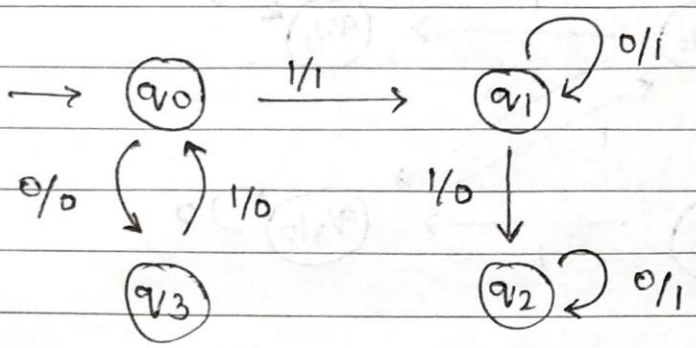
18DCS007
6CSE1

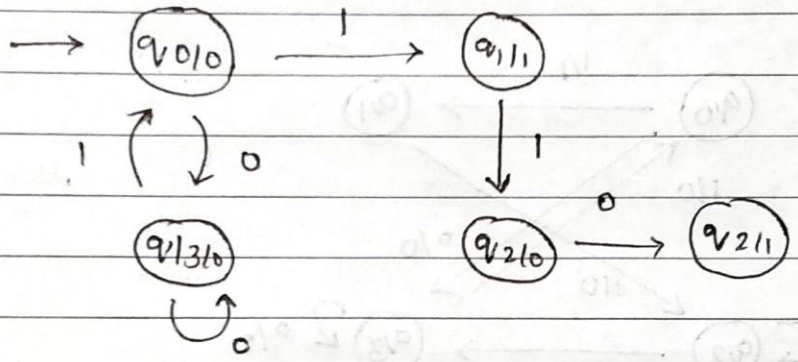
(1) TOC ASSIGNMENT

UNIT - 2

3. Mealey machine according to table :



equivalent moore machine :-



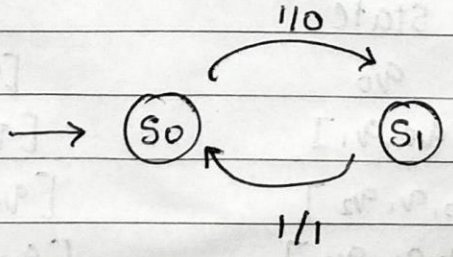
4. Fine set of state S : {S0, S1}

I = {1}

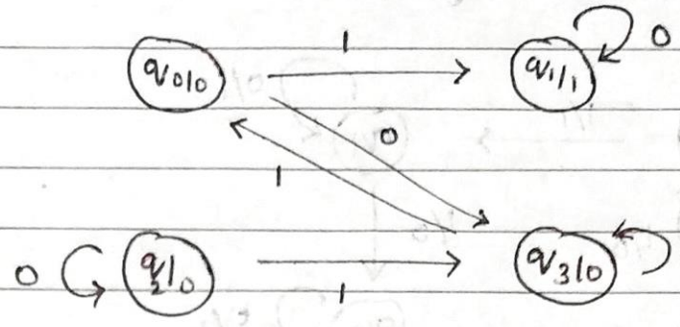
State function is given as : I × S → S

S	I
S0	S1
S1	S0

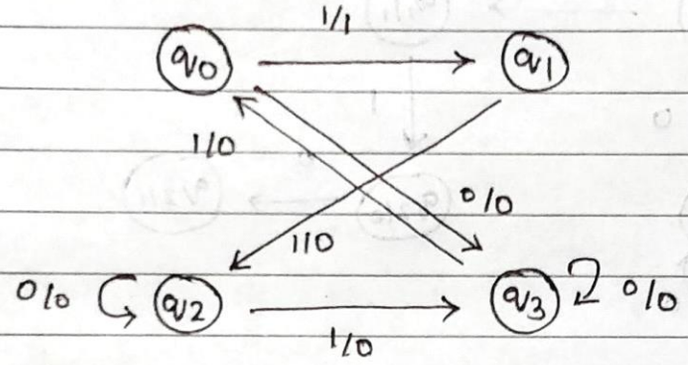
transition diagram



6. Moore Machine



equivalent mealey machine



