CS 302 **5 December, 2017**

QUIZ 9

ANSWER

$G = (\{S,A,B\}, \{a,b,c\}, R, S)$ where productions are :

$R : S \rightarrow SA \mid a \; ; \; A \rightarrow BS \mid Bb \; ; \; B \rightarrow cA$

- Eliminate left recursion : $S \rightarrow aC \; ; \; C \rightarrow AC \mid e$

- Eliminate common left symbol B : $A \rightarrow BD \; ; \; D \rightarrow S \mid b$ and keep on substituting for variables to yield : $R' : S \rightarrow aC \; ; \; A \rightarrow cAD \; ; \; C \rightarrow cADC \mid e \; ; \; D \rightarrow aC \mid b \; ; \; B \rightarrow cA$

The new grammar is $G' = (\{S, A, B, C, D\}, \{a,b,c\}, R', S)$; but the variable A is nongenerative ; after removing A ; D, B, b and c all become nonreachable hence after removing these useless symbols and the productions of the variables the grammar becomes $G'' = (\{S, C\}, \{a\}, R'', S)$ where $R'' : S \rightarrow aC \; ; \; C \rightarrow e$

which further simplifies to $G''' = (\{S\}, \{a\}, R''', S)$ where $R''' : S \rightarrow a$