CNC 2012
Formal Languages
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Assigment 6
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19.)

$S \to aAbB \mid ABC \mid a$
$A \to aA \mid a$
$B \to bBcC \mid b$
$C \to abc$

$A' \to a$
$B' \to b$
$C' \to c$

$S \to A'AB'B \mid ABC \mid a$
$A \to A'A \mid a$
$B \to B'BC'C \mid b$
$C \to abc$
$A' \to a$
$B' \to b$
$C' \to c$

$S \to A'T_2 \mid AT_3 \mid a$
$A \to A'A \mid a$
$B \to B'T_5 \mid b$
$C \to A'T_6$
$T_1 \to B'B$
$T_2 \to AT_1$
$T_3 \to BC$
$T_4 \to C'C$
$T_5 \to BT_4$
$T_6 \to B'C'$

27.)

$S \to A \mid B$
$A \to aaB \mid Aab \mid Aba$
$B \to bB \mid Bb \mid aba$

$\downarrow$

$S \to A \mid B$
$A \to aaB \mid aaBR_1$
$B \to bB \mid aba \mid bBR_2 \mid abaR_2$
$R_1 \to ab \mid ba \mid abR_1 \mid baR_1$
$R_2 \to b \mid bR_2$

$aab^*abab^*(ab|ba)^* \mid b^*abab^*$

30. $S \to aAb \mid a$
$A \to SS \mid b$

$S \to aT \mid a$
$T \to aTSB' \mid aSB' \mid bB'$
$A \to aTS \mid aS \mid b$
$B' \to b$

I just took a STAB' at this one..

33.)

$S \to BA \mid AB \mid \lambda$
$A \to BB \mid AA \mid a$
$B \to AA \mid b$

$\to$

$S \to BA \mid AB \mid \lambda$
$A \to BB \mid a \mid BBR_1 \mid aR_1$
$B \to AA \mid b \Rightarrow B \to BBA \mid aA \mid BBR_1A \mid aR_1A \mid b$
$R_1 \to AR_1 \mid A$

$B \to aA \mid aR_1A \mid b \mid aAR_2 \mid aR_1AR_2 \mid bR_2$
$R_2 \to BA \mid BR_1A \mid BAR_2 \mid BR_1AR_2$

$A \to a \mid aR_1$
$A \to aABR_1 \mid aR_1ABR_1 \mid bBR_1 \mid aAR_2BR_1 \mid aR_1AR_2BR_1 \mid bR_2BR_1$
$A \to aAB \mid aR_1AB \mid bB \mid aAR_2B \mid aR_1AR_2B \mid bR_2B$

$S \to aAA \mid aR_1AA \mid bA \mid aAR_2A \mid aR_1AR_2A \mid bR_2A$

$S \to aB \mid aR_1B$
$\to aABR_1B \mid aR_1ABR_1B \mid bBR_1B \mid aAR_2BR_1B \mid aR_1AR_2BR_1B \mid bR_2BR_1B$
$\to aABBB \mid aR_1ABB \mid bBB \mid aAR_2BB \mid aR_1AR_2BB \mid bR_2BB$

$S \to \lambda$

$R_1 \to aR_1 \mid aR_1R_1$
$\to aABR_1R_1 \mid aR_1ABR_1R_1 \mid bBR_1R_1 \mid aAR_2BR_1R_1 \mid aR_1AR_2BR_1R_1 \mid bR_2BR_1R_1$
$\to aABR_1 \mid aR_1ABR_1 \mid bBR_1 \mid aAR_2BR_1 \mid aR_1AR_2BR_1 \mid bR_2BR_1$

$R_1 \to a \mid aR_1$
$\to aABR_1 \mid aR_1ABR_1 \mid bBR_1 \mid aAR_2BR_1 \mid aR_1AR_2BR_1 \mid bR_2BR_1$
$\to aAB \mid aR_1AB \mid bB \mid aAR_2B \mid aR_1AR_2B \mid bR_2B$

$R_2 \to aAA \mid aR_1AA \mid bA \mid aAR_2A \mid aR_1AR_2A \mid bR_2A$
$\to aABR_1A \mid aR_1AR_1A \mid bR_1A \mid aAR_2R_1A \mid aR_1AR_2R_1A \mid bR_2R_1A$
$\to aAAR_2 \mid aR_1AAR_2 \mid bAR_2 \mid aAR_2AR_2 \mid aR_1AR_2AR_2 \mid bR_2AR_2$
$\to aAR_1AR_2 \mid aR_1AR_1AR_2 \mid bR_1AR_2 \mid aAR_2R_1AR_2 \mid aR_1AR_2R_1AR_2 \mid bR_2R_1AR_2$

$B \to aA \mid aR_1A \mid b \mid aAR_2 \mid aR_1AR_2 \mid bR_2$