Sigma^*$
	string	language

a set of symbols

language — a set of strings

a sequence of symbols

열 문자열 (vs 수열)

~~set~~ sequences of symbols