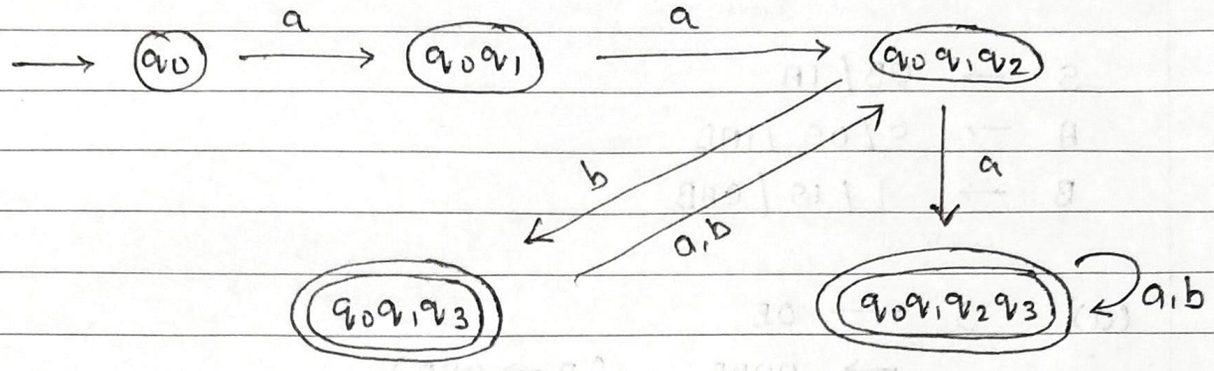
8.

	State	a	b
→	q_0	q_0, q_1	q_0
	q_1	q_2	q_1
	q_2	q_3	q_3
*	q_3	–	q_2

DFA :-

	State	a	b
→	q_0	$[q_0 q_1]$	$[q_0]$
	$[q_0, q_1]$	$[q_0 q_1 q_2]$	$[q_0 q_1]$
	$[q_0, q_1 q_2]$	$[q_0 q_1 q_2 q_3]$	$[q_0 q_1 q_2]$
	$[q_0 q_1 q_2 q_3]$	$[q_0 q_1 q_2 q_3]$	$[q_0 q_1 q_2 q_3]$
	$[q_0 q_1 q_3]$	$[q_0 q_1 q_2]$	$[q_0 q_1 q_2]$

(3)



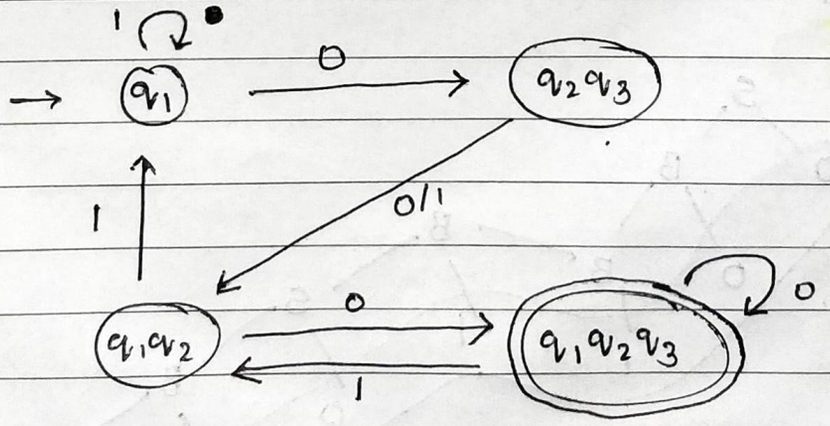
10. NFA Table:

		0	1
	q_1	q_2, q_3	q_1
	q_2	q_1, q_2	–
*	q_3	q_2	q_1, q_2

equivalent DFA:

