

new
Sire

'A' Day
cycle-02

10.10.18

Last Class Continuity:

if $x > 1$, then $2^x > x^2$: prove without

$$\frac{2^{x+1}}{2^x} = \frac{2^x \cdot 2}{2^x(1+\frac{1}{2^x})} = \frac{2}{1+\frac{1}{2^x}} > 1 \quad \text{L.H.S}$$

$$\text{R.H.S} = 1.53 \dots$$

$$\text{L.H.S} = \frac{2}{(1+\frac{1}{2^x})(1+\frac{1}{2^x})(1+\frac{1}{2^x})} >$$

প্রমাণ করা হবে যাবে। L.H.S 2 করে যাবে

R.H.S = 1.53 করে যাবে।

So, conclusion is true for the hypothesis being true.

Inductive Proof:

$$\frac{(1+n)(2+n)(3+n)}{6} = (1+n) + \frac{(1+n)(2+n)(1+n)}{6}$$

If $n > 0$,

$$\sum_{i=0}^n i^2 = \frac{n(n+1)(2n+1)}{6}$$

$n=0$,

$$\text{L.H.S } 0 = 0 \quad \text{R.H.S}$$

সমস্ত ক্ষেত্রে সমান হয়।

8/1/2021

Part 'N'

80-31889

Inductive Step:

$$\sum_{i=0}^{n+1} (\cancel{i})^2 i^2 = \frac{(n+1)(n+2)(2(n+1)+1)}{6}$$

$$\frac{(n+1)(n+2)(2n+3)}{6}$$

$$\sum_{i=0}^n i^2 + (n+1)^2 = \frac{(n+1)(n+2)(2n+3)}{6}$$

$$\frac{(n+1)(n+2)(2n+1)}{6} + (n+1)^2 = \frac{(n+1)(n+2)(2n+3)}{6}$$

$$\frac{(1+n)(1+n)n}{6}$$

এটি একটি Proof করা যাই,

Proof by Contradiction!

if H and then not C then Total is False

True	False	False
------	-------	-------

④ Square of even number is even.

$$(2n+1)^2$$

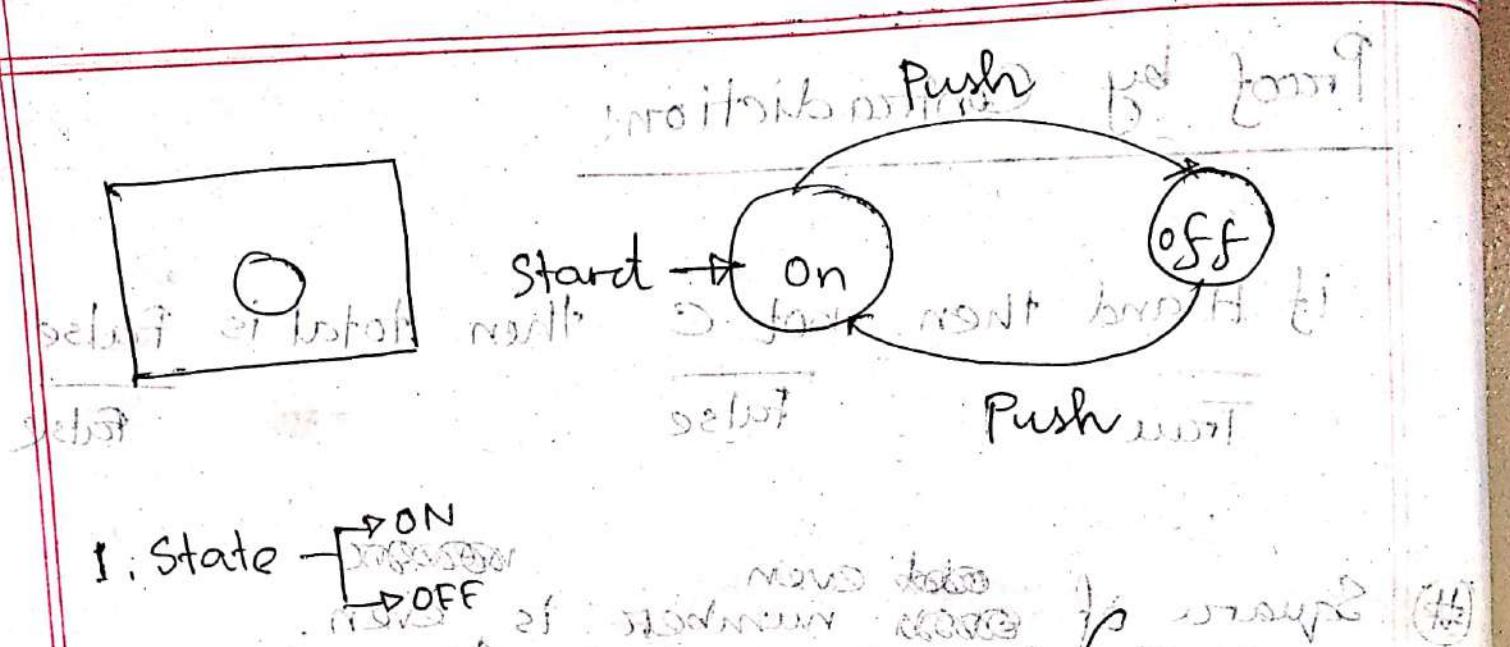
$$= 4n^2 + 4n + 1$$

$$\begin{aligned} &= 2n(2n+2) + 1 \\ &= 2K+1 \end{aligned}$$

So, odd number's square is odd.

So, even number's square is even.

∴ Total is False \therefore (P) is true



2. Transformation of states by input (Finite Automata)

1. Alphabets

Set of Symbols

$$\begin{aligned}
 & \text{set of Alphabets} \\
 & \Sigma = \{0, 1\} \\
 & \text{sigma}
 \end{aligned}$$

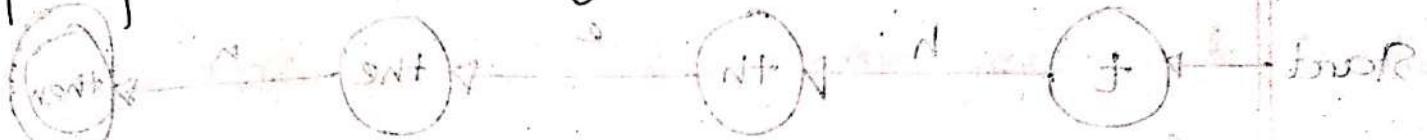
2. String: bba is mapped to bba

0011010100 is a string of length 8.

empty string (ϵ) is a string of length 0.

length (ক্ষেত্রফল অন্তর্গত সার্কুলেট অন্তর্গত সার্কুলেট)

$|011| = 3$ versa length of string segment^2



Language

John Smith

Mr. John ~~W~~right

$$\Sigma^* = \{ \epsilon, 0, 1, 00, 01, 10, 11, \dots \dots \}$$

$\Sigma' = \{0, 1\}$ # language ~~not~~ meaningful

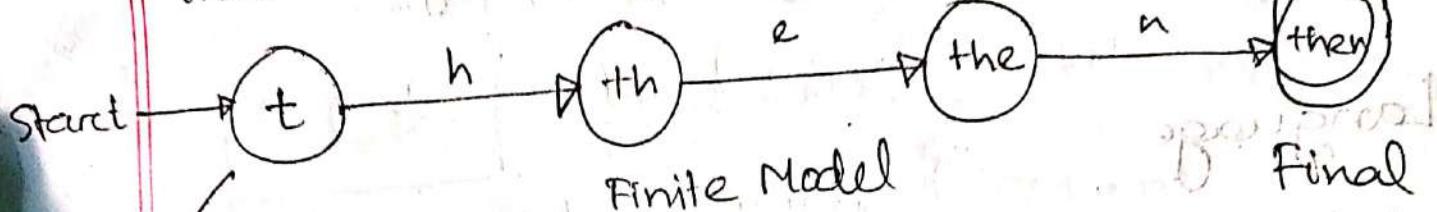
$$\sum^2 = \{10, 11, 00\}$$

$\exists^e \{ e \}$ tuqil.
kutusunus sətir

$$V \in \mathbb{A}^*/\text{torsion} \subset C_0 \otimes \mathbb{Q}^*$$

Sequence Reading

"Then" Detection



4th state $w_{10} \in M$

t
th

the
then

Final State

Double Circle

A
Case 2

aby the then

graph LR; Start(()) -- "Input sequence" --> Q1[Q]; Q1 -- "Initial sequence Read" --> Q2[Q];

1. Set of States, Q

2. Set of Inputs

3. Start Node, q_0 (q0 is Q set's member)

4. Set of Final States (Final State)

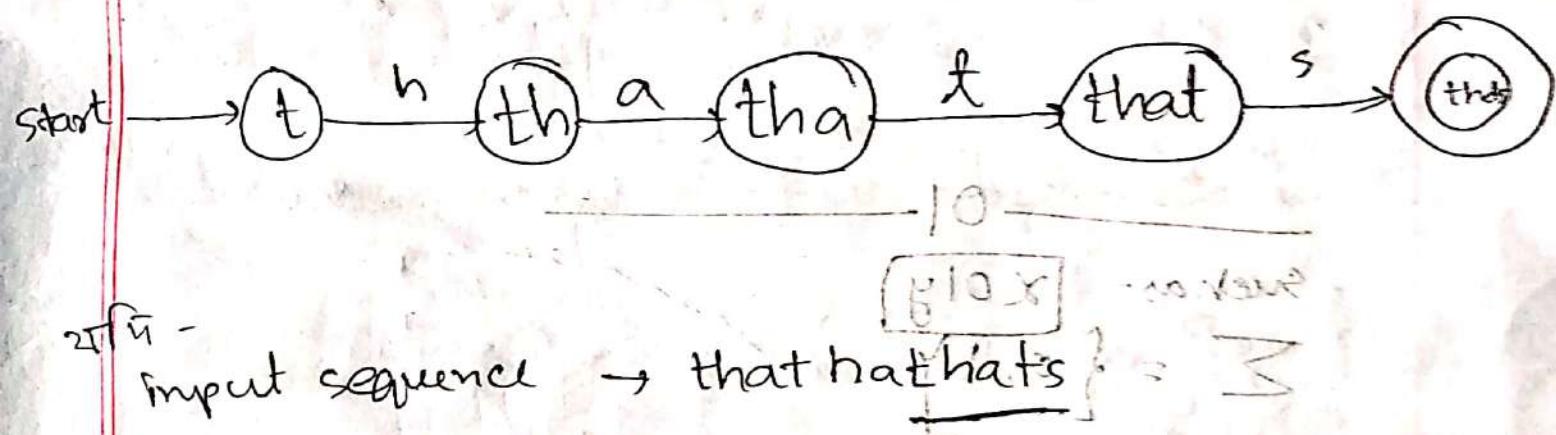
5. Transition function (δ)

Mapping (q0)

- # Transition Function হলু অর্থে $f(q, \alpha)$. Next State
 □ এটা প্রতি একটা ফাংশন। Depends on Recurrent State
 Next State input : initiait = S

To read 'that's' state initiait = P

estate initiait = F



সুন্দর -
 Input sequence \rightarrow that hat that's $\underline{\text{initiait}}$ = 3

কি বা কিন্তু কি কিম্বা কিম্বা ?

এই এটা ধর টা type automata আছে,

- ⇒ Deterministic Finite Automata
 (only state \Rightarrow current state)
- ⇒ Non-deterministic Finite Automata
 (multiple state current state)

(হিসেব আমেরিকান)

Shankar
Sir

'B' Day
Cycle-02

13/10/18

Q = Set of states

Σ = Set of input symbols

δ = Transition function

q_0 = Starting state

F = Final states



01

such as - $x01y$

$\Sigma = \{0, 1\}$

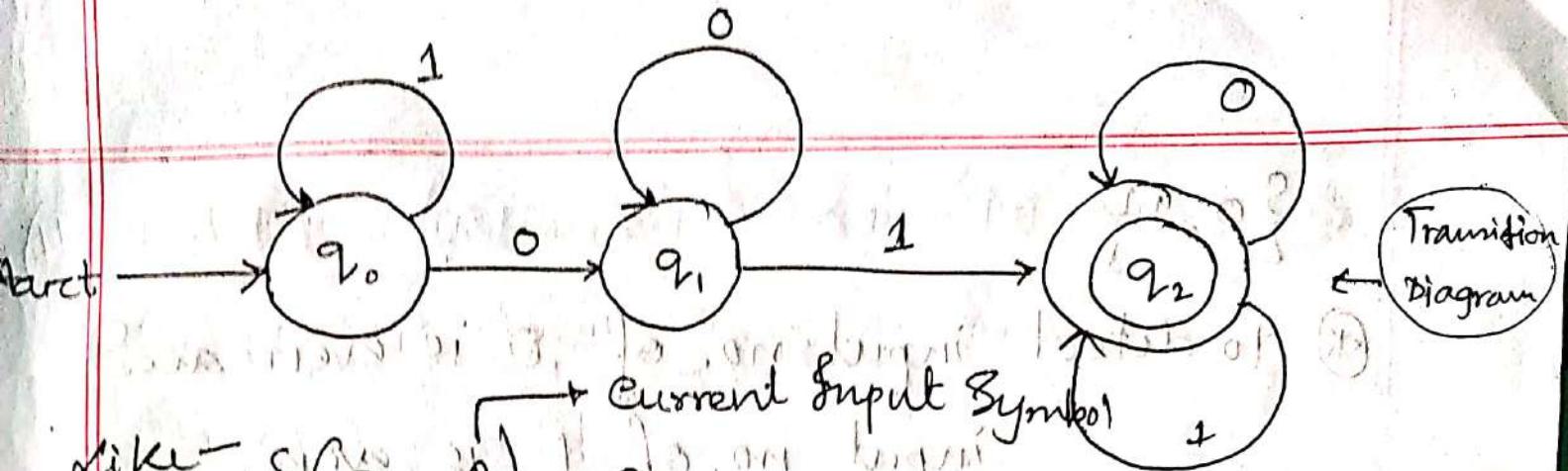
1. 01 Never seen

2. 0 seen, 1 unseen

3. 01 seen

(state becomes 0/010 -> state 0/010
state 0/010 -> final state 0/010
state 0/010 and 0/011).

