#1 use pumping lemma to prove that

$L = \{ a^n b^k c^{n+k} \mid n \geq 0, k \geq 0 \}$ is not regular.

Assume (L is regular)

$\forall m > 0$ we choose "$w = a^m b^m c^{2m} \in L$ ($|w| \geq m$)"

consider $\forall$ possible decomp of $w = xyz$ ($|xy| \leq m$, $|y| \geq 1$).

y has the form a^k ($1 \leq k \leq m$)

set $i = 0$, $xz = a^{m-k} b^m c^{2m} \notin L$ ~ "pumping lemma is true"

$\therefore$ L is not regular.

#2.

$w = a^m b^{m+1}$ $(|xy| \le m,\ |y| \ge 1)$

$\downarrow$

all decomp

$y = a^k$

$w_i = a^{m+(i-1)k} \cdot b^{m+1}$

괄호 제외 i 값

$\cancel{m} + (i-1)k = \cancel{m} + 1$

$i - 1 = \frac{1}{k}$

$i = \frac{1}{k} + 1$

set $\left(i = \frac{1}{k} + 1\right)$ 는 정수 아닌 경우

$a^{m+1} \cdot b^{m+1}$

#3.

$L = \{ w \mid n_a(w) = n_b(w) \}$ is not regular.

Is L^* regular

$\forall m > 0$ c

#4.

$L = \{ w \mid \underset{\sim}{n_a(w)} \neq \underset{\sim}{n_b(w)} \}$ is not regular.

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