		0	1
→	q_1	$[q_2q_3]$	$[q_1]$
*	$[q_2q_3]$	$[q_1q_2]$	$[q_1q_2]$
	$[q_1q_2]$	$[q_1q_2q_3]$	$[q_1]$
*	$[q_1q_2q_3]$	$[q_1q_2q_3]$	$[q_1q_2]$

DFA:



(4)

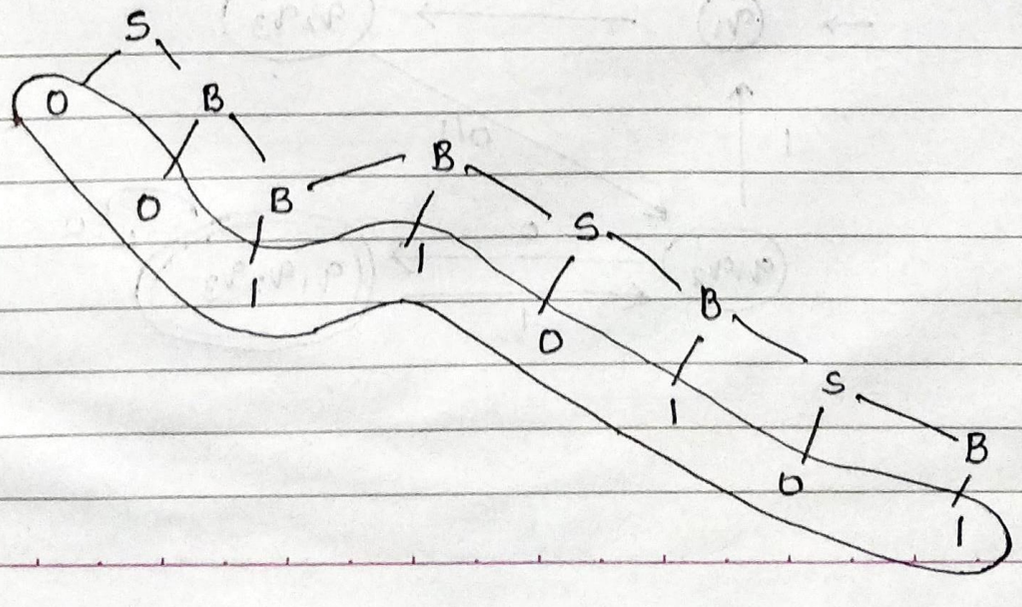
UNIT - 3

1. S → 0B / 1A
   A → 0 / 0S / 1AB
   B → 1 / 1S / 0BB

(a) S → 0B
→ 00BB (B → 0BB)
→ 001B (B → 1)
→ 0011S (B → 1S)
→ 00110B (B → 0B)
→ 001101S (B → 1S)
→ 0011010B (B → 0B)
→ 00110101 (B → 1)

(b) S → 0B
→ 00BB (B → 0BB)
→ 00B1S (B → 1S)
→ 00B10B (S → 0B)
→ 00B101S (B → 1S)
→ 00B10101 (B → 1)
→ 00110101 (B → 1)

(c)

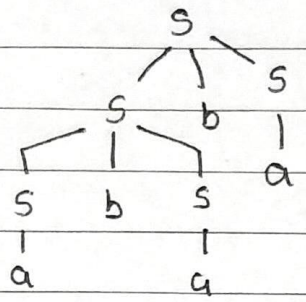


(5)

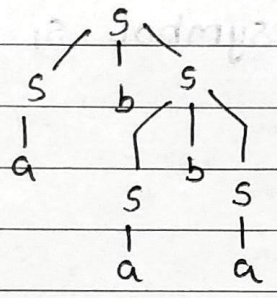
2. let us take $w = ababa$ $S \rightarrow SbS \mid a$

derivation true for string ababa

(I)



(II)



→ as there are two derivation tree for a string ababa, so the G is ambiguous

4. $S \rightarrow AB$
$A \rightarrow a$
$B \rightarrow c/b$
$D \rightarrow E$
$C \rightarrow D$
$E \rightarrow a$

From nulles :

$B \rightarrow C \rightarrow D \rightarrow E \rightarrow A$

$\therefore B \rightarrow a$

$\therefore B \rightarrow a/b$ ($\because$ remove useless production)

∴ grammar will be:

$S \rightarrow AB$

$A \rightarrow a$

$B \rightarrow a/b$

5.