(concept of 010)



like - $\delta(q_0, 0) = q_1$

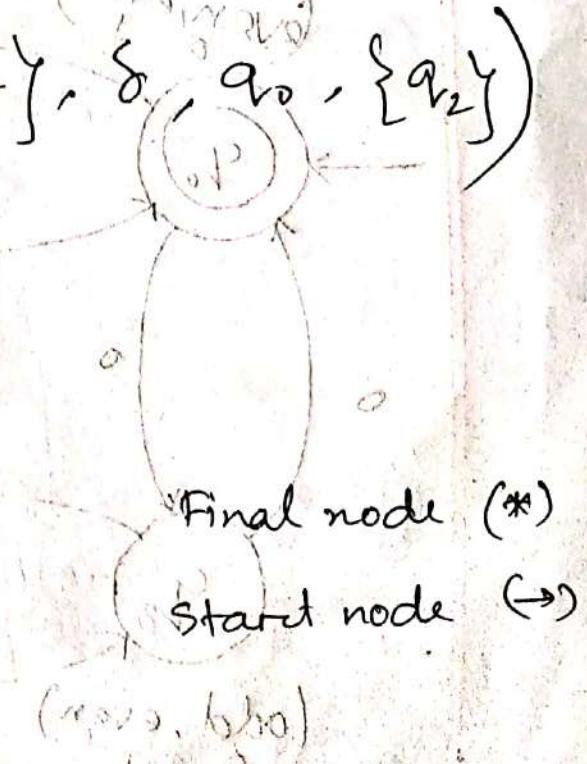
\downarrow
Current State

$$\delta(q_0, 1) = q_2$$

Let, in the name of finite automata be A.

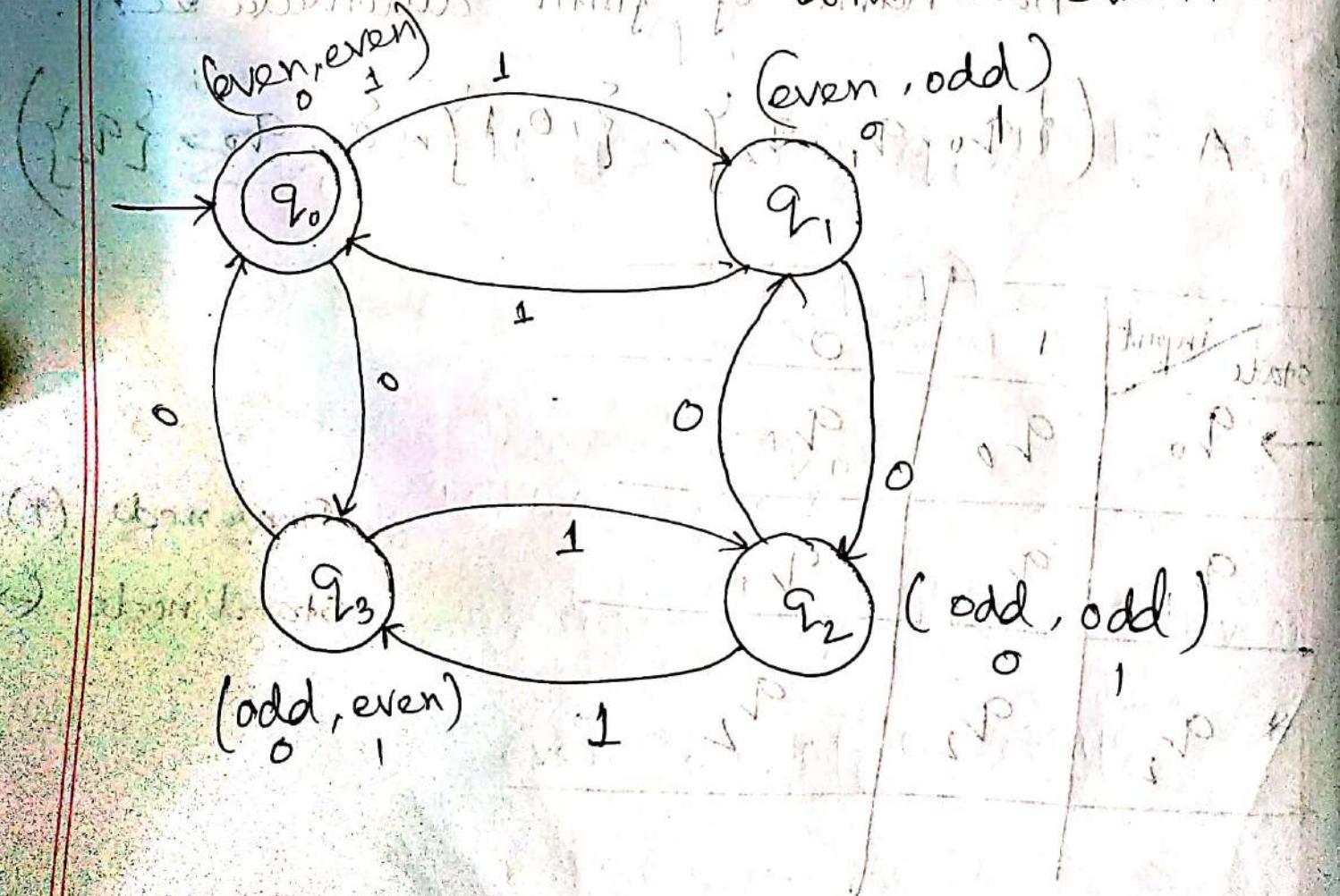
$$A = (Q, \Sigma, \delta, q_0, q_f)$$

state	input	1	0
$\rightarrow q_0$	q_0	q_0	q_1
q_1	q_1	q_2	q_1
* q_2	q_2	q_2	q_2



④ To detect input no. of 0 is even and
input no. of 1 is even.

1. 0 even 1 even { input starting node
2. 0 even 1 odd
3. 0 odd 1 even
4. 0 odd 1 odd { that means 0 no. of 0 and 0 no. of 1. So both are even.



$110110(10\cancel{0}, P) \hat{\delta}) \beta + (1011, P) \hat{\delta}$

starting state ($\neq q_0$) β .

$$\hat{\delta}(q_0, \epsilon) = q_0, P =$$

$$\begin{aligned}\hat{\delta}(q_0, 1) &= \hat{\delta}(\hat{\delta}(q_0, \epsilon), 1) \\ &= \hat{\delta}(q_0, 1) \\ &= \cancel{q_0} q_1\end{aligned}$$

$$\begin{aligned}\hat{\delta}(q_0, 11) &= \hat{\delta}(\hat{\delta}(q_0, 1), 1) \\ &= \hat{\delta}(q_1, 1) \\ &= q_0\end{aligned}$$

$$\hat{\delta}(q_0, 110) = \hat{\delta}(\hat{\delta}(q_0, 11), 0)$$

$$= \hat{\delta}(q_0, 0)$$

$$= q_3$$

$$\hat{\delta}(q_0, 1101) = \delta(\hat{\delta}(q_0, 110), 1) \quad |$$

$$= \delta(q_3, 1) \text{ state B with rate } P$$

$$= q_2 \xrightarrow{P} (\exists, 1)$$

$$\hat{\delta}(q_0, 11010) = \delta(\hat{\delta}(q_0, 1101), 0) \quad |$$

$$= \delta(q_2, 0) \xrightarrow{P}$$

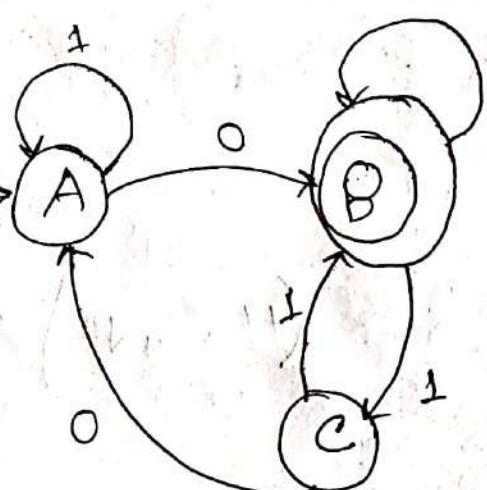
$$\hat{\delta}(q_0, 110101) = \delta(\hat{\delta}(q_0, 11010), 1) \quad |$$

$$= \delta(q_1, 1) \xrightarrow{P}$$

~~$$\hat{\delta}(q_0, 1101010) = \delta(\hat{\delta}(q_0, 110101), 0) \xrightarrow{P}$$~~

So, final node $\hat{\delta}(q_0, 1101010)$ এর মুক্ত স্থানে q_0 আসবে। So, even no. of 1 & even no. of 0 আসবে।

1	0	1
A	B	A
*	B	C
C	A	(B)



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24 25 ②
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Q1. Assume,

$$Q = \{q_0, q_1, q_2\}$$

$$\Sigma = \{0, 1\}$$

$$q_0 = q_0$$

$$f = \{q_2\}$$

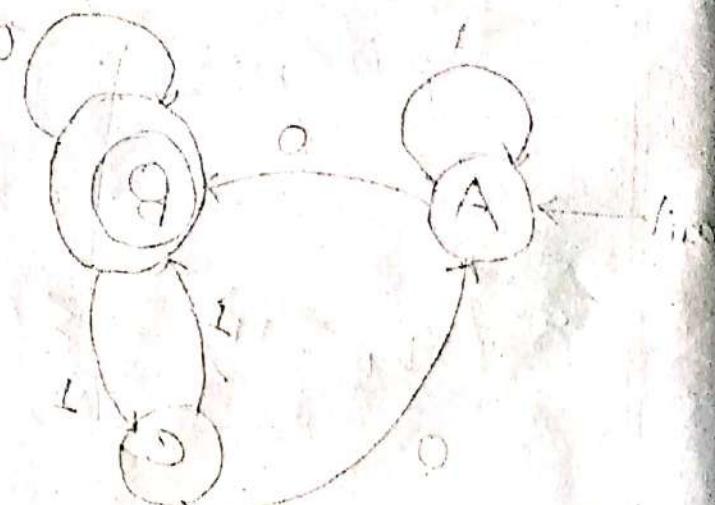
Input:

Transition Table

Output:

① Compute δ

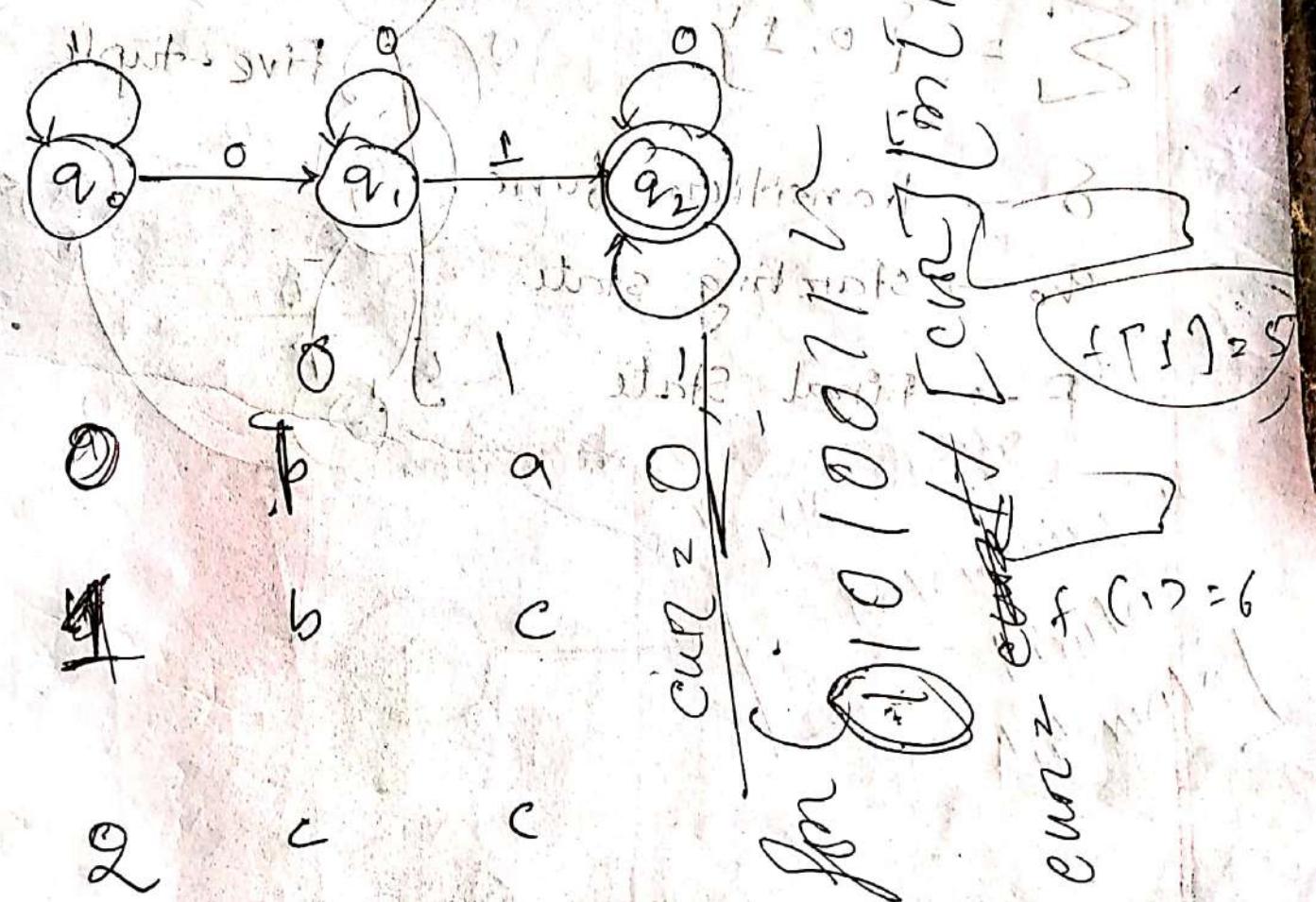
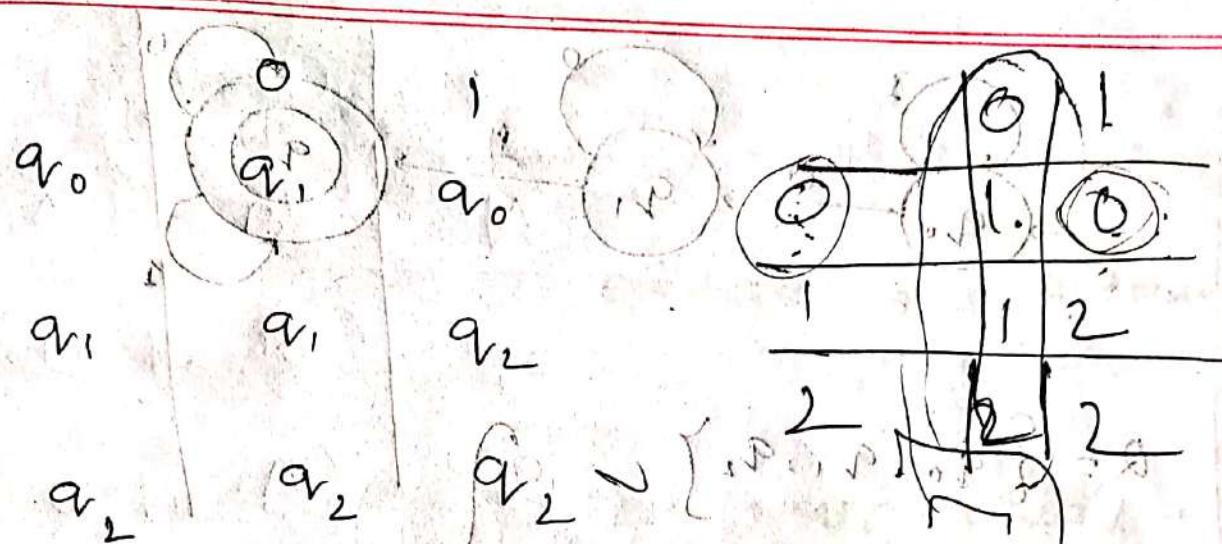
② for any input sequence compute
final state using δ .



