

Automata Theory and Computability - 15CS54

Module-3: Assignment

Sl. No.	Questions		
1	<p>Write the CFG for following languages.</p> <p>a. $L = \{a^{n+3}b^n \mid n \geq 1\}$</p> <p>b. $L = \{a^n b^m : n \neq m\}$</p> <p>c. $L = \{ww^R \mid w \in \{a,b\}^*\}$</p>		
2	<p>Simplify following CFG.</p> <p>$S \rightarrow AB \mid AC$</p> <p>$A \rightarrow aA \mid bAa \mid a$,</p> <p>$B \rightarrow bbA \mid aB \mid AB$</p> <p>$C \rightarrow aCa \mid aD$</p> <p>$D \rightarrow aD \mid bC$</p>		
3	<p>Consider the CFG with productions</p> <p>$E \rightarrow E+T \mid T$</p> <p>$T \rightarrow T * F \mid F$</p> <p>$F \rightarrow (E) \mid 0 \mid 1$</p> <p>Write LMD, RMD and parse tree for the string 0+((1*0)+0)</p>		
4	<p>Consider the grammar: $S \rightarrow aS \mid aSbS \mid \epsilon$</p> <p>Is the above grammar ambiguous?</p> <p>Show that the string "aab" has two</p> <ol style="list-style-type: none"> i) Parse trees ii) Left most derivations iii) Right most derivations 		
5	<p>Convert each of the following grammars to Chomsky normal form.</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> $S \rightarrow ABC$ $A \rightarrow aC \mid D$ $B \rightarrow bB \mid \epsilon \mid A$ $C \rightarrow Ac \mid \epsilon \mid Cc$ $D \rightarrow aa$ </td> <td style="width: 50%; vertical-align: top;"> $S \rightarrow aTVa$ $T \rightarrow aTa \mid bTb \mid \epsilon \mid V$ $V \rightarrow cVc \mid \epsilon$ </td> </tr> </table>	$S \rightarrow ABC$ $A \rightarrow aC \mid D$ $B \rightarrow bB \mid \epsilon \mid A$ $C \rightarrow Ac \mid \epsilon \mid Cc$ $D \rightarrow aa$	$S \rightarrow aTVa$ $T \rightarrow aTa \mid bTb \mid \epsilon \mid V$ $V \rightarrow cVc \mid \epsilon$
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6	<p>Design a PDA for the following language:</p> <p>$L = \{wcw^R : w \in \{a,b\}^*\}$.</p> <p>Also Draw the transition diagram. Write the computation (sequence of all configurations) for the input string 'abacaba' and 'abcab'</p>		