$S \rightarrow aAD$

$A \rightarrow aB/bAB$

$B \rightarrow b$

$D \rightarrow d$

→ creating new start symbol S_1

$S_1 \rightarrow S$

$S \rightarrow aAD$

$A \rightarrow aB/bAB$

$B \rightarrow b$

$D \rightarrow d$

→ removing unit production $S_1 \rightarrow S$

$S_1 \rightarrow xAD$

$S \rightarrow xAD$

$A \rightarrow xB/BAB$

$B \rightarrow b$

$D \rightarrow d$

→ removing terminal from RHS

(7)

$S_1 \rightarrow xy$
$S \rightarrow xy$
$A \rightarrow xb / RB$
$B \rightarrow b$
$D \rightarrow a$
$x \rightarrow y$
$y \rightarrow AD$
$R \rightarrow BA$

→ Now, this G1 is in CNF

6. $S \rightarrow AA/a$
$A \rightarrow SS/b$

Converting to CNF
$S \rightarrow AA/x$
$A \rightarrow SSly$
$x \rightarrow a$
$y \rightarrow b$

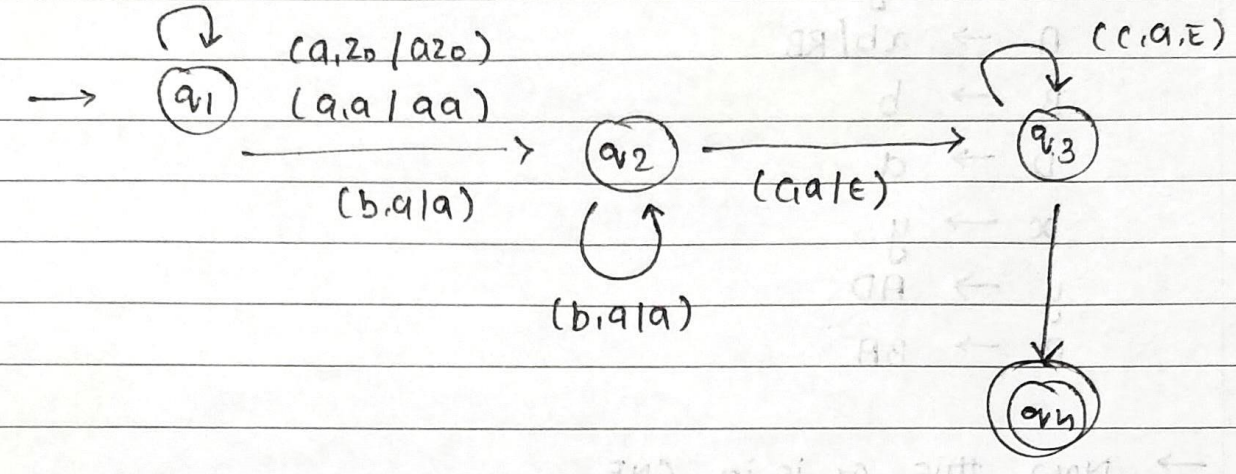
substitute $A \rightarrow SS$: $S \rightarrow AB$
$S \rightarrow ASS/x$
$A \rightarrow SAA/y$
$x \rightarrow a$
$y \rightarrow b$

→ substitute $S \rightarrow x \rightarrow a$ & $A \rightarrow y \rightarrow b$
$S \rightarrow bSS/x$
$A \rightarrow aAA/y$
$x \rightarrow a$
$y \rightarrow b$