Sept. 8, 1988

Unit 3

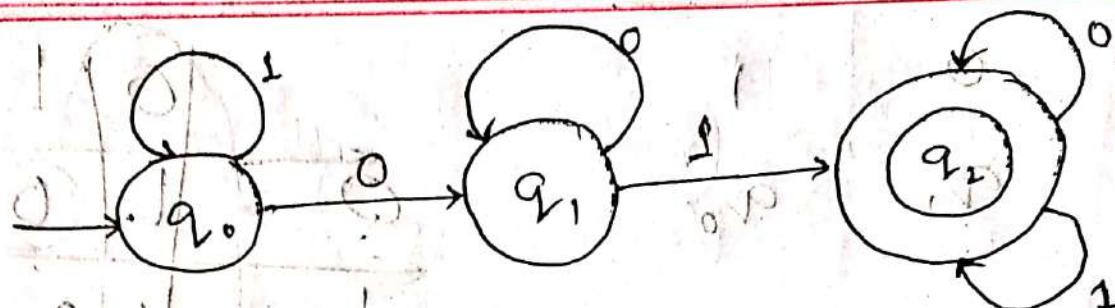
Q = 0.5/300



'E' Day

28.10.18

Cycle-02



$$Q = \{q_0, q_1, q_2\}$$

$$\Sigma = \{0, 1\}$$

δ → transition p func.

q_0 → starting state

F → Final state

Five-tuple



Non-deterministic

(finite) Automata

- * Det. এম্বে কোনো স্টেট একটি নাম স্টেট ও ট্রানিট. করতে পারে।
- * Not det.: মাত্র নিতে পারে / multiple state এ নিতে পারে।

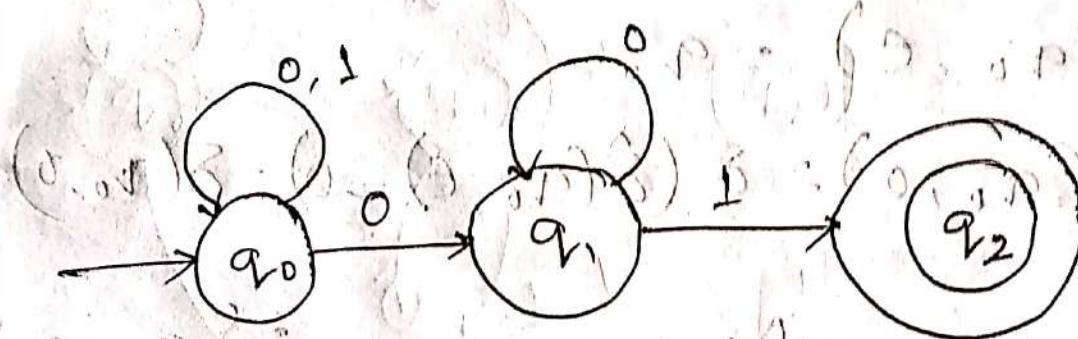
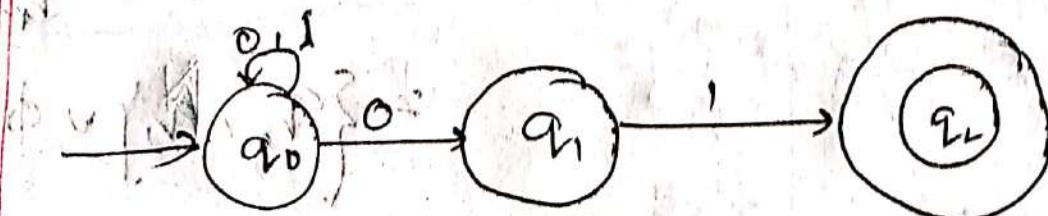


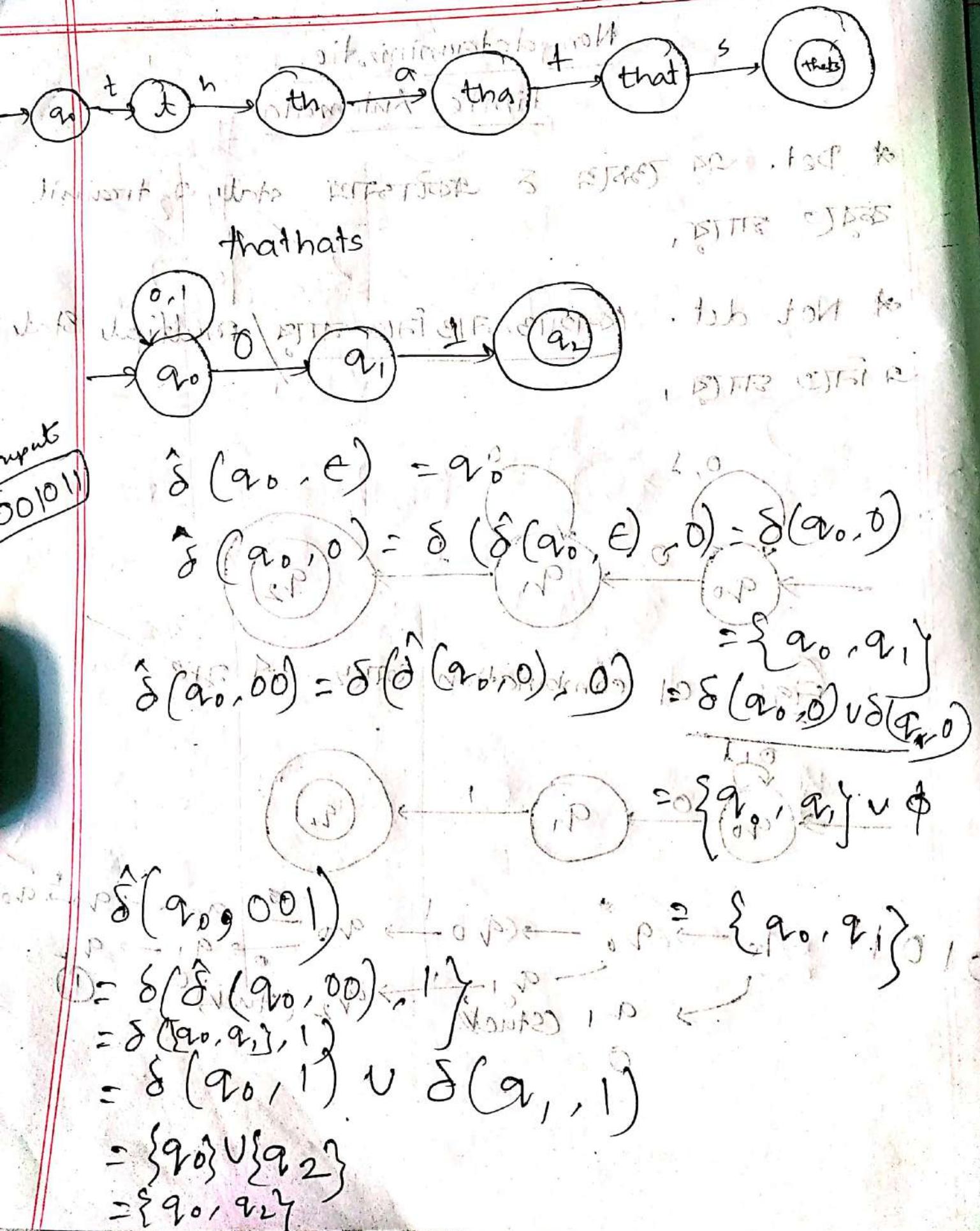
Fig: 20.1 (combination) আর্ক: কি কি?



1. $0\{1\}^* q_0 \rightarrow q_0 \rightarrow q_0 \xrightarrow{1} q_0 \xrightarrow{0} q_0 \xrightarrow{1} q_0 \xrightarrow{0} q_0$

$q_0 \xrightarrow{1} q_1 \xrightarrow{1} q_2 \text{ (stuck)}$ ①

$(1, \rho) 6 \vee (1, \rho)$



$$\begin{aligned}
 \hat{\delta}(q_0, 0010) &= \hat{\delta}'(\hat{\delta}(q_0, 001), 0) \\
 &= \hat{\delta}(\{q_0, q_2\}, 0) \\
 &= \hat{\delta}(q_0, 0) \cup \hat{\delta}(q_2, 0) \\
 &= \{q_0, q_1\} \cup \emptyset \\
 &= \{q_0, q_1\}
 \end{aligned}$$

eldest writing to deepest with arrow (↑)

$$\begin{aligned}
 \hat{\delta}(q_0, 0010) &= \hat{\delta}(\hat{\delta}(q_0, 0010), 1) \\
 &= \hat{\delta}(\{q_0, q_1\}, 1) \\
 &= \hat{\delta}(q_0, 1) \cup \hat{\delta}(q_1, 1) \\
 &= \{q_0\} \cup \{q_1\} \\
 &= \{q_0, q_1\}
 \end{aligned}$$

'A' Day
Cycle - 03

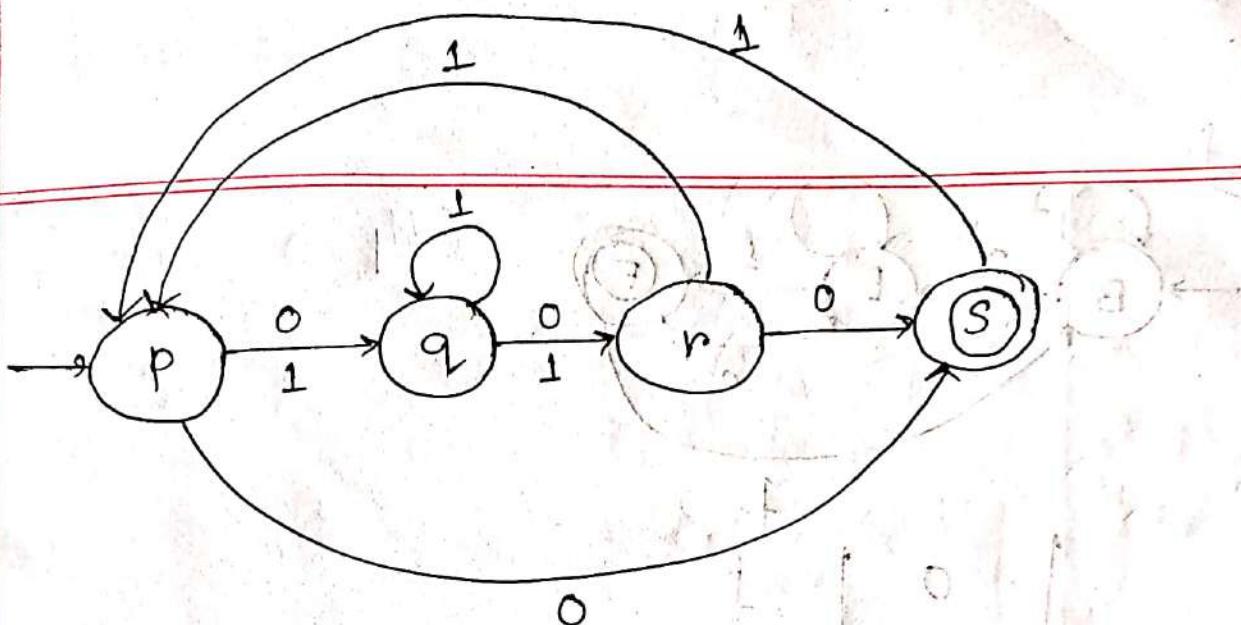
29.10.18



Input status	0	1
q_0	$\{q_0, q_1\}$	q_0
q_1	\emptyset	q_2
* q_2	\emptyset	$(10100 \dots 0)^*$

Draw the graph of given table.

status	0	1
P	$\{q, s\}$	$\{q\}$
q	$\{p, r\}$	$\{q, r\}$
r	$\{s, t\}$	$\{p, t\}$
* s	\emptyset	$\{p\}$

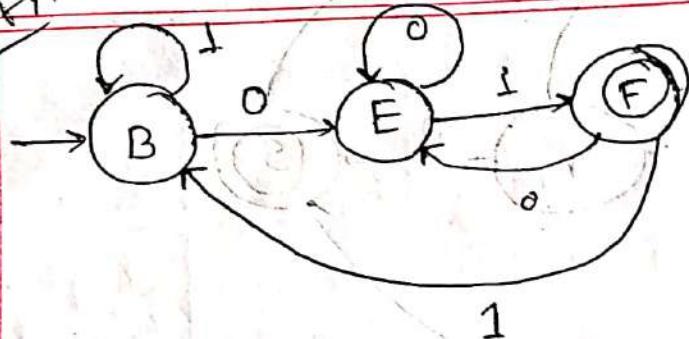


✳ 2^n sequence combination डिट्रॉइट

n = no. of states. For this - such as -

	A	B	C	D
\emptyset	\emptyset	\emptyset	\emptyset	\emptyset
q_0	\emptyset	$\{q_0, q_1\}$	$\{q_0\}$	$\{q_0\}$
q_1	\emptyset	\emptyset	$\{q_1\}$	$\{q_1\}$
$* q_2$	\emptyset	\emptyset	\emptyset	\emptyset
$\{q_0, q_1\}$	E	$\{q_0, q_1\}E$	$\{q_0, q_1\}F$	
$* \{q_0, q_1\}$	F	$\{q_0, q_1\}F$	$\{q_0\}B$	
$* \{q_1, q_2\}$	G	\emptyset	$\{q_2\}D$	
$* \{q_0, q_1, q_2\}$	H	$\{q_0, q_1\}E$	$\{q_0, q_1\}F$	

