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STD II YEAR CSE SEC : ..... ROLL NO : 19

S.No.	Date	Title	Page No.	Te
01.	13/3/24	Design a DFA to accept string starts with '0' and ends with '1'.	DAY 1	
02	13/3/24	Consider a DFA $M=(Q,\Sigma,\delta,q_0,F)$ where $Q=\{A,B,C\}$ $\Sigma=\{0,1\}$		
03	13/3/24	construct NFA which accepts set of all strings with 3 consecutive 0's.		
04	13/3/24	construct DFA which accepts even no: of zeroes followed by single 1.		
05	13/3/24	Draw NFA with input symbols $\{0,1\}$ which accepts all the string "01".		
06	13/3/24	Draw NFA which starts with even no: of 0's & ends with 1.		
07	13/3/24	Draw NFA with ε for the R.E		
08	13/3/24	Convert finite Automata for the given R.E		
09	13/3/24	Find regular expression for given DFA		
10.	13/3/24	Conversion of NFA to DFA.		
11.	14/3/24	MINIMISE THE DFA.	DAY 2	
12.	14/3/24	Identify the language by RE		
13.	14/3/24	Construct NFA with ε-moves		
14.	14/3/24	Construct RE from DFA		
15.	14/3/24	Prove the (R.E or not)		
16.	15/3/24	write CFG for given language.	DAY-3	
17.	15/3/24	Write LMD & RMD		
18.	15/3/24	Eliminate ε, infinite production		
19.	15/3/24	convert the grammar to CNF		
20	15/3/24.	convert the grammar to CNF		
21.	18/3/24	Design a PDA	DAY-4.	
22	18/3/24	Design a PDA		
23	18/3/24	Convert grammar to PDA		
24	18/3/24	Designing a TM.		
25	18/3/24.	Design a TM		

16 Write CFG for languages given below.

i, set of all strings that start with a & end with b over $\Sigma = \{a, b\}$

ii, set of all strings over $\Sigma = \{a, b\}$ having 'aa' as a substring.

iii, set of all binary strings that starts & end with different digits.

Aim

To write CFG for given languages

PROCEDURE

i, start with a & end with b

$\Sigma = \{a, b\}$, $L = \{ab, aab, abb \cdots\}$

CFG $S \rightarrow aB$

$B \rightarrow aB \mid b \mid \varepsilon$

ii, 'aa' as a substring

$\Sigma = \{a, b\}$ $L = \{aa, aaa, aab, baa \cdots\}$

CFG $S \rightarrow XaaY \mid XaaY \mid aaX \mid aaY \mid aaXY \mid XaaYaa$

$X \rightarrow aX \mid bX \mid \varepsilon$

$Y \rightarrow aY \mid bY \mid \varepsilon$

iii, start & end with different digits

$\Sigma = \{0, 1\}$, $L = \{01, 10, 001, 110 \cdots\}$

CFG $S \rightarrow 0A1 \mid 1B0$

~~$A \rightarrow 0A \mid 1A \mid \varepsilon$~~

$B \rightarrow 0B \mid 1B \mid \varepsilon$

RESULT

Thus CFG for given languages is written successfully.

17. Write leftmost & rightmost derivations & draw parse tree for the string.
id+id*id from the CFG

Aim

To write lmd & rmd & draw parse tree for the string given below.

PROCEDURE

$E \overset{lm}{\Rightarrow} E*E$

$\Rightarrow E+E*E$

$\Rightarrow id+E*E$

$\Rightarrow id+id*E$

$\Rightarrow id+id*id.$

$E \overset{rm}{\Rightarrow} E*E$

$\Rightarrow E*id.$

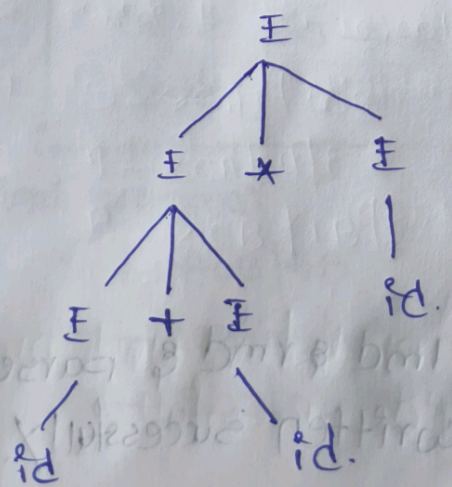
$\Rightarrow E+E*id.$

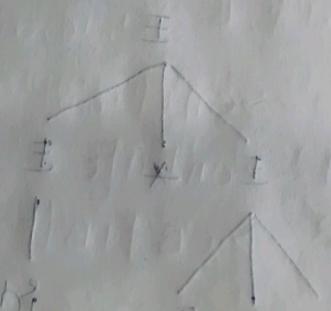
$\Rightarrow E+id*id.$

$\Rightarrow id+id*E.$

DIAGRAM

PARSE TREE





RESULT Thus the lmd & rmd & parse tree for given string is written successfully.

18 Eliminate ε productions, unit productions & useless symbols from grammer

S → ASB | ε

A → aAS / a

B → SbS / A | bb

Aim

To eliminate ε-productions, unit productions & useless symbols from given grammer

PROCEDURE

STEP 1.

Eliminating ε productions.

S is nullable.

S → ASB | AB

A → aAS | aA | a.

B → SbS | Sb | b | A | bb.

STEP 2 Eliminating unit productions.

Unit pairs	Productions
(S,S)	S → ASB | AB
(A,A)	A → aAS | aA | a
(B,B)	B → SbS | Sb | b | bb
(B,A)	B → aAS | aA | a.

Final grammar

S → ASB | AB

A → aAS | aA | a

B → SbS | Sb | b | bb | aAS | aA | a.

STEP 3 Eliminate useless symbols

There are no useless symbols.

RESULT

Thus the ε-productions, unit productions & useless eliminated successfully.

19. convert the given grammar to CNF

$S \rightarrow aSa \mid bSb \mid a \mid b$

Aim

To convert given grammar to CNF.

CNF $A \rightarrow BC$ and $A \rightarrow a$.

PROCEDURE

1. the given grammar is optimized
2. Introduce the production

$A \rightarrow a$

$B \rightarrow b$

3. Rewrite the grammar

$S \rightarrow ASA \mid BSB \mid a \mid b$

$A \rightarrow a$

$B \rightarrow b$

4. Break productions

$S \rightarrow AP_1 \mid BP_2 \mid a \mid b$

$P_1 \rightarrow SA$

$P_2 \rightarrow SB$

$A \rightarrow a$

$B \rightarrow b$.

RESULT

Thus the given grammar is converted into CNF successfully.

20 convert the given grammar to GNF.

S → ABA

A → aA/ε

B → bB/ε.

Aim

To convert given grammer into GNF.

GNF

A → ax or A → a.

PROCEDURE

1. Eliminate ε-production

S, A, B are nullable

S → ABA | AB | BA | AA | A | B

A → aA | b

B → bB | b.

2. Eliminate unit production.

Unit pair	production
(S, S)	S → ABA | AB | BA | AA
(S, A)	S → aA | a.
(S, B)	S → bB | b
(A, A)	A → aA | b
(B, B)	B → bB | b.

Final grammer is

S → AXA/aA/AB/AA/a/BB/b

A → aAa/a

B → bB/b [(A → B) are in CNF.]

a, lemma 1,

sub A → B production in S

S → aAXA/aXA/bBA/bA/AB/aB/aAA/aa/a

A → aAa/b

B → bB/b.

RESULT

Thus, the given grammar is converted into CNF successfully.