→ Now, G is in GNF

UNIT-4

1. PDA : for $L = \{ a^n b^m c^n \mid m,n >= 1 \}$

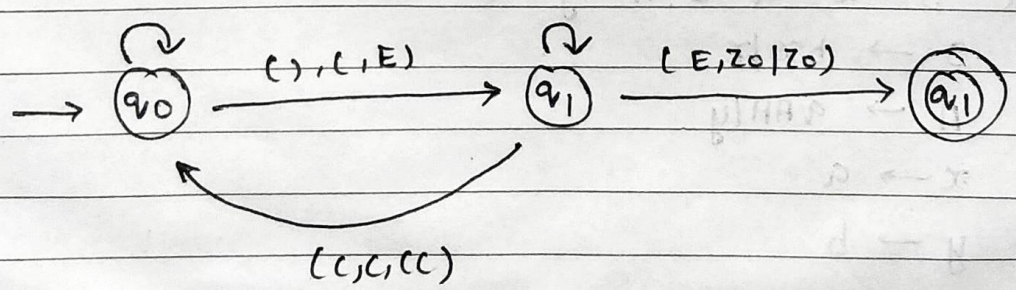


2. PDA for well formed parenthesis:

here the function are

$\delta(q_0, (, Z_0) = (q_0, (Z_0)$
$\delta(q_0, (, () = (q_0, ()$
$\delta(q_1,), () = (q_1, \varepsilon)$
$\delta(q_0, \varepsilon, Z_0) = (q_f, \varepsilon)$

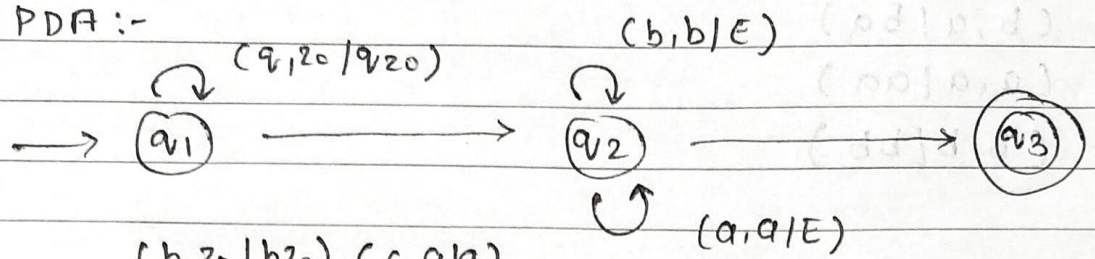
$((, Z_0 / (Z_0) = (), (, E)$
$((, (/ (( )$



(9)