DFA



1

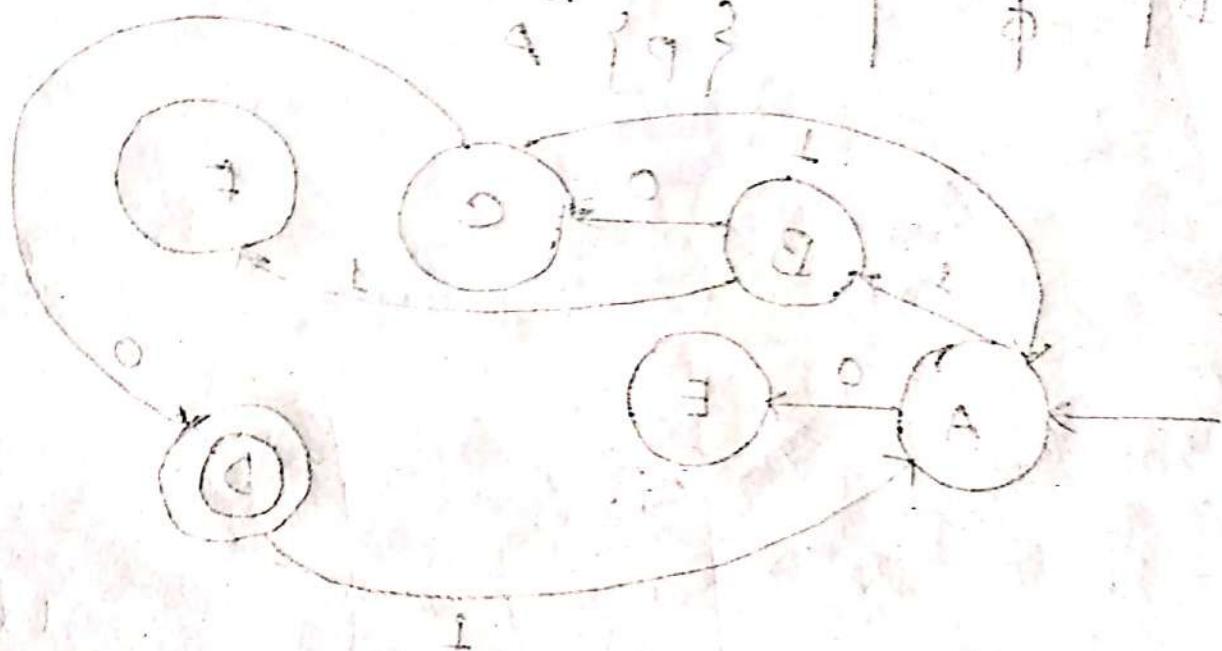
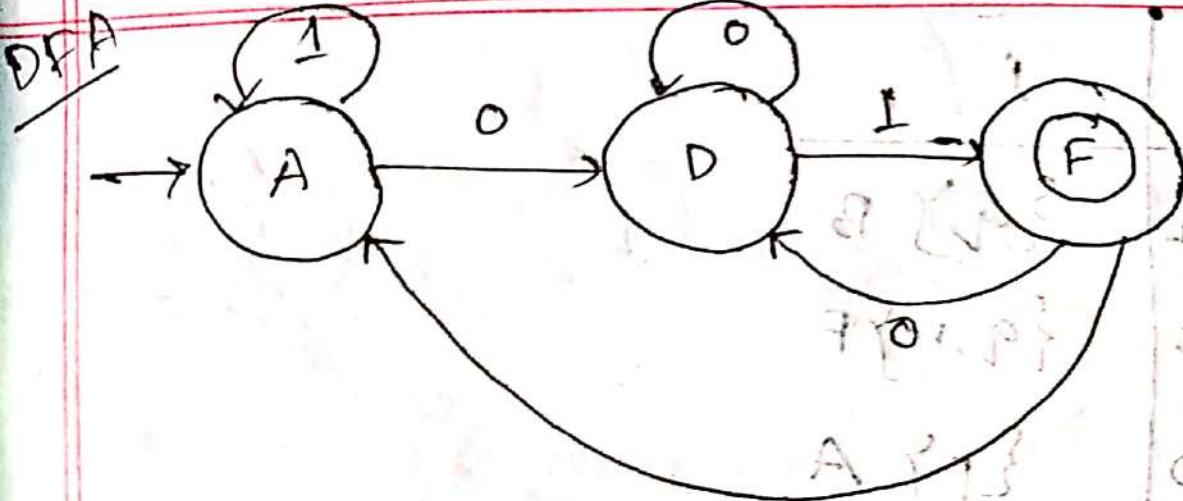
	0	1	
$\{q_0, q_1\}$	$\{q_0, q_1\}$	q_0	q_0
q_1	ϕ	q_2	q_2
q_2	ϕ	ϕ	ϕ
*			

	0	1	
A	D	A	
B	E	C	
C	E	E	
D	D	F	
E	E	E	
*	F	D	A

$$\{q_0, q_2\} = F$$

$$\phi = E$$

$$\{q_0, q_1\} = D$$



~~nakhar~~
Siz

'B' Day
Cycle - 03

30.10.18

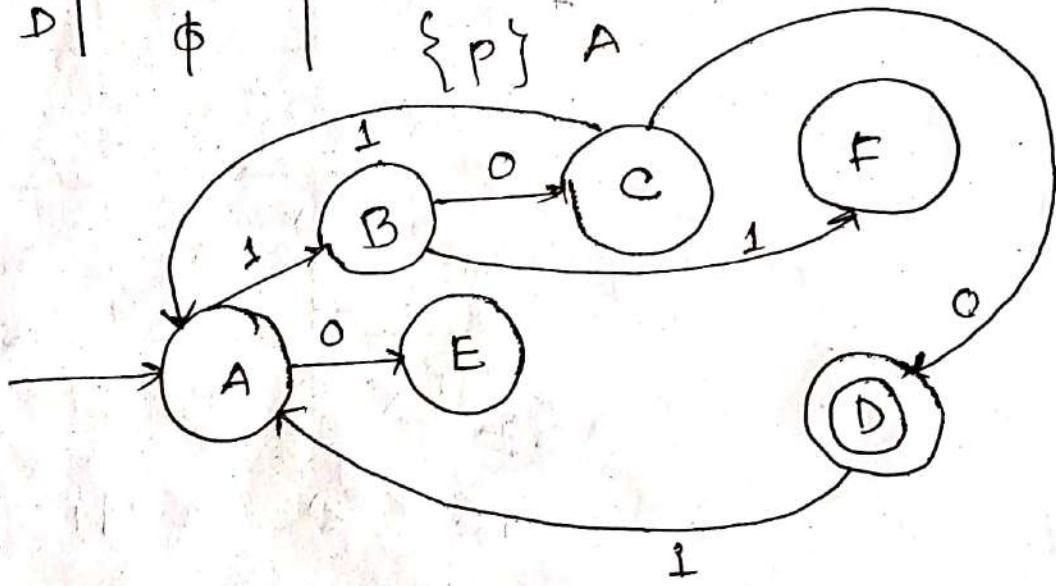
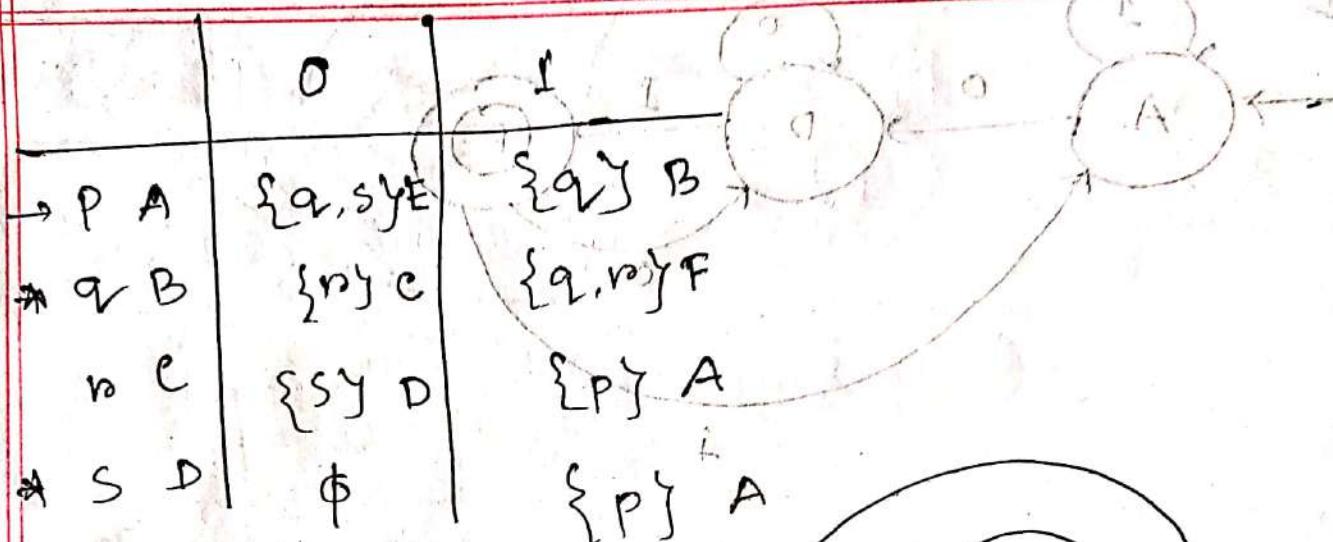


Table showing state transitions between two sets of states.

	0	1
X → A		
B	E	B
C	C	F
D	D	A
	∅	A

	O	I	AM
P	{Q, R, Y, E}	{Q}	B
Q	{B}	{Q, R, Y, F}	M
R	{C}	{P}	positive
S	{D}	{P}	F, P, G, S, S

	O	I	AM
A	E	B	Full ব্যবহার যথৈত্ব
B			
C			
D			
E	C		{P, Q, R, Y, H}
F			
G			
H			

ϵ -NFA

ϵ - empty string (अक्षरात्रे भागी नह)

\emptyset - nothing (अक्षरात्रे भागी)

$Q, \Sigma, \delta, q_0, F$

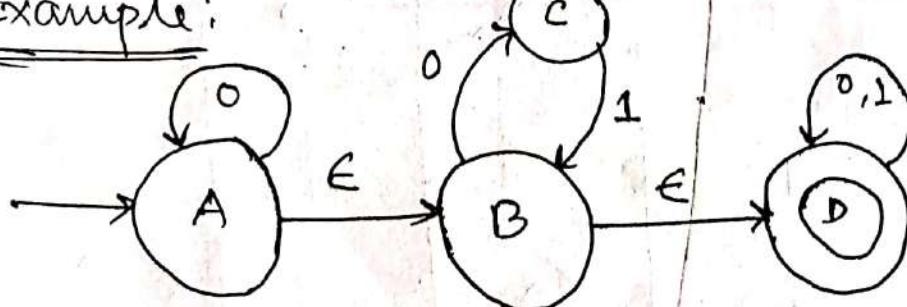
(current state, input)

For DFA $Q \times \Sigma \rightarrow$ next state

NFA $Q \times \Sigma \rightarrow 2^Q$

ϵ -NFA $Q \times \Sigma \cup \{\epsilon\} \rightarrow 2^Q$

Example:

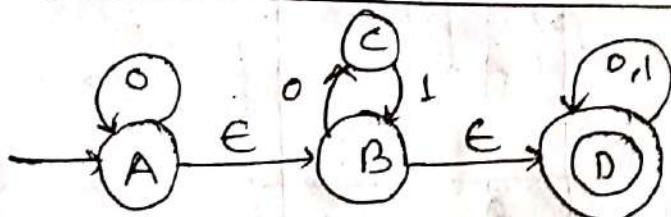


epsilon closure:

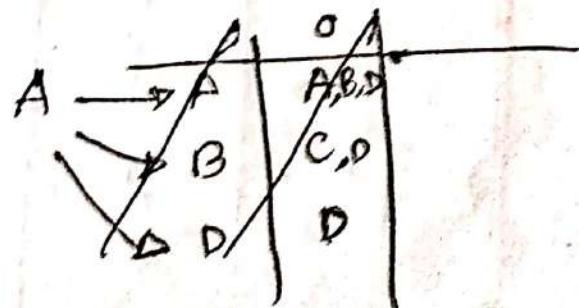
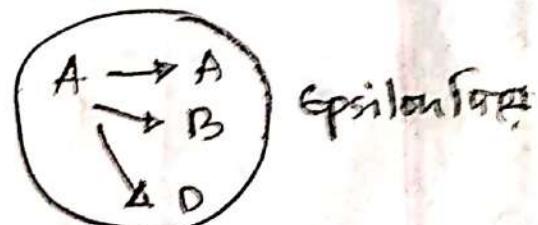
$$\text{Eclose}(A) = \{A, B, D\}$$

- * अब ड्रा \cong NFA कैसे बनाएं NFA, DFA आदि
- * E-NFA \rightarrow NFA convert कैसे करें यहाँ

Conversion of E-NFA \rightarrow NFA:



	0	1
A	A	\emptyset
B	C	\emptyset
C	\emptyset	B
D	D	D

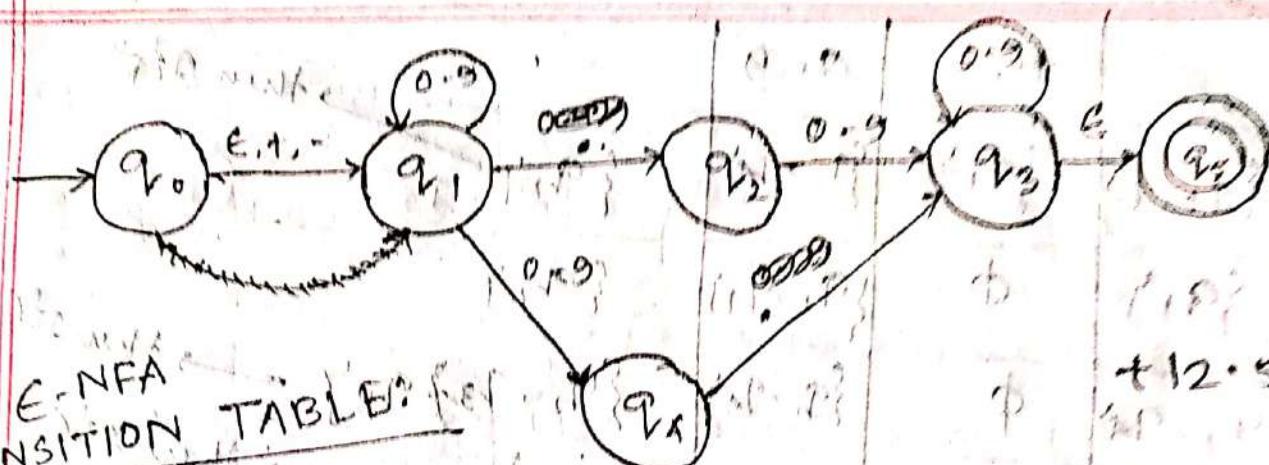


Shrikhand
Sirc

En Date

Cycle. 03

1/11/18



E-NFA
TRANSITION TABLE:

