형식언어 과제

Assignment #2

강좌 명: 형식언어

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ex3) $A \to 0B \mid 1A$

$B \to 1A \mid 0C$

$C \to 0C \mid 1C \mid \varepsilon$

$L(A) = \{0\}L(B) \cup \{1\}L(A)$

$L(B) = \{1\}L(A) \cup \{0\}L(C)$

$L(C) = \{0\}L(C) \cup \{1\}L(C) \cup \{\varepsilon\}$

$A = 0B + 1A$

$B = 1A + 0C$

$C = 0C + 1C + \varepsilon$

$C = 0C + 1C + \varepsilon$

$= (0+1)C + \varepsilon$

$= (0+1)^*\varepsilon = (0+1)^*$

$B = 1A + 0C$

$= 1A + 0(0+1)^*$

$A = 0B + 1A$

$= 0(1A + 0(0+1)^*) + 1A$

$= 01A + 00(0+1)^* + 1A$

$= (01+1)A + 00(0+1)^*$

$= (01+1)^* 00(0+1)^*$

$\therefore A = (01+1)^* 00(0+1)^*$

ex4) $S \to aA \mid bS$

$A \to aS \mid bB$

$B \to aB \mid bB \mid \varepsilon$

$L(S) = \{a\}L(A) \cup \{b\}L(S)$

$L(A) = \{a\}L(S) \cup \{b\}L(B)$

$L(B) = \{a\}L(B) \cup \{b\}L(B) \cup \{\varepsilon\}$

$S = aA + bS$

$A = aS + bB$

$B = aB + bB + \varepsilon$

$= (a+b)B + \varepsilon$

$= (a+b)^*\varepsilon = (a+b)^*$

$A = aS + bB$

$= aS + b(a+b)^*$

$S = aA + bS$

$= a(aS + b(a+b)^*) + bS$

$= (aa+b)S + ab(a+b)^*$

$= (aa+b)^* ab(a+b)^*$

$\therefore S = (aa+b)^* ab(a+b)^*$

ex 5) $S \to 0A \mid 1B \mid 0$

$A \to 0A \mid 0S \mid 1B$

$B \to 1B \mid 1 \mid 0$

$L(S) = \{0\}L(A) \cup \{1\}L(B) \cup \{0\}$

$L(A) = \{0\}L(A) \cup \{0\}L(S) \cup \{1\}L(B)$

$L(B) = \{1\}L(B) \cup \{1\} \cup \{0\}$

$S = 0A + 1B + 0$

$A = 0A + 0S + 1B$

$B = 1B + 1 + 0$

$= 1^*(0+1)$

$A = 0A + 0S + 11^*(0+1)$

$= 0A + (0S + 11^*(0+1))$

$= 0^*0S + 0^*11^*(0+1)$

$S = 0A + 1B + 0$

$= 00^*0S + 00^*11^*(0+1) + 11^*(0+1) + 0$

$= 00^*0S + (00^* + \varepsilon)11^*(0+1) + 0$

$= 00^*0S + 0^*11^*(0+1) + 0$

$= (00^*0)^*(0^*11^*(0+1) + 0)$

$\therefore S = (00^*0)^*(0^*11^*(0+1) + 0)$

ex 8) $A \to aB \mid bA$

$B \to aB \mid bC$

$C \to bD \mid aB$

$D \to bA \mid aB \mid \varepsilon$

$A = aB + bA$

$B = aB + bC$

$C = bD + aB$

$D = bA + aB + \varepsilon = A + \varepsilon$

$C = bD + aB$

$= bA + b + aB$

$= A + b$

$B = aB + bC$

$= aB + bA + bb$

$= A + bb$

$A = aB + bA$

$= aA + abb + bA$

$= (a+b)A + abb$

$= (a+b)^*abb$

$\therefore A = (a+b)^*abb$