6. wcw^+ / $w \in (a,b)^*$

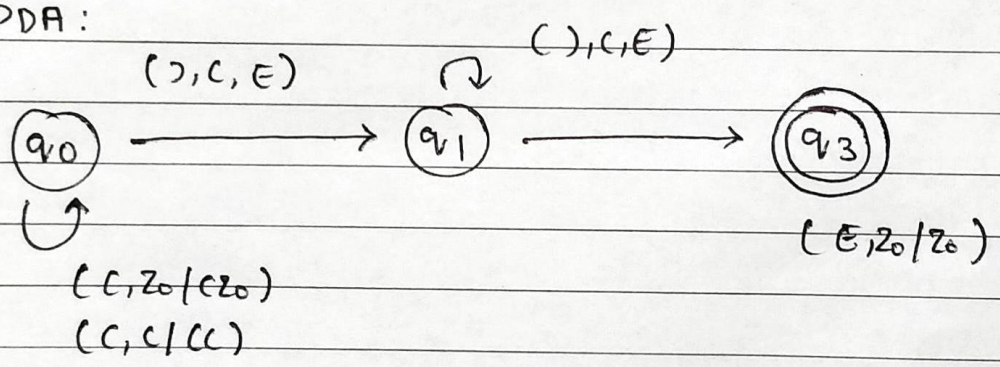
PDA :-



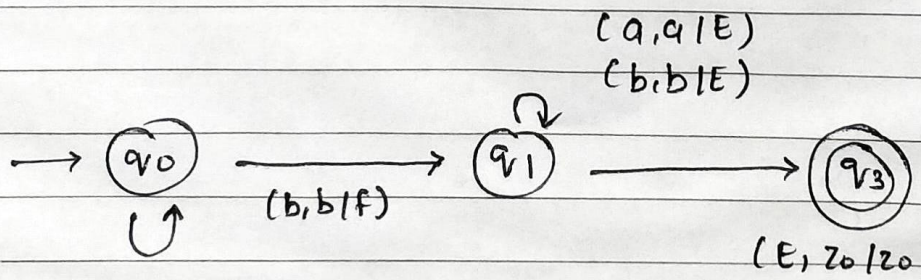
(b,z0/bz0) (c,a/a)
(a,a/aa) (c,b/b)
(b,a/ba)
(a,b/ab)
(b,b/bb)

10. grammar : $S \rightarrow SS \mid (S) \mid ()$

PDA :



7. Construct PDA for even palindrome :-



(10)

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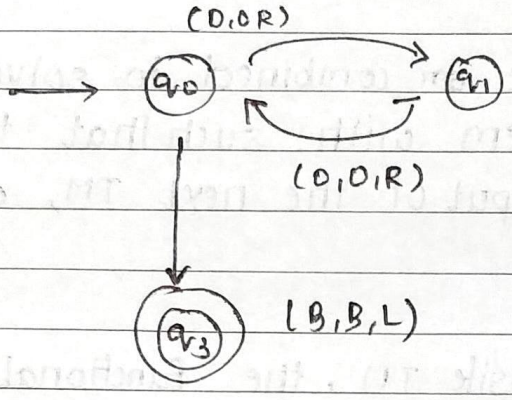
(b, Z0 | bZ0)
(a, Z0 | aZ0)
(a, b | ab)
(b, a | ba)
(a, a | aa)
(b, b | bb)