	$+/-$	0.9	ϵ	$\epsilon \neq$
$\rightarrow q_0$	$\{q_1\}$	\emptyset	$\{\emptyset\}$	$\{q_1\}$
q_1	\emptyset	$\{q_1, q_2\}$	$\{q_2\}$	\emptyset
q_2	\emptyset	$\{q_3\}$	\emptyset	$\{q_4\}$
q_3	\emptyset	$\{q_3\}$	\emptyset	$\{q_5\}$
q_4	\emptyset	\emptyset	$\{q_3\}$	\emptyset
* q_5	\emptyset	\emptyset	\emptyset	\emptyset

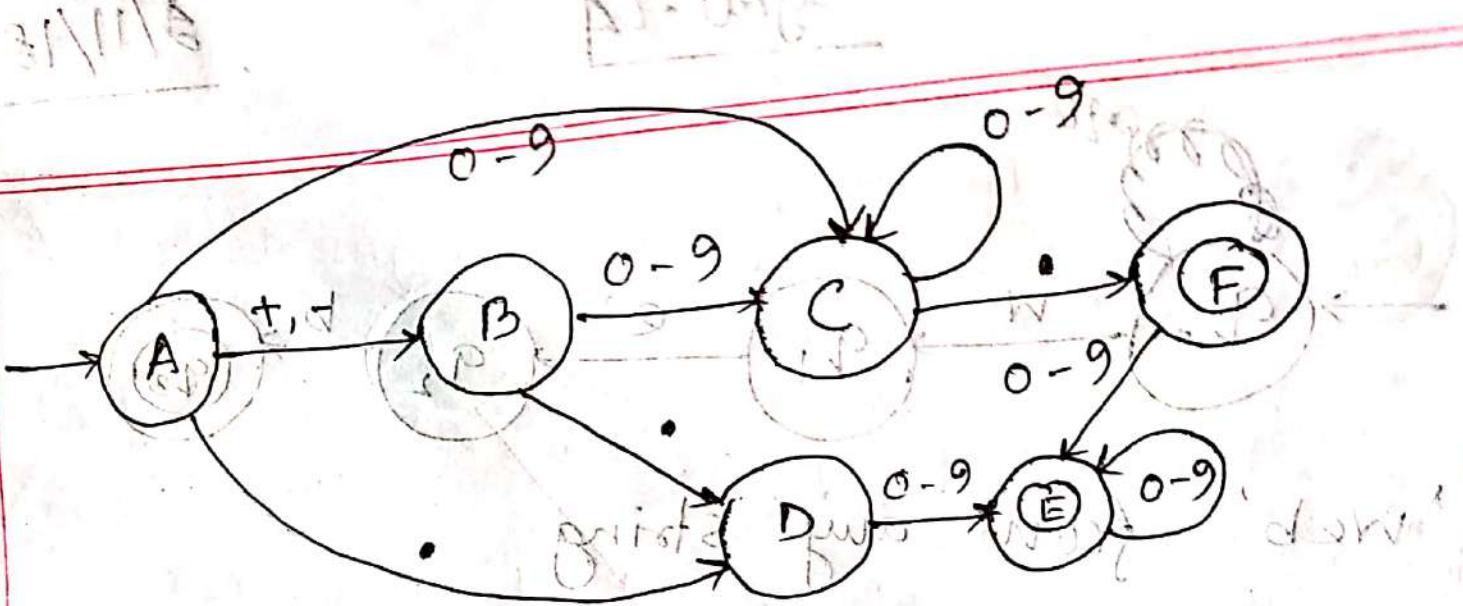
$$\Sigma = \{\epsilon, \cdot, +/-, 0, 9\}$$

E-NFA to DFA:
Art Diagram

2020-2021
Date: 20/10/2020
then 26th

	+,-	0-9	*	P	Q	R	S	T
A	$\{q_0, q_1\}$	$\{q_1\}$	$\{q_1, q_2\}$	$\{q_2\}$	$\{q_2, q_3, q_5\}$	$\{q_3\}$	$\{q_3, q_4\}$	$\{q_4\}$
B	$\{q_1\}$	\emptyset	$\{q_1, q_4\}$	$\{q_2\}$	$\{q_2, q_3, q_5\}$	$\{q_3\}$	$\{q_3, q_4\}$	$\{q_4\}$
C	$\{q_1, q_4\}$	\emptyset	$\{q_1, q_4\}$	$\{q_2\}$	$\{q_2, q_3, q_5\}$	$\{q_3\}$	$\{q_3, q_4\}$	$\{q_4\}$
D	$\{q_{12}\}$	\emptyset	$\{q_3, q_5\}$	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset
q_5	$\{q_2, q_3, q_5\}$	\emptyset	$\{q_3, q_5\}$	\emptyset	\emptyset	\emptyset	$\{q_3, P\}$	$\{P\}$
E	$\{q_3, q_5\}$	\emptyset	$\{q_3, q_5\}$	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset
F	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset
G	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset
H	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset
I	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset
J	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset
K	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset
L	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset
M	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset
N	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset
O	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset
P	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset
Q	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset
R	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset
S	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset
T	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset
U	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset
V	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset
W	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset
X	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset
Y	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset
Z	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset	\emptyset
Now Remaining:								
	+,-	0-9	*	P	Q	R	S	T
A								
B								
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D								
E								
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X								
Y								
Z								

Ending State	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
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C																				
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(কোনো state) (মকে কুকুরীয়ালী এ পিল্লে যেতো
 (কুকুরীয়া)

State A মাত্র যায়, তাহা এবং closure

o result H {T}

থেমনি: $q_0 \text{ to } q_1, - q_3 \text{ to } q_5$

বাসেক বাই গুরু বাস H {T}

বাস বাই নুর নুর বাস বাই গুরু {T}

বাস বাই নুর

(1+45) 233 , 02

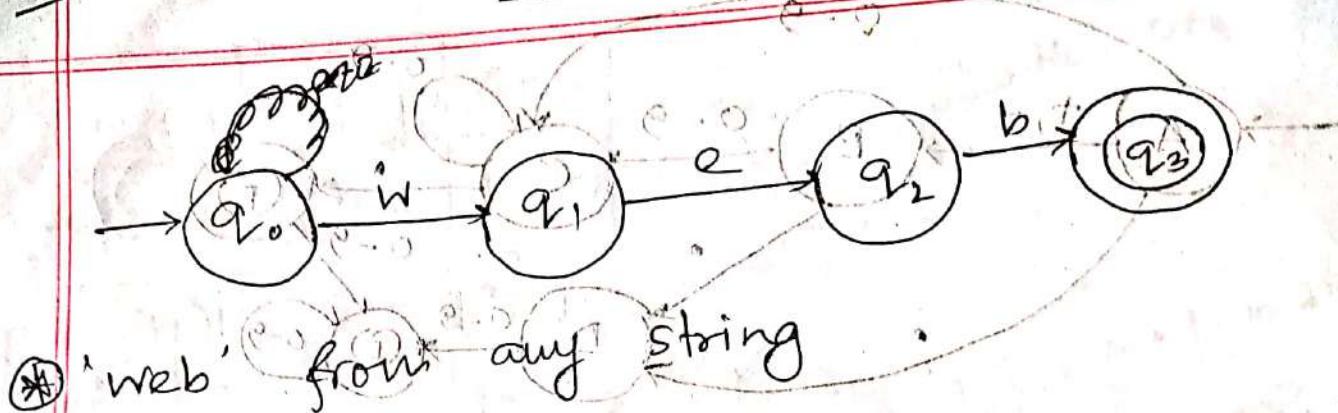
1 + 1.45. 8 + 45 (N) : 233 , 02

1 6 N A B 6 N A
 1 B (1 S + 2 4 S) C

Snehal
Sir

'A' Day
Cycle - 04

5/11/18



Proof by Contradiction: (1st class notes) H
revision

If H, then C

If H and not C lead falsehood

(*) If n^2 is even, then n is even,

but,

n is not even

$$\text{so, } n = (2k+1)$$

$$\text{Now, } n^2 = (2k)^2 + 2 \cdot 2k \cdot 1 + 1$$

$$= 4k^2 + 4k + 1$$

$$= 2(2k^2 + 2k) + 1$$

If n^2 is even, n is odd. \therefore is always false

So,

from contradiction we can say

'If n^2 is even, n is even'

CT-OI
num.

Syllabus

Chap-1

Art 1'1, 1'2, 1'5

Chap-2

Art 2'2, 2'2'1, 2'2'2, 2'2'3, 2'2'4 Example 2'4

Art 2'3, 2'3'1, 2'3'2, 2'3'3, 2'3'4, 2'3'5,

2'4'2, 2'5, 2'5'1 - 2'5'5

Shekhar
Sirc

'B' Day
cycle - 04

6/11/18

Regular Expression

$$L = \{001, 01, 111\}$$

$$M = \{\epsilon, 01\}$$

1) Union Operator

$$L \cup M = \{\epsilon, 001, 01, 111\}$$

Intersection

$$L \cap M = \{01\}$$

2) Concatenation

$$L \cdot M = \{001, 01, 111, 00101, 01011101\}$$

3) Closure Operator

Let,

$$L = \{0, 11\}$$

$$L^0 = \{\epsilon\}$$

$$L^1 = \{0, 11\}$$

$$L^2 = \{00, 011, 110, 1111\}$$

$$L^3 = \{000, 0110, 0011, \dots\}$$

$$L^* = L^0 \cup L^1 \cup L^2 \cup L^3 \cup \dots \cup L^n$$

Basis

$$\epsilon \in \{\phi\}$$

যে কোনো symbol'র Regular Expression

$$L(\epsilon) = \{\epsilon\}$$

$$L(\phi) = \phi$$

$$L(0) = \{0\}$$

$$L(0^*) = \{\epsilon, 0, 00, 000, \dots\}$$

④ L এর টেক্সু আ লিখ সেট Bold/italic

ক্ষেত্রে দিত হবে,

STATEMENT -

$L \cup M = L + M \rightarrow$ Union

$L \cdot M = LM \rightarrow$ Concatenation

$a^* e = \{e, a, aa, aaa, \dots\} \{e\}$

$= \{e, ae, aae, aaaa, \dots\}$

$(01)^* = \{e, 01, 0101, 010101, \dots\}$

* Coding of Regular Expression Website -

www.regular-expressions.info

Sample of JavaScript Code:

`var x = /a* e/;` → True

`x.test(".....ae....")`

False
Return

$\uparrow ae \downarrow \rightarrow$ string not exact case
at string exact case

$y = a+1$

$a=1$
 $y=5$

* एवं मासि द्युक्षला अधिकारी त्रिकोणी Symbol

शृणु शान्ति,

LAB-02
'C' Day
Cycle-04

18/11/18

for ($i = 0$; $i < \infty$; $i++$)

$j = 0$

{ if ($i == 0$)

{ if ($\text{regx}[0] == \text{input}[0]$)

{ continue;

else if ($\text{regx}[i] == '*'$)

while ($j == \text{a}[i-1]$)

{
 $j++$;
}

}

else if ($\text{regx}[i] != \text{input}[j]$
 & $i != 0$)

{

if ($\text{regx}[i] == \text{input}[j]$)

{
 $j++$;
 continue;
}

else
{ break; }

Regular Expression:

1) Union

2) Concatenation

3) Closure/Star/ Kleene closure

 $L = \{001, 11, 01\} \rightarrow \text{language}$ $M = \{\epsilon, 01\}$ $L \cup M = \{001, 11, 01, \epsilon\}$ $L \cdot M = \{001, 11, 01, 00101, 1101, 0101\}$ $L^* \quad L^\circ = \{\epsilon\}$ $L^1 = \{001, 11, 01\}$ $L^2 = \{001001, 00111, \dots\}$ $\Rightarrow L^* = L^\circ \cup L^1 \cup L^2 \cup L^3 \cup \dots$ \rightarrow General regular language

(Minimised)

(Minimal) until

খেয়াল Algebraic form এ লিখুন

LUM হবে $L + M$

Like $0 + 1$ is $\{0\} \cup \{1\}$

L.M হবে LM

যেমন: কাথার 01 প্রাকলে $\{0\}, \{1\}$ ~~concatenation~~

0^* প্রাকলে $\rightarrow = \{ \epsilon, 0, 00, 000, \dots \}$

$0^0 = \{\epsilon\}$ - যাবু $0^1 \rightarrow = \{1, 01, 001, 0001, \dots \}$

Precedence

Precedence of these operators:

Suppose - $0^* 1 + 1^* 0$ যাতে { 0 , 1 } কাবু কৃত যোগ

ক্ষেত্র 1: Precedence

1) Star (Kleen closure) \leftarrow যবাব আছে

2) Dot (Catenation)

3) Plus (Union) \leftarrow যবাব আছে

like -

$$0^* 1 + 1^* 0$$

$$\begin{aligned} & \{ \epsilon, 0, 00, \dots \} \cup \{ \epsilon, 1, 11, \dots \} \\ & = \{ 1, 01, 001, \dots \} + \{ 0, 10, 110, \dots \} \end{aligned}$$

