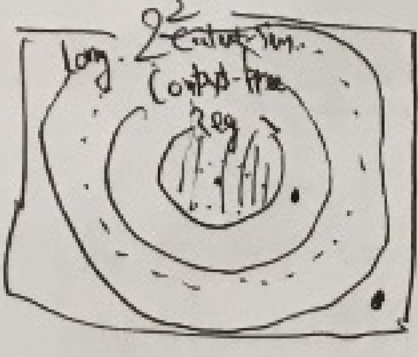
3/28(화) Chap3 Regular Languages

$\Sigma = \{a, b\}$

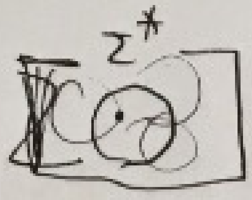
Ex $L_1 = \{ab\}$ ≐ L(ab), $L_2 = \{\}$ ≐ L(φ), $L_3 = \{\varepsilon\}$ ≐ L(ε) ...

$L_3' = \{a, abc\}$ ≐ L(a∪abc)



$L \in 2^{\Sigma^*}$

$\equiv L \subseteq \Sigma^*$



$L_4 = \{\varepsilon, a, aa, aaa, \dots\} \doteq a^*$

$= \{a^n \mid n \geq 0\}$

$L_5 = \{\varepsilon, ab, abab, ababab, \dots\}$

$= \{(ab)^n \mid n \geq 0\} \doteq (ab)^*$

$L_6 = \{\varepsilon, ab, aabb, aaabbb, \dots\}$

$= \{a^n b^n \mid n \geq 0\}$ X non-regular $\subset a^* b^*$

$= \{a^n b^m \mid n, m \geq 0\}$

finite language – 원소나열법

in " – 조건제시법

Three language descriptions

1. regular expression – 원소나열법 비슷한 조건제시법 – 정규식
2. finite automata – automata를 이용한 조건제시법] rewriting systems
3. regular grammar – grammar " "

Definitions of R.L.'s

1. Aho & Ullman's book – DFA
2. regular expression – ~

in this text –

well-formed syntax | well-defined semantics

식 → 식+식 | 식×식 | 식^식 | IN amb.

↑ unambiguous

자 → IN | (식)

인 → 자 | 인^식

항 → 인 | 항×자 left ass. +, ×

식 → 항 | 식+항

( ) / ^식 / × / +

Syntax of R.E

P → V | ε | φ | (E)

F → P | F*

T → F | T·F

E → T | E∪T left associtivite ∪, ·

precedence: ( ) / * / · / ∪

vs

$L : \text{RegExp} \to 2^{V^*}$

Ex) $L((ab)^*) \underset{(2)}{=} \left(L((ab))\right)^* \underset{(3)}{=} \left(L(a)\cdot L(b)\right)^* \underset{\text{lc,lc}}{=} \left(\{a\}\cdot\{b\}\right)^* \underset{\text{def of } \cdot}{=} \{ab\}^*$

$= \{ab\}^* \underset{\text{def. of } *}{=} \{\varepsilon, ab, abab, ababab, \dots\} \underset{\text{def. of } \cdot}{=} \{(ab)^n \mid n \geq 0\}$

Thm 3 (3/28) Prof Fact 3.2 !

A language family $\mathcal{FF}$ (=set)
(=class of language)
a lang. class

$\{a_1, a_2, \dots, a_n\}$ – finite

$\{a_1, a_2, \dots\}$ – infinite