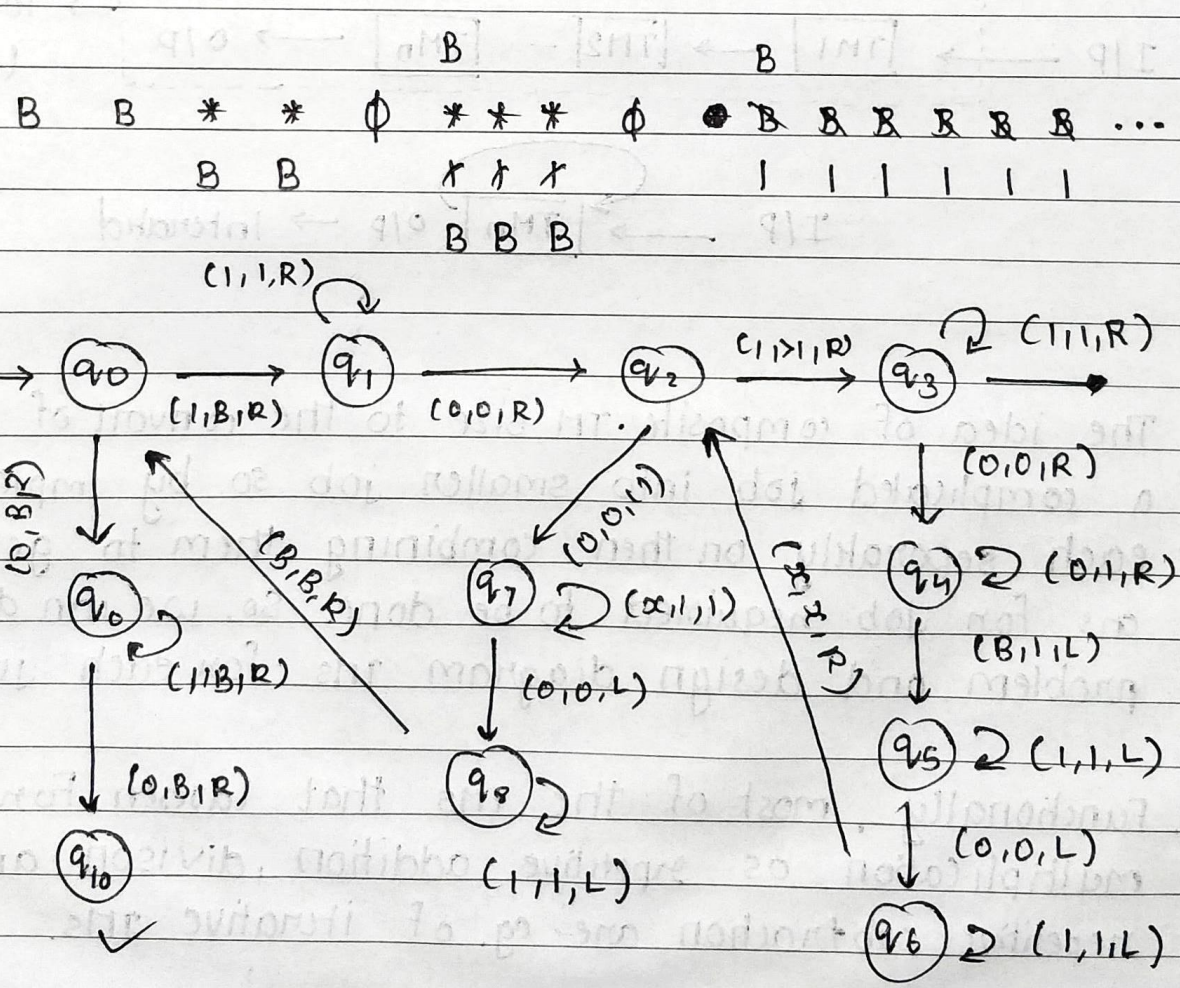
UNIT - 5

1. Construct TM • $L = \{0^{LM} / n \geq 0\}$



2. Construct TM for multiplication let $x = 2$

$y = 3$



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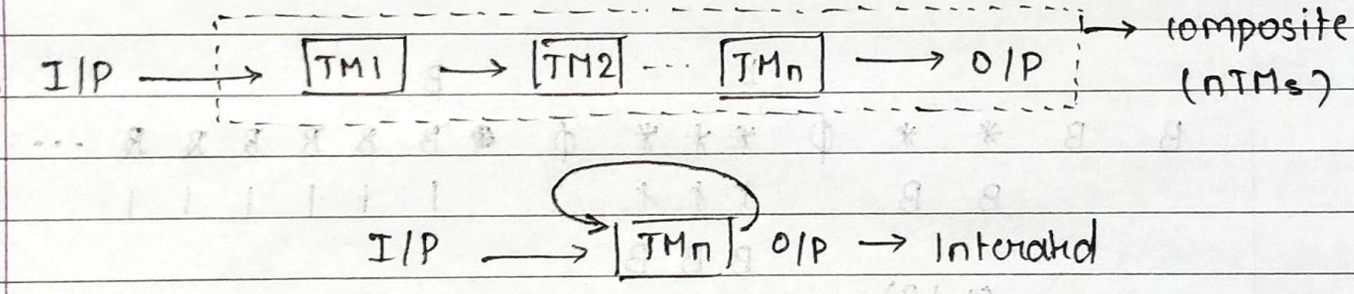
3. COMPOSITE & ITERATED TM :

→ Two or more TM can be ~~or~~ combined to solve & ~~combine~~ complete problem with, such that the o/p of one TM from the input of the next TM, and so on. This is composite.

→ For realizing a composite TM, the functional matrices of the component TMs are combined by re-looking the symbols required and suitably branching to an component TM.



→ The idea of composite TM size to the convert of breaking a complicated job into smaller job so by implementing each separately on then combining them to get the ans for job required to be done. So, we can divide problem and design diagram TMs for each job

→ Functionally, most of the TMs that lavesen. For eg. multiplication os repetitive addition, divison and repetitive subtraction are eg. of iterative TMs.