यदि हमारा अन्ये Option एवं नाम एकत्र
पाइ-

$$(01)^* + (10)^* + 1(01)^* + 0(10)^*$$

० दिये

शुरू

१ दिये

अंत

१ दिये

शुरू

० दिये

अंत

० दिये

शुरू

१ दिये

अंत

$$\{ \epsilon, 01, 0101, \dots \} + \{ \epsilon, 101010, \dots \}$$

$$+ \{ 1, 101, 10101, \dots \} + \{ 0, 010, 01010, \dots \}$$

$$(01)^* 0$$

'B' Day
cycle-05

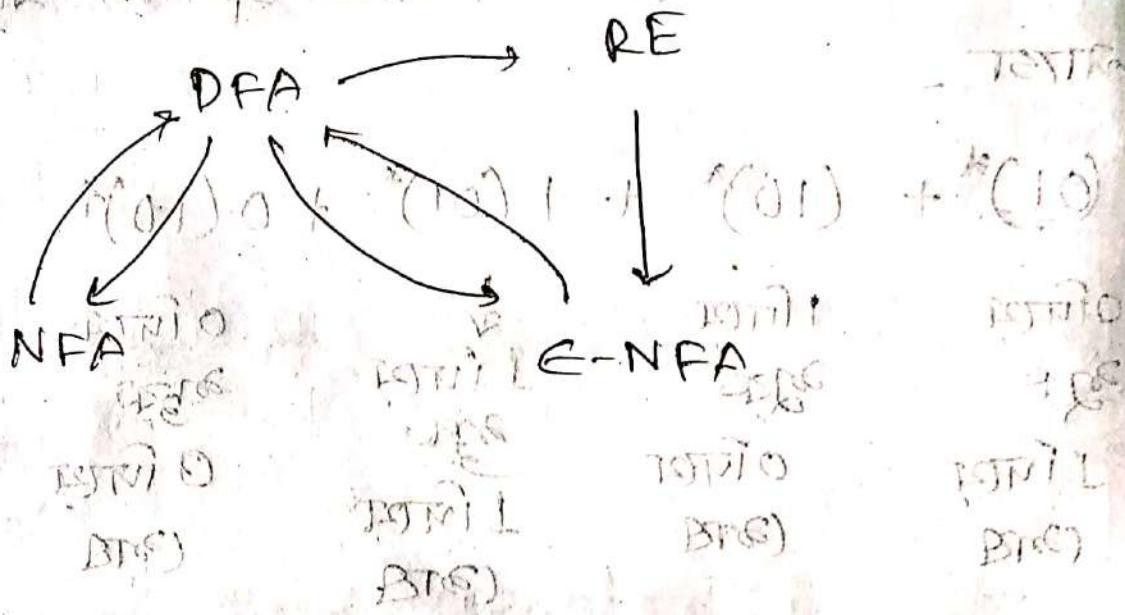
14/11/18

$$(1+0)^* 1$$

$$0^* 1 + 1^* 0$$

$$(\{1, 0\}^*)^* 1$$

$$\begin{aligned} &= (\{\epsilon, 1, 11, 111, \dots, 10^k, \dots\})^* 1 \\ &\quad \cup \{1, 11, 111, 1111, \dots\} \cup \{1, 01, 001, 0001, \dots\} \end{aligned}$$

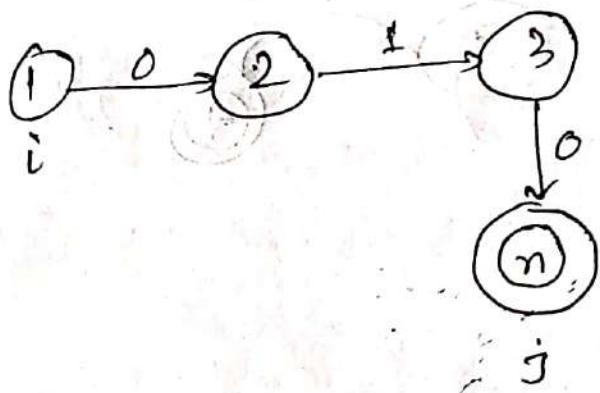


L

Let,

$L(A) = \{\text{Language of DFA}\} \cap \{0, 1, 0, 1, 0, 1, \dots\}$

$L(R) = \{0, 1, 0, 1, 0, 1, \dots\} \cap \text{RE}$

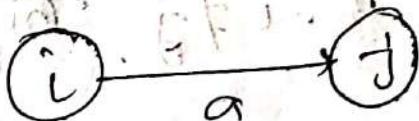


R_{ij}

মনে রাখি $n = k$, যদি $i \neq j$ এবং $i \neq n$ এবং $j \neq n$ এবং i ও j এর মধ্যে অবস্থান করে আছে। তাহলে $i \rightarrow j$ এর max. air state লাগতেব। যা মিসেসী হলো step তা লিমে $i \rightarrow j$ এর। যা $i \rightarrow j$ এর

one i ও j same হব। যেখানে (হলো Path) হব,

1. No path
 $R_{ij} = \emptyset$. (Directly কোনো Path নাই, So এটা পাসেন)



2. Only path

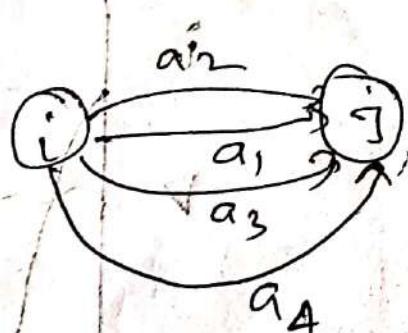
$$R_{ij}^{(a)} = a$$

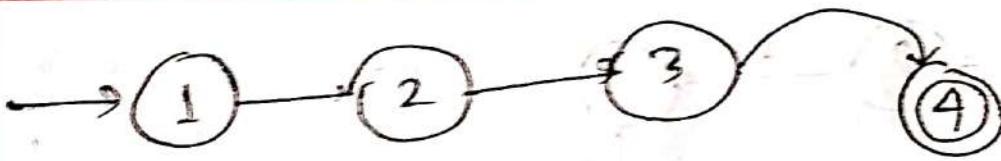
একটা Path থাকে

3. a_1 or a_2 or a_3 or a_4

That means.

$$R_{ij} = a_1 + a_2 + a_3 + a_4$$





$k=4 \rightarrow R_{ij}^{(3)}$

$k=3 \rightarrow R_{ij}^{(2)}$

$k=2 \rightarrow R_{ij}^{(1)}$

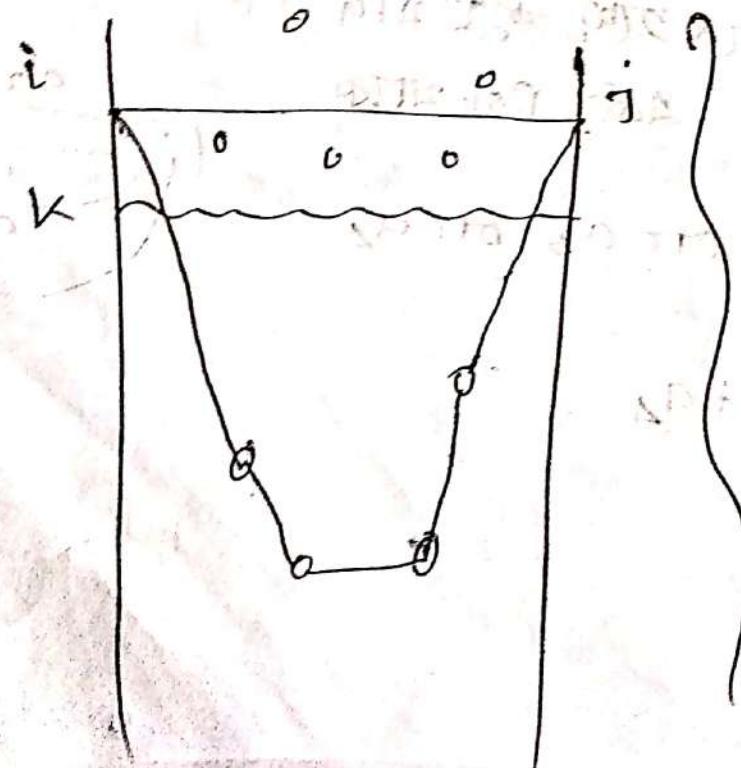
$k=1 \rightarrow R_{ij}^{(0)}$

Directly যাওয়া মাত্র-

1. Direct path

2. $i=j$

3. $i \neq j$ হলে আগের পুর্ণাব বিন্দু Condition

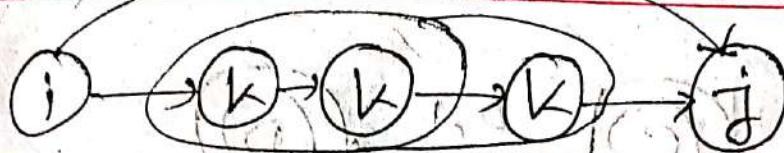


k হতে $(k+1)$

বর্তমান Value State

Use করতে পারব

AT, 10



प्रत्येक बारे 3 का प्रकरण Repeat 270 बार

$$1) \text{ Direct } R_{ij}^{(k)} = R_{ij}^{(k-1)}$$

2) Many

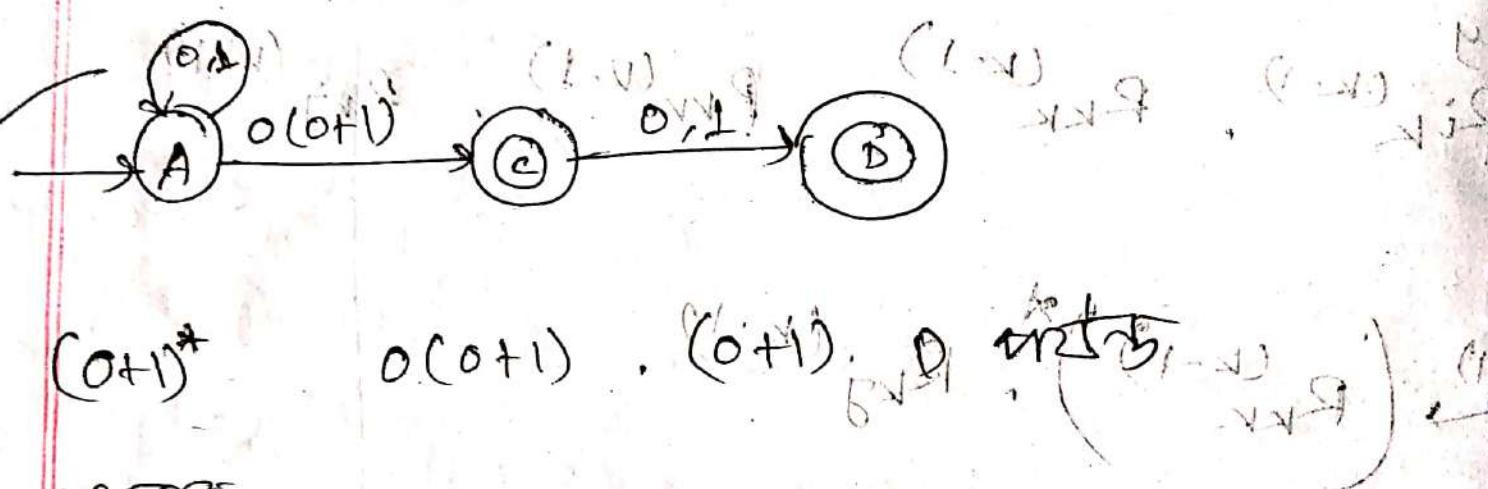
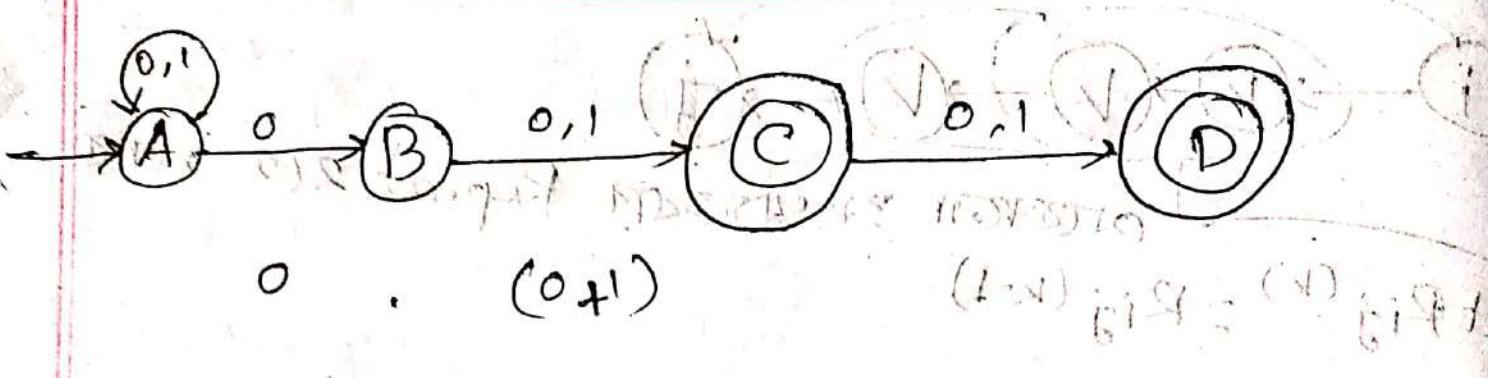
$$R_{ij} = R_{ik}^{(k-1)} \cdot R_{kk}^{(k-1)} \cdot R_{kj}^{(k-1)}$$

$$R_{ik}^{(k-1)} \rightarrow \left(R_{kk}^{(k-1)} \right)^* \cdot R_{kj}^{(k-1)} \quad (1+0) \quad (1+0)$$

So,

$$R_{ij}^{(k)} = R_{ij}^{(k-1)} + R_{ik}^{(k-1)} \cdot \left(R_{kk}^{(k-1)} \right)^* \cdot \left(R_{kj}^{(k-1)} \right)$$

Article theorem - 3.4



विवरण,

$$(0+1)^* \cdot 0(0+1) \cdot (0+1) \cdot 0 \cdot (0+1)$$

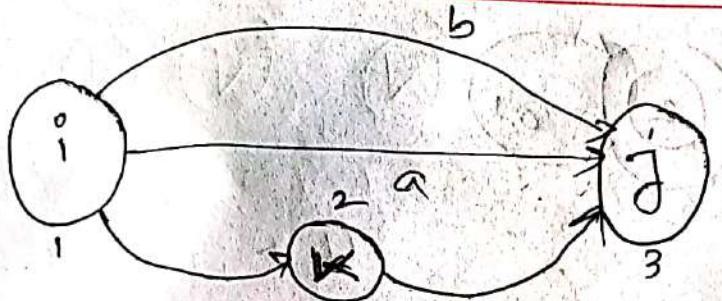
Thus, total Result

$$= (0+1)^* \cdot 0(0+1) + (0+1)^* \cdot 0(0+1) \cdot (0+1)$$

shakhar
sirc

'B' Day
cycle - 06

24/11/18



$$R_{ij} = \phi \quad (\text{Single Path नाही})$$

$$R_{ij} = a \quad (\text{One Path येते})$$

$$R_{ij} = a+b \quad (\text{Multiple Path})$$

म्हणून, i to j direct ना आहे क हस्त माझी?

