

NAME:- KRUNAL RANIK

Roll No:- U18C0081

CLASS:- BITECH III, Computer Eng.

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## System Software Tutorial II

$S \rightarrow aBDh$   
 $B \rightarrow cC$   
 $C \rightarrow bC | \epsilon$   
 $D \rightarrow EF$   
 $E \rightarrow g | \epsilon$   
 $F \rightarrow f | \epsilon$

Now,

$$\text{First}(P) = \{f, \epsilon\}$$

$$\text{First}(E) = \{g, \epsilon\}$$

$$\text{First}(D) = \{g, f, \epsilon\}$$

$$\text{First}(C) = \{b, \epsilon\}$$

$$\text{First}(B) = \{c\}$$

$$\text{First}(S) = \{a\}$$

$$\text{Follow}(D) = \{h\}$$

$$\text{Follow}(B) = \text{Follow}(\text{First}(D) - \epsilon) \cup \{h\}$$

$$= \{g, f, h\}$$

$$\text{Follow}(C) = \text{Follow}(B) = \{g, f, h\}$$

$$\text{Follow}(E) = \{\text{First}(F) - \epsilon\} \cup \{\text{Follow}(D)\}$$

$$= \{f, h\}$$

$$\text{Follow}(F) = \text{Follow}(D) = \{h\}$$

$$S \rightarrow (L) | a$$

$$L \rightarrow SL'$$

$$L' \rightarrow , SL' | \epsilon$$

$$\text{First}(S) = \{ (, a \}$$

$$\text{First}(L) = \text{First}(S) = \{ (, a \}$$

$$\text{First}(L') = \{ , , \epsilon \}$$

$$\text{Follow}(S) = \{ \$ \} \cup \{\text{First}(L') - \epsilon\} \cup \{\text{Follow}(L)\}$$

$$= \{ \$, a, , \}$$

$$\text{Follow}(L) = \{ ) \}$$

$$\text{Follow}(L') = \text{Follow}(L) = \{ ) \}$$

Ans 3

Ans 3

$$S \rightarrow ACB \mid c^b B \mid Ba$$

$$A \rightarrow da \mid BC$$

$$B \rightarrow g \mid \epsilon$$

$$C \rightarrow h \mid \epsilon$$

$$\text{First}(C) = \{h, \epsilon\}$$

$$\text{First}(B) = \{g, \epsilon\}$$

$$\text{First}(A) = \{d, g, h, \epsilon\}$$

$$\text{First}(S) = \{d, g, h, \epsilon, b, a\}$$

$$\text{Follow}(S) = \{\$ \}$$

$$\text{Follow}(A) = \{h, g, \$ \}$$

$$\text{Follow}(B) = \{a, \$, g, h\}$$

$$\text{Follow}(C) = \{b, g, \$, h\}$$

Ans 4

$$S \rightarrow iGtSS' \mid a$$

$$S' \rightarrow \epsilon S \mid \lambda$$

$$G \rightarrow Fb$$

Parsing table,

N/I	a	b	e	i	t	\$
S	$S \rightarrow a$				$S \rightarrow iGtSS'$	
S'			$S' \rightarrow \lambda$ $S' \rightarrow \epsilon S$			$S' \rightarrow \lambda$
G		$G \rightarrow b$				

It is not LL(1) grammar because  $M(S, e)$  has 2 entries!

Ans 5. Parsing table,

N/I	a	(	)	,	\$
S	$S \rightarrow a$	$S \rightarrow (L)$			
L	$L \rightarrow SL'$	$L \rightarrow SL'$			
L'			$L' \rightarrow \epsilon$	$L' \rightarrow ,SL'$	

Hence, it is an LL(1) Grammar