

**Ganpat University**  
**U V Patel College of Engineering**  
**B.Tech Sem-VII CE/ IT/ CE(AI)**  
**A.Y. 2024-2025**  
**2CEIT701: Compiler Design**  
**Assignment-1**

1. Define the following terms with an example:

Lexeme, Token, Pattern

2. Let G be CFG

$$S \rightarrow bB \mid aA$$

$$A \rightarrow b \mid bS \mid aAA$$

$$B \rightarrow a \mid aS \mid bBB$$

For the string “bbaababa” find

- (i) leftmost derivation  
(ii) rightmost derivation  
(iii) parse tree
3. Identify and remove left recursion from the grammar:  
 $X \rightarrow XzY \mid zZ \mid Z$   
 $Y \rightarrow Yy \mid i$   
 $Z \rightarrow ZxY \mid ZyY \mid Xa$
4. Perform Left Factoring on the following CFG:  
 $X \rightarrow xd \mid x \mid xb \mid xbc \mid b$

5. Find First(), Follow(), Select(), Construct M-Table for the following grammar and check if it is LL(1) or not.

$A \rightarrow qQ'Tu$ $Q \rightarrow rR$ $R \rightarrow pR \mid \epsilon$ $T \rightarrow UV$ $U \rightarrow t \mid \epsilon$ $V \rightarrow s \mid \epsilon$  Parse the string “qrptsu\$” using a predictive parsing table and show all the steps using stack.	$S \rightarrow aAC \mid bB$ $A \rightarrow Abc \mid Abd \mid \epsilon$ $B \rightarrow f \mid g$ $C \rightarrow h \mid i$
$N \rightarrow eAB \mid CDg$ $A \rightarrow a \mid CA$ $B \rightarrow b \mid DB$ $C \rightarrow c \mid d$ $D \rightarrow e \mid f \mid \epsilon$  Parse the string “ecdafeb\$” using an M-Table and show all the steps using stack.	$E \rightarrow x \mid \#EA@ \mid ab$ $A \rightarrow *EB \mid By \mid \epsilon$ $B \rightarrow \%EAz \mid b \mid \epsilon$

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6. Consider the following grammar:

$A \rightarrow AcB \mid cC \mid C$

$B \rightarrow bB \mid id$

$C \rightarrow CaB \mid BbB \mid B$

Terminal Symbols are:  $\{a, b, c, id\}$

Non-Terminal Symbols are:  $\{A, B, C\}$

Perform: 1) Remove left recursion

2) On the Answer of 1st option perform left factoring

3) On the answer of 2nd option find  $FIRST()$ ,  $FOLLOW()$ ,  $SELECT()$  and

Construct M-Table and parse the string "cidbidaidcid"

**Note: Submit Assignment on or before: 20<sup>th</sup> Sept. 2024**