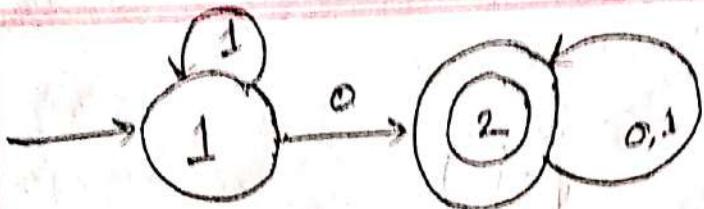
$$R_{ij}^{(k)} = R_{ij} + R_{ik} R_{kk}^* R_{kj}$$

Actually -

$$R_{ij}^{(k)} = R_{ij}^{(k-1)} + R_{ik}^{(k-1)} (R_{kk}^{(k-1)})^* R_{kj}^{(k-1)}$$

Why $(k-1)$ why not k ?

⇒ कायं कि k पर्याप्त नाही



But, $k=0$

Possibility -

$R_{11}^{(0)}$	$\epsilon + 1$	$(\text{if } R_{11}^{(0)} = \epsilon)$	$\rho = 0.79$
$R_{12}^{(0)}$	0	$(\text{if } R_{12}^{(0)} = 0)$	$\rho = 0.79$
$R_{21}^{(0)}$	ϕ	$(\text{if } R_{21}^{(0)} = \phi)$	$\rho = 0.79$
$R_{22}^{(0)}$	$\epsilon + 1 + \phi$		

For $k=1$ From formula $R_{ij}^{(1)} = R_{ij}^{(0)} + R_{ik}^{(0)}$ $(R_{kj}^{(0)}) R_{ij}^{(0)}$

$R_{11}^{(1)}$	$(\epsilon + 1) + (\epsilon + 1) (\epsilon + 1)^* (\epsilon + 1)$ $= 1^* 0$
$R_{12}^{(1)}$	$0 + (\epsilon + 1) (\epsilon + 1)^* 0$ $= 1^* 0$
$R_{21}^{(1)}$	$\phi + \phi \cdot (\epsilon + 1)^* (\epsilon + 1)$ $= \phi$
$R_{22}^{(1)}$	$(\epsilon + 0 + 1) + \phi \cdot (\epsilon + 1)^* 0$ $= (\epsilon + 0 + 1) + \phi = \epsilon + 0 + 1$

Note:

सेमी प्रॉजेक्ट

SAT(25) ϕ १२५

२७२ Result २७० ϕ .

like, १०३०

$$R \cdot \phi = \phi$$

But,

$$R + \phi = R$$

Example - 3.5 (H.W) → (MUST)

For $k=2$,

$$R_{ij}^{(2)} = R_{ij}^{(1)} + R_{ik}^{(1)} (R_{kk}^{(1)})^* \cdot R_{kj}^{(1)}$$

$R_{11}^{(2)}$	$1^* + (1^* 0) \cdot (\epsilon + o + 1)^* \cdot \phi = 1^*$
$R_{12}^{(2)}$	$1^* 0 + (1^* 0) \cdot (\epsilon + o + 1)^* \cdot (\epsilon + o + 1)$
$R_{21}^{(2)}$	$\phi + (\epsilon + o + 1) \cdot (\epsilon + o + 1)^* \cdot \phi = \phi$
$R_{22}^{(2)}$	$(\epsilon + o + 1) + (\epsilon + o + 1) \cdot (\epsilon + o + 1)^* \cdot (\epsilon + o + 1)$

$$R_{11}^{(2)} \Leftrightarrow i=1, j=1 \\ \text{with respect to } k=2 \\ \text{with respect to } k=2, k=2 \\ \text{with respect to } k=2, j=1$$

$$R_{21}^{(2)} \Leftrightarrow i=2, j=1 \\ \text{with respect to } k=2 \\ \text{with respect to } k=2, k=2 \\ \text{with respect to } k=2, j=1$$

$$R_{12}^{(2)} \text{ and } i=1, j=2 \\ i=1, k=2 \\ k=k=2 \\ k=2, j=2$$

$$R_{22}^{(2)} \Leftrightarrow i=2, j=2 \\ i=2, k=2 \\ k=2, k=2 \\ k=2, j=2$$

Shankar SVM

(TAB) 0338 - shq 25/11/18

e, 1, 0

1. int \cdot $(\text{int})^{(\text{int})}$ $= \text{big} = (\text{big})$

1,0,11

6

$$L = \phi^{-1}(1+O(\epsilon))^{-1} \left(\frac{1}{\epsilon} \right) + O(L)$$

$$(1+0.1)^3 = 1.331$$

$$\phi = \phi_{m=1}, (150^\circ) + \phi$$

~~(110) 12. M⁽¹⁰¹¹⁾, 10100, 11111, 11100, 10011, 100100~~

Entferni Elemente von L:

see \sqrt{t}

1. 1. 1. 1.

Capillo

-1 → break

Enter elements of M:

S-1, S-1

卷之三

\rightarrow break

- * Union
- * Concatenation
- * Closure

$\{x_1, x_2\}$

C. V. S.

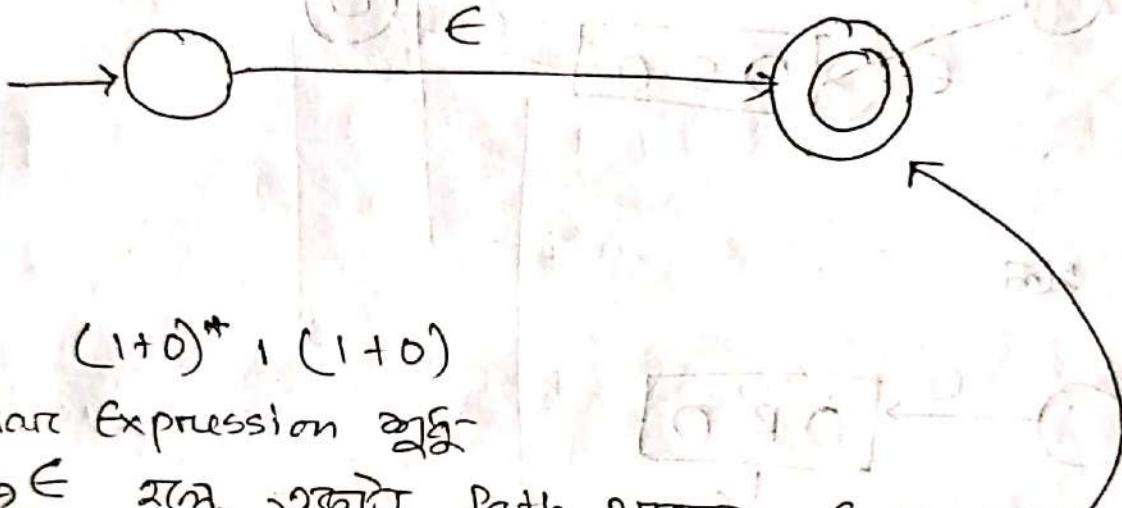
L'ESPRESSO

nathar
Sirc

E Day
Cycle-06

27/11/18

Regular Expression to E-NFA:



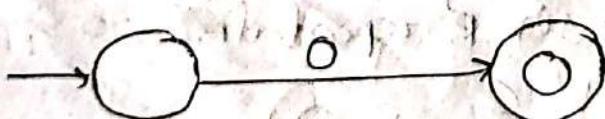
$$(1+0)^* 1 (1+0)$$

Regular Expression છે -

$\hookrightarrow \epsilon$ રેન્ડ એકો Path માટે એ અનુભવ



0 રેન્ડ -



Let એક symbol R 3 s યોજે -

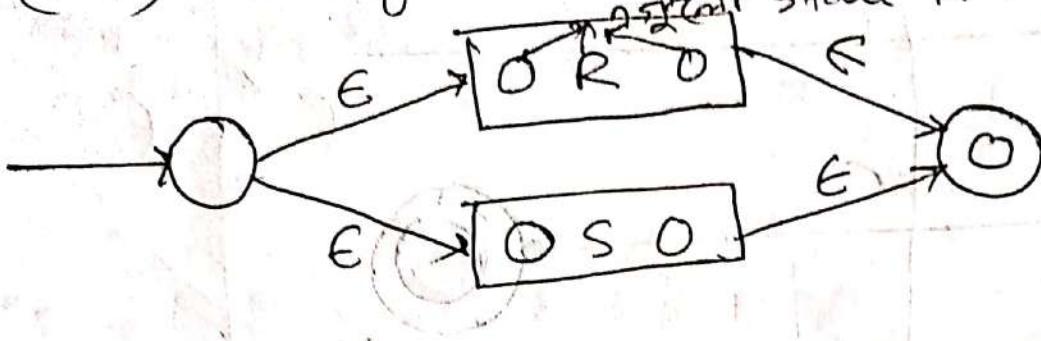
$$R = (0+1)^*$$

$$S = 1^*$$

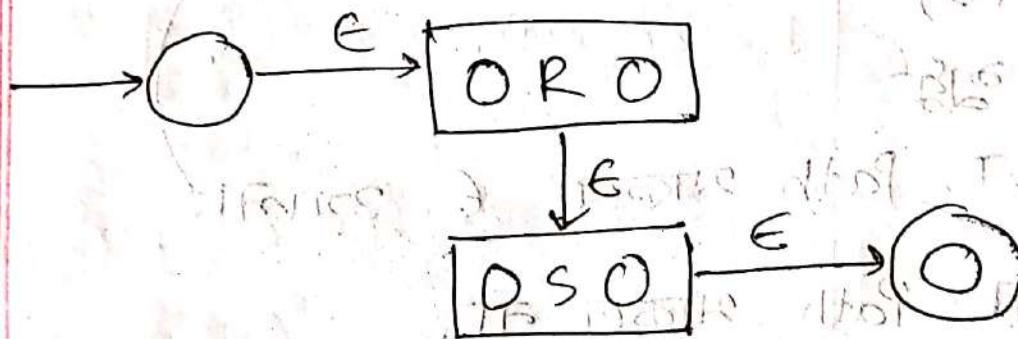
$$R = \boxed{0 \quad R \quad 0}$$

$$S = \boxed{0 \quad S \quad 0}$$

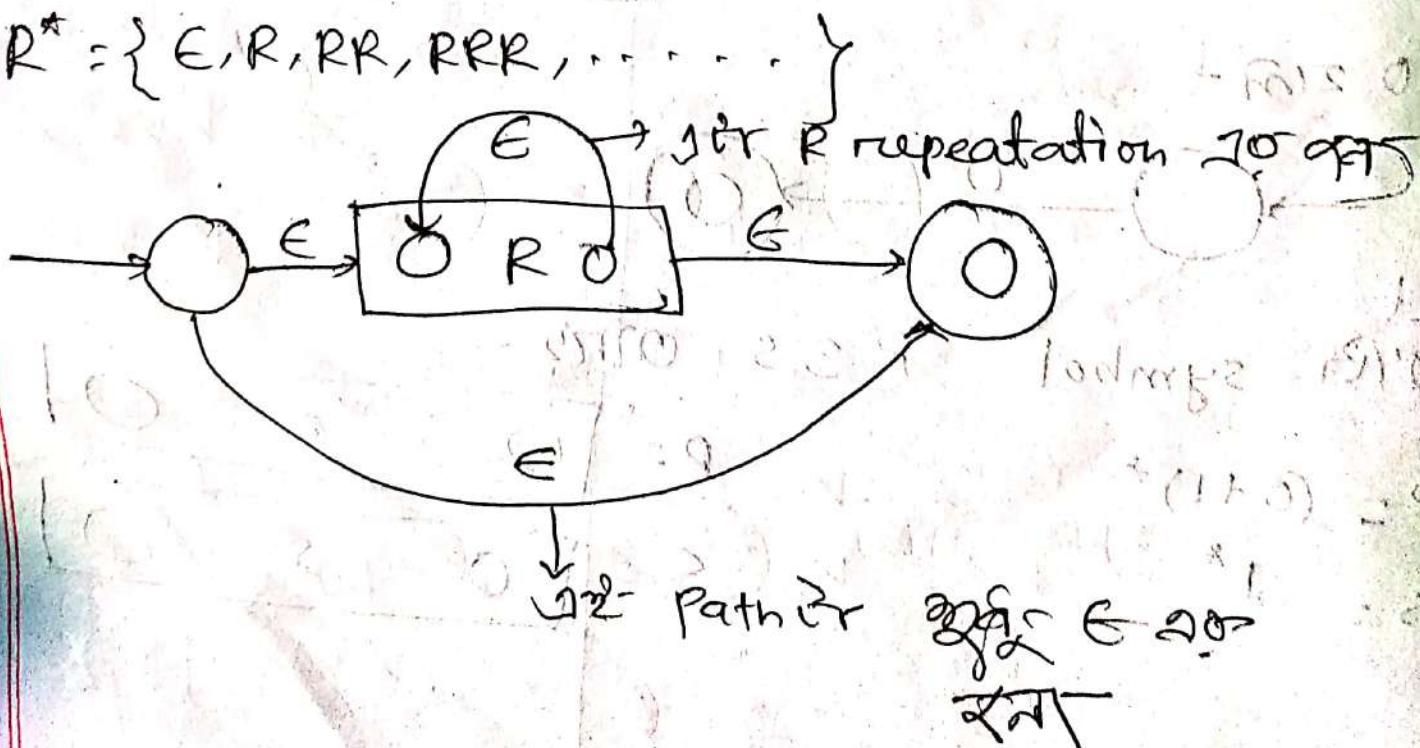
(R+S) හි ප්‍රාග්‍රැම් ප්‍රාග්‍රැම් ප්‍රාග්‍රැම් ප්‍රාග්‍රැම් ප්‍රාග්‍රැම්

