제3강 9/5 (화) Chap 2. Finite State

Cantor's Diagonal arguments.

x_d, $\overline{x_d}$ $x_d \in \mathbb{N}$ but $\overline{x_d} \notin \mathbb{N}$

하지만 $x_d, \overline{x_d} \in \{0,1\}^{\mathbb{N}}$. $\therefore \{0,1\}^{\mathbb{N}}$ is not countable)

(N)

QED.

$\{0,1\}^*$ vs. $\{0,1\}^{\mathbb{N}}$

$= \bigcup_{i \in \mathbb{N}_0} \{0,1\}^i$

$= \{0,1\}^0 \cup \{0,1\}^1 \cup \{0,1\}^2 \cup \{0,1\}^3 \cup \dots$

$\{0,1\}^0$ = $\{\epsilon\}$ (empty string)

$\{0,1\}^1$ = $\{0\} \cup \{1\}$ = 2개 = 2^1개

$\{0,1\}^2$ = $\{00, 01, 10, 11\}$ = 4개 = 2^2개

$\{0,1\}^3$ = $\{000, 001, \dots, 111\}$ = 8개 = 2^3

Let Σ를 voc. 이라 하자.

$\Sigma^n = \{\Sigma$의 원소로 이루어진 길이 n개의 문자열$\}$ (string)

f: 자연수의 부분집합 → Σ

Σ^*.

※ $f: A \to B$

서로 다른 함수 f의 갯수?

$|f| = |B|^{|A|}$

$\Sigma^{\{1,2,\dots,n\}} = a_1 a_2 \cdots a_n$ $1 \le \forall i \le n : a_i \in \Sigma$.

$a: \{1,2,\dots,n\} \to \Sigma$

$a(1) = a_1$

$a(2) = a_2$

⋮

$a(n) = a_n$

$\{0,1\}^{\mathbb{N}} = 2^{\mathbb{N}}$

0.011011001… (positions 012345678) ⟷ $\{1, 2, 4, 5, 8, \dots\}$

무한 이진수의 집합 ⟷ 자연수의 부분집합

Russel's Paradox

$S = \{x \mid x \notin x\}$

Let $x = S$ in). Then $S = \{S \mid S \notin S\}$

$S \in S$ or $S \notin S$

이발사 모순

거짓말쟁이 개똥이.

Gödel's Incompleteness Theorem.

→ Denial of Self recursion

Four Terminologies in Formal Language Theory (FLT)

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

↳ a set of sequences of symbols

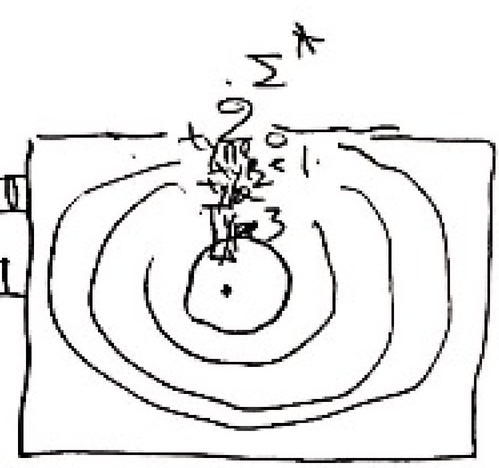
$x \in L$ or $x \notin L$

membership problem!

Chomsky's Language Hierarchy

1. Type 3 ... regular languages ... Part II
2. Type 2 ... context-free ... Part III
(3. Type 1 .. context-sensitive ..)
4. Type 0 ... languages

part IV (part V)



(정규문법) Regular Grammar

Part II Regular Languages (정규 언어), Finite (state) Automata, Regular Expressions (정규 식), Regular Grammar

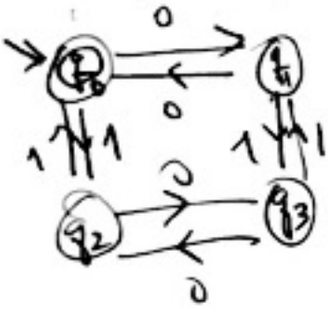
Part III Context-free language, Pushdown Automata, X, Context-free grammar

Part IV, V. ~~Turing Mach~~ language, Turing Machine, X, grammar

Chap2. Finite State Automata

Ex. 2nd Ed. $\Sigma = \{m, C, G, W\}$ $L \subseteq \Sigma^*$

Ex 2.4 in p 50 of 3rd Ed.



$\Sigma = \{0, 1\}$ $L \subseteq \{0, 1\}^*$

q_0 0110110 → q_0 (o)

q_0 0110110 → q_1 (x)