1/ 1

제 21강 11/27 (화) Turing-Church's Thesis.

Partial recursive function

~~Thesis~~.

primitive recu. ftn

μ-recursive ftn

Review.

① TM의 간단함/복잡함.

② GIT (Gödel's incompleteness Theorem) — 없다.

Denial of Self recursion.

피타고라스와 힐버트의 무너진 꿈.

Complement of recursive & recursively enumerable languages

Def. R.E. lang $L \leftrightarrow \exists$ a TM M ∋. $x \in \Sigma^*$ $\begin{cases} x \in L \rightarrow M \text{ accept} \\ x \notin L \rightarrow M \text{ reject or does not terminate} \end{cases}$

recursive lang $L \leftrightarrow \exists$ a TM M ∋. $\forall$ terminate.

program — 0. R.E TM

algorithm — 1 recursive TM 끝난다

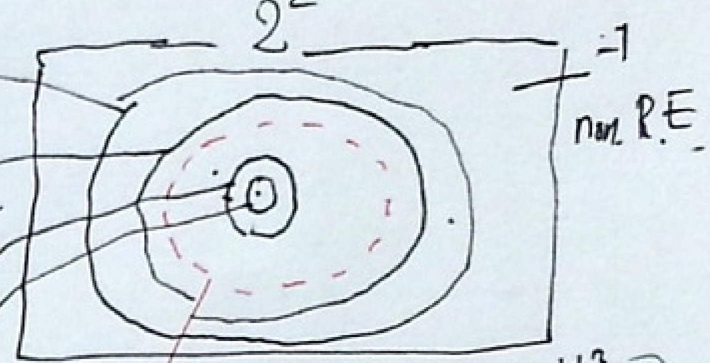
2 context free fa+stack

type 3. 정규언어 fa

NP-complete

2^{Σ^*}

non R.E.



Fact $\exists_a$ TM M ∋. $L = L(M)$.

$\Rightarrow \exists_a$ TM M' ∋. $\bar{L} = L(M')$. $\boxed{\bar{L} = L^c}$

∋. $\bar{L} = U - L$

$L = \{x \in L \mid p(x)\}$

$L(M) = \{x \in \Sigma^* \mid (\varepsilon, q_0, x) \overset{*}{\vdash} (\alpha, f, \beta),\ \alpha, \beta \in \Gamma^*, f \in F\}$

명제의 분류

- Thm - 증명
- 보조 Lemma
- Coll. 이어짐
- Fact (바뀐다)
- Thesis 아직 증명 X

configuration of TM. (I.D.)

$\Gamma^* \times Q \times \Gamma^*$ Γ: 읽고 쓰고, memory

Configuration of PDA

$Q \times \Gamma^*$ Γ: 읽고, 쓰고, stack

Conf. of FA

$Q \times \Sigma^*$. Σ: 쓸 수 없다

$L, \bar{L}$의 경우의 수

9개 vs 6개

3×3 3!

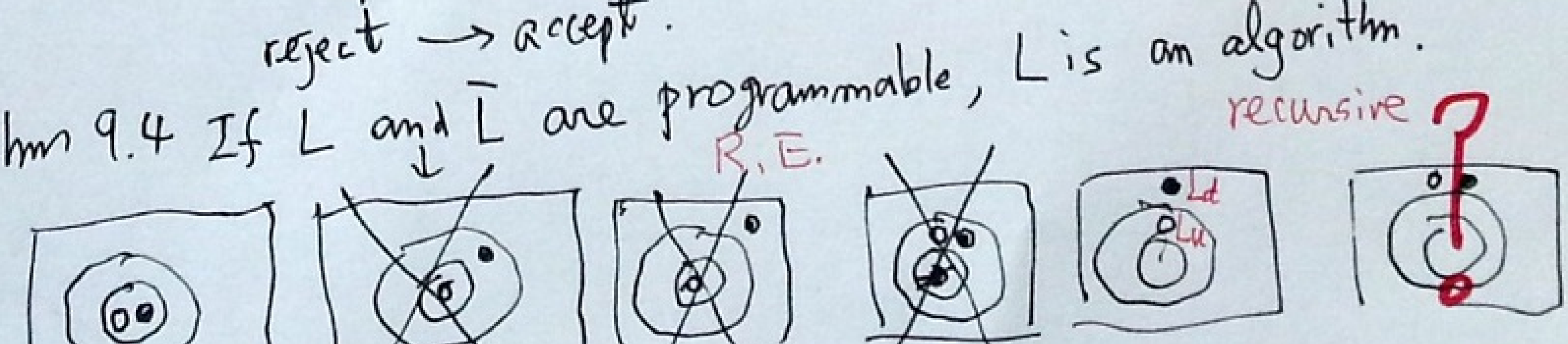
Thm 9.3 If L is recursive. Then $\bar{L}$ is also

accept → reject

reject → accept.

→ Thm 9.4 If L and $\bar{L}$ are programmable, L is an algorithm.

R.E. recursive ?

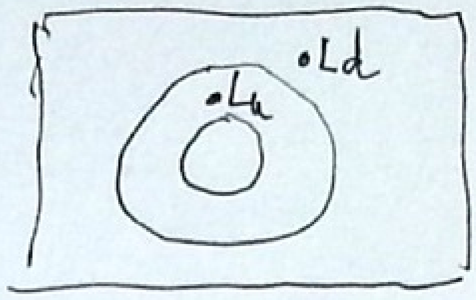


Diagonalization Language Ld

TM is countable, Σ^* is countable

(program) (input data)

$\therefore (M_i, w_i)$ is also countable



$L_d = \{ w_i \in \Sigma^* \mid w_i \notin L(M_i) \}$

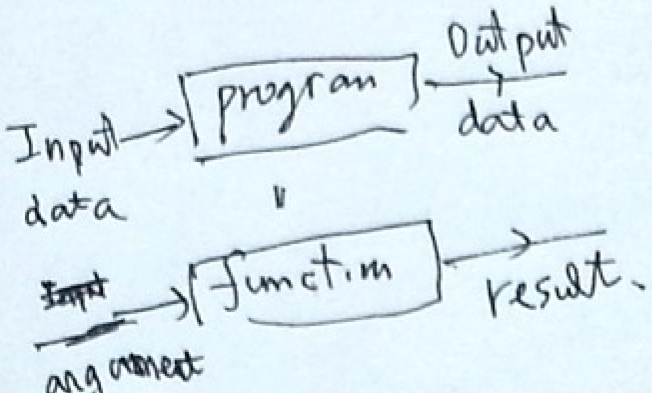
$L_u = \{ w_i \in \Sigma^* \mid w_i \in L(M_i) \}$

$L_u = \overline{L_d}$ $(\overline{L_u} = L_d)$

Ld is NOT R.E.

Lu is R.E.

Chap. 9-1 Computability. (Partial Recursive Function



$f: N^m \to N^n$ vs $f: N \to N$.

Primitive recursive ftn

- zero ftn. $\zeta: N^m \to \{0\}$ $\vec{x} \in N^m$ $= (a_1, a_2, \ldots, a_m)$