M.Numan İNCE 31-12-18 HW-1

S 2.30a $L=\{0^n1^n0^n1^n \mid n \geq 0\}$

show that above lang. is not CF

→ Assume that L is Context free

→ L must have a pumping length(P)

→ we take a string S such as $S=0^P1^P0^P1^P$

→ Divide S into parts $uvxyz$

following conditions must be true

1) uv^ixy^iz is in A for every $i \geq 0$

2) $|vy| > 0$

3) $|vxy| \leq P$

case 1 : vxy doesn't straddle a boundary both v and y only contain one type of character. e.g $P=5$ $S=0^51^50^51^5$

$\underbrace{00000}_{u}\underbrace{1111}_{vxy}\underbrace{1\,00000\,11111}_{z}$

$|vxy| \leq P$ 3. cond is ok

check 1. cond uv^ixy^iz $i=2$ uv^2xy^2z

00000111111100000 11111

$0^51^70^51^5$ is not in $A \notin L$

case 2 : vxy straddles third boundary

$\underbrace{00000}_{u}\underbrace{1111}_{v}\underbrace{1}_{x}\underbrace{00}_{y}\underbrace{000\,11111}_{z}$ uv^2xy^2z

00000111111100000001111 1

$0^51^70^71^5$ is not in A $\notin L$

cond 1 is not ok. in two case it is not CFL

S 2.21 $\Sigma=\{a,b\}$ count of a's twice of b

if we show rule with terminals

aab
aba
baa

$S_1 \rightarrow S_0 \mid \epsilon$

So can place different where in three positions.

$S_0 \rightarrow S_1aab \mid aS_1ab \mid aaS_1b \mid aabS_1 \mid S_1aba \mid aS_1ba \mid abS_1a \mid abaS_1 \mid S_1baa \mid bS_1aa \mid baS_1a \mid baaS_1$

$S_1 \rightarrow S_0 \mid \epsilon$

S. 2.4c $\{w \mid$ the length of w is odd$\}$ $\Sigma=\{0,1\}$

$S \rightarrow 0R \mid 1R$ $\quad R \rightarrow 0S \mid 1S \mid \epsilon$

S. 2.4e $\{w \mid w^R = w$ w is a palindrome$\}$ $\Sigma=\{0,1\}$

$S \rightarrow 0S0 \mid 1S1 \mid 0 \mid 1 \mid \epsilon$

S. 2.9 let $G=(V,\Sigma,S,R)$ $a^ib^jc^k \mid i=j$ or $j=k$

$V=\{S,U,V,X,Y\}$

$S \rightarrow U \mid V$

$U \rightarrow aU \mid X$

$V = Vc \mid Y$

$X = bXc \mid \epsilon$

$Y = aYb \mid \epsilon$

So abc word can be generate two different ways.

$S \rightarrow U \rightarrow aV \rightarrow abVc \rightarrow abc \rightarrow 1.w$

$S \rightarrow V \rightarrow Vc \rightarrow aYbc \rightarrow abc \rightarrow 2w$

result is ambigous