

Name : .....

ID : .....



## Quiz 2



1) Construct a grammar that represents:

*(2 points)*a. The language of all palindromes over  $\{0, 1\}^*$ *(1 point)*

Ex : 011110 , 1010110101

Answer :

$$S \rightarrow 0S0 \mid 1S1 \mid 0 \mid 1 \mid \epsilon$$
b. The regular expression :  $(0 \mid 1)^*11$ *(1 point)*

Answer :

$$S \rightarrow A11$$
$$A \rightarrow 0A \mid 1A \mid \epsilon$$
c. The language of all Non palindromes over  $\{0, 1\}^*$ 

Answer :

$$S \rightarrow 0S0 \mid 1S1 \mid D$$
$$D \rightarrow 1A0 \mid 0A1$$
$$A \rightarrow \epsilon \mid 0A \mid 1A$$

2) For the following grammar construct the LL(1) parsing table and parse the input: **{stmt;}.**

(4 points)

$P \rightarrow S$

$S \rightarrow \text{stmt} \mid \{B$

$B \rightarrow \} \mid S \mid S;B$

*Handwritten solution:*

**Parsing table**

	S	;	\$
stmt-seq	(1)		
stmt-seq'		(2)	(3)
stmt	(4)		

  

$\text{stmt-seq} \rightarrow \text{stmt} \text{ stmt-seq}' \quad (1)$   
 $\text{stmt-seq}' \rightarrow ; \text{stmt-seq} \quad (2)$   
 $\text{stmt-seq}' \rightarrow \epsilon \quad (3)$   
 $\text{stmt} \rightarrow S \quad (4)$

to parse S; S;

stmt-seq \$	S; S; \$	Predict
stmt stmt-seq \$	S; S; \$	Predict
S stmt-seq \$	S; S; \$	match
stmt-seq \$	; S; \$	Predict
; stmt-seq \$	; S; \$	match
stmt-seq \$	S; \$	
stmt stmt-seq \$	S; \$	

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3) Consider the following grammar

(4 points)

$$P \rightarrow P + Q \mid Q$$

$$Q \rightarrow Q d F \mid F$$

$$F \rightarrow (P) \mid \text{id}$$

a) Remove the left-Recursion

(2 points)

b) Get the First and Follow sets

(2 points)

Answer :

$$P \rightarrow Q P'$$

$$P' \rightarrow + Q P' \mid \epsilon$$

$$Q \rightarrow F Q'$$

$$Q' \rightarrow d F Q' \mid \epsilon$$

$$F \rightarrow (P) \mid \text{id}$$

Non-Terminal	First	Follow
P	( , id	\$ , )
P'	+ , $\epsilon$	\$ , )
Q	( , id	\$ , ) , +
Q'	d , $\epsilon$	\$ , ) , +
F	( , id	\$ , ) , d , +

1) Consider the following grammar

(4 points)

$$S \rightarrow aAd \mid aB$$

$$A \rightarrow a \mid ab$$

$$B \rightarrow ccd \mid ddc$$

c) Remove the left factoring

(2 points)

d) Get the First and Follow sets

(2 points)

Answer :

$$S \rightarrow a S'$$

$$S' \rightarrow A d \mid B$$

$$A \rightarrow aA'$$

$$A' \rightarrow b \mid \epsilon$$

$$B \rightarrow ccd \mid ddc$$

Non-Terminal	First	Follow
S	a	\$
S'	a , c , d	\$
A	A	d
A'	b , $\epsilon$	d
B	c , d	\$