



Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India
(Autonomous College Affiliated to University of Mumbai)

Mid Semester Examination Synoptic

March 2019

Max. Marks: 20

Class: TE

Course Code: CE61

Name of the Course:- System Programming and Compiler Construction Synoptic

Duration: 1 Hour

Semester: VI

Branch: Computer

Question No.		Max. Marks																		
Q.1	<p>Listing all four functions- 1 mark</p> <table><tr><th>NODE n</th><th>$nullable(n)$</th><th>$firstpos(n)$</th></tr><tr><td>A leaf labeled ϵ</td><td>true</td><td>\emptyset</td></tr><tr><td>A leaf with position i</td><td>false</td><td>$\{i\}$</td></tr><tr><td>An or-node $n = c_1 c_2$</td><td>$nullable(c_1)$ or $nullable(c_2)$</td><td>$firstpos(c_1) \cup firstpos(c_2)$</td></tr><tr><td>A cat-node $n = c_1 c_2$</td><td>$nullable(c_1)$ and $nullable(c_2)$</td><td>if ($nullable(c_1)$) $firstpos(c_1) \cup firstpos(c_2)$ else $firstpos(c_1)$</td></tr><tr><td>A star-node $n = c_1^*$</td><td>true</td><td>$firstpos(c_1)$</td></tr></table> <p>Rules for computing $nullable$ and $firstpos$</p> <p>"Rules for computing $lastpos$ are same as that of $firstpos$."</p> <p>Rules for computing $followpos$:-</p> <ol style="list-style-type: none">1.If n is a cat-node with left child C_1 and right child C_2 , then for every position i in $lastpos(C_1)$, all positions in $firstpos(C_2)$ are in $followpos(i)$.2. If n is a star-node, and i is a position in $lastpos(n)$, then all positions in $firstpos(n)$ are in $followpos(i)$. <p>2 marks for writing the rules for any of the functions mentioned.</p>	NODE n	$nullable(n)$	$firstpos(n)$	A leaf labeled ϵ	true	\emptyset	A leaf with position i	false	$\{i\}$	An or-node $n = c_1 c_2$	$nullable(c_1)$ or $nullable(c_2)$	$firstpos(c_1) \cup firstpos(c_2)$	A cat-node $n = c_1 c_2$	$nullable(c_1)$ and $nullable(c_2)$	if ($nullable(c_1)$) $firstpos(c_1) \cup firstpos(c_2)$ else $firstpos(c_1)$	A star-node $n = c_1^*$	true	$firstpos(c_1)$	05
NODE n	$nullable(n)$	$firstpos(n)$																		
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A cat-node $n = c_1 c_2$	$nullable(c_1)$ and $nullable(c_2)$	if ($nullable(c_1)$) $firstpos(c_1) \cup firstpos(c_2)$ else $firstpos(c_1)$																		
A star-node $n = c_1^*$	true	$firstpos(c_1)$																		

Q.2

05

■ The LL(1) parsing table:

	int	*	+	()	\$
E	TX			TX		
X			+E		ϵ	ϵ
T	intY			(E)		
Y		*T	ϵ		ϵ	ϵ

1 mark for computing first set of all the non-terminals correctly.

1 mark for computing follow of all the non terminals correctly.

2.5 marks for constructing parsing table correctly. 1 error in the entry is allowed, exceeding that marks will be reduced accordingly.

0.5 marks will be given to find whether the above grammar is LL(1) or not.

OR

2.5 marks for construction of correct canonical collection of LR(0) items.

2.5 marks for constructing correct LR(0) parsing table. - 1 error in the entry is allowed, exceeding that marks will be reduced accordingly.

Q.3

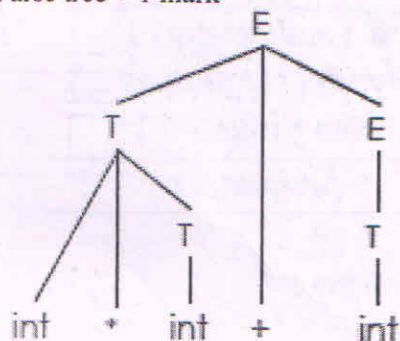
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a. $E \rightarrow T + E \mid T$

$T \rightarrow \text{int} * T \mid \text{int} \mid (E)$

2 mark for rewriting correct productions

b. Parse tree - 1 mark



c. Input

Handle

int * int + int

$T \rightarrow \text{int}$

int * T + int

$T \rightarrow \text{int} * T$

T + int

$T \rightarrow \text{int}$

T + T

$E \rightarrow T$

T + E

$E \rightarrow T + E$

E

2 marks for writing the correct handles

2.5 marks for construction of correct canonical collection of LR(0) items.
2.5 marks for constructing correct SLR(1) parsing table. - 1 error in the entry is allowed, exceeding that marks will be reduced accordingly.

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OR

Step by step parsing of the input string should be done. Contents of the stack and input string should be shown. Action should be written accordingly for each of the steps of parsing.
5 marks will be allotted only if above specifications are fulfilled.