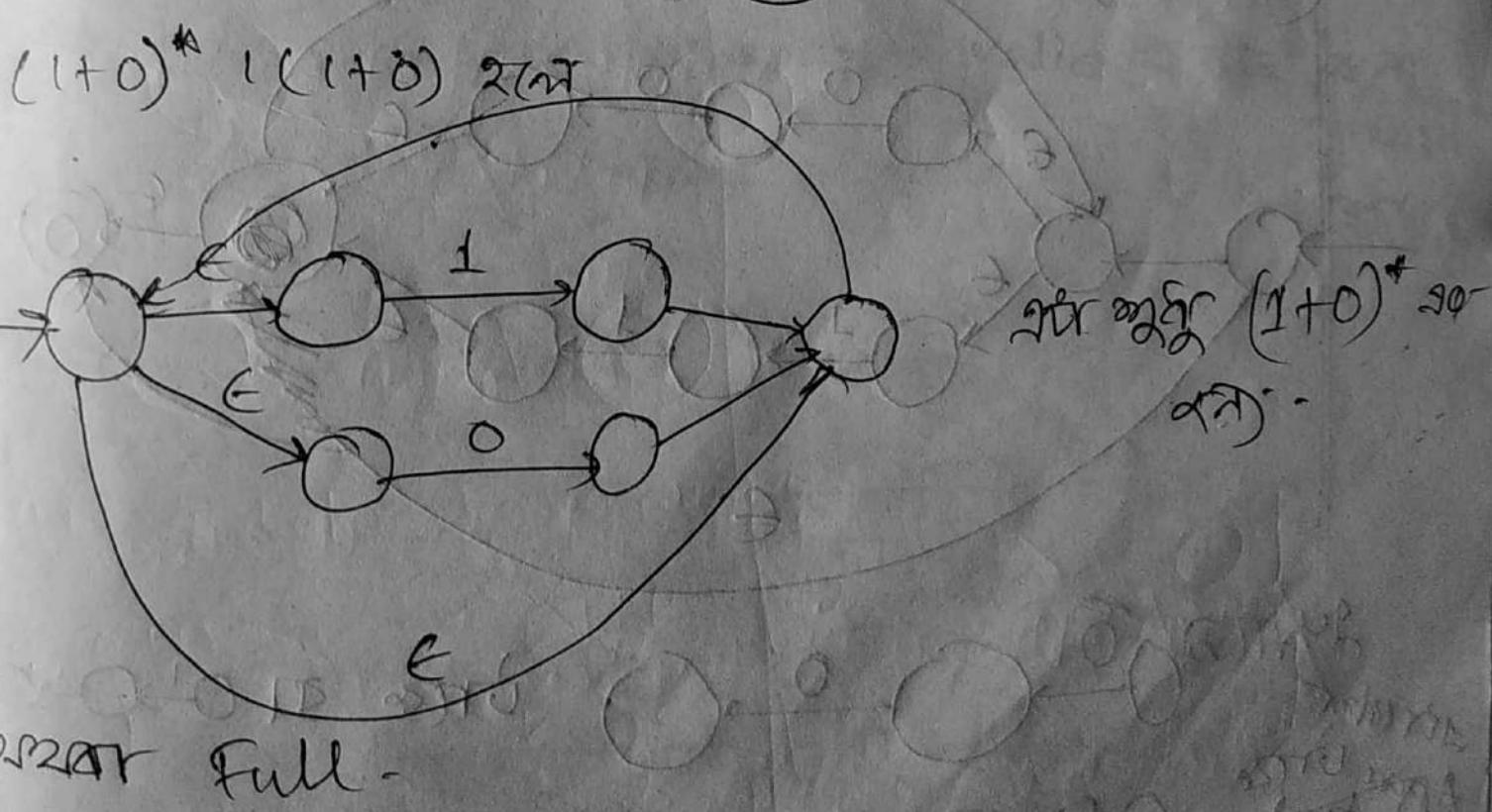
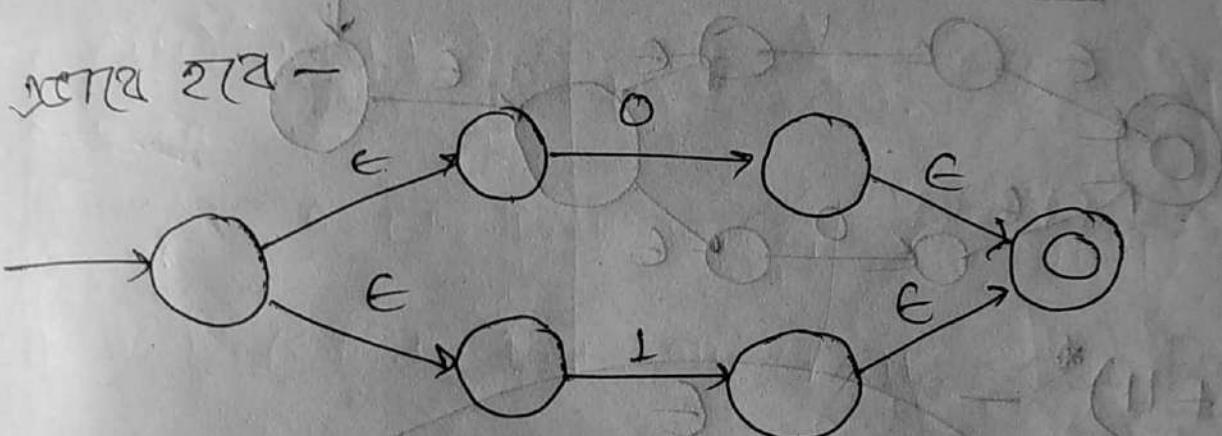
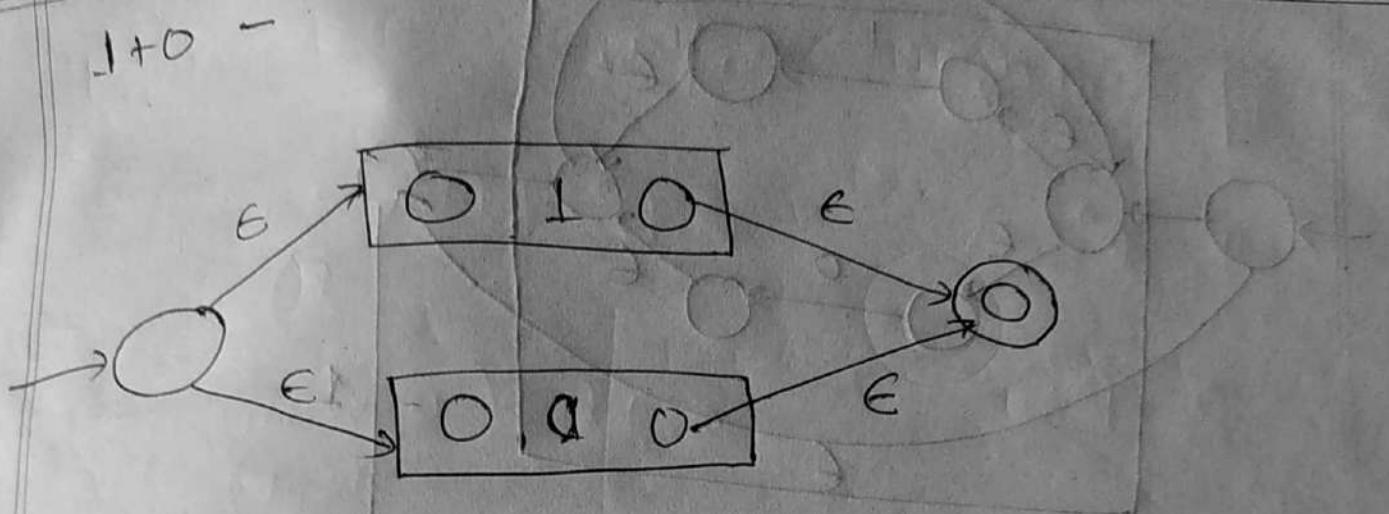


(RS) ප්‍රාග්‍රැම්

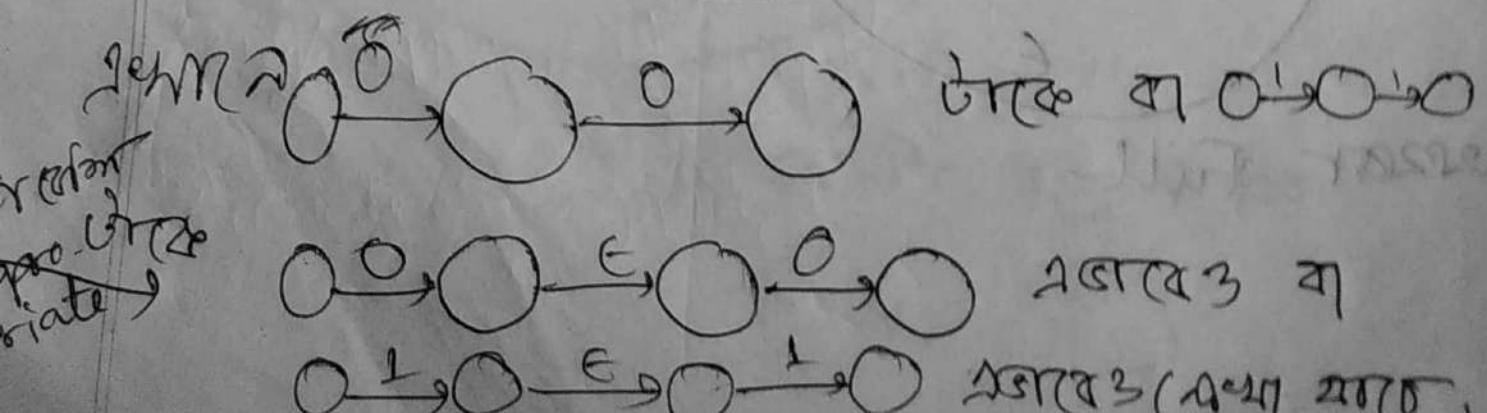
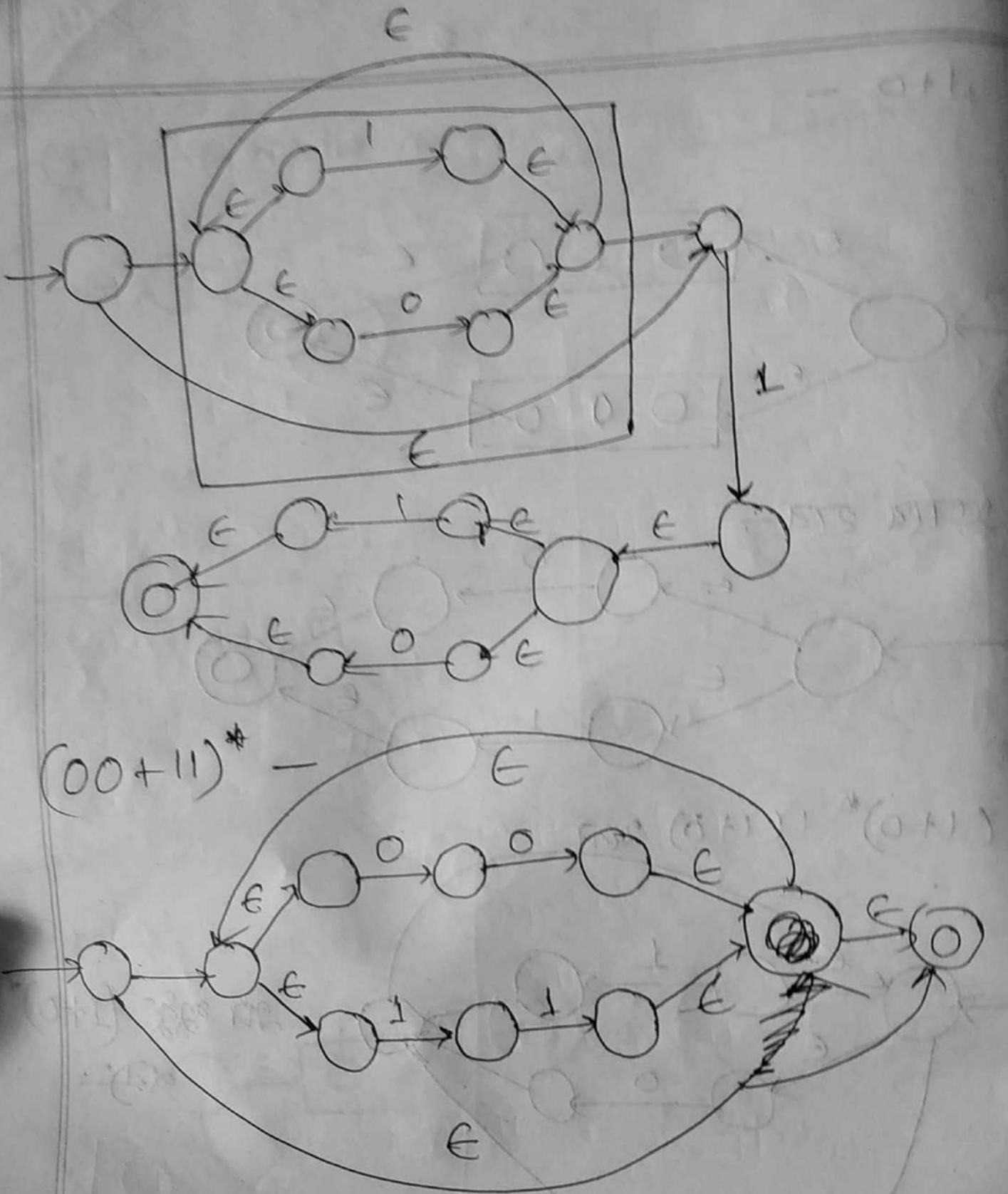


R^* ප්‍රාග්‍රැම්





6/20/77 Full -



newmark
SIRC

B' Day
cycle-07

8/12/18

1. Union

2. Concatenation

3. Enclosure

(*) → dot(.)) () * / \
→ any operator

$a_1 + a_2 + a_3 + \dots + a_n$

$[a_1, a_2, a_3, \dots, a_n]$ ← At Unix

$[a_1 - a_n] \rightarrow$ এভেংকুরা থার্ম কিনে $[a - z]$

~~example: এটি Variable declaration valid ক্ষেত্রে কিনা~~

$[- A-Z a-z] [0-9] [- A-Z a-z 0-9]^*$ দেখাব
ব্যস্ত

Lexical Analyzer

$[0-9]$ → At Unix O.S.
! :

$[A-Z a-z]$ → [:alpha:]

$a_1 + a_2$

$a_1 \mid a_2$

$+ R^+$

RR^* (min. 1 শব্দ মাত্রে
R)

? $R^?$

$\epsilon + R$ (0 শব্দ এবং
মাত্রে)

$R\{S\}$ মাত্রে হচ্ছে, R, S বৃক্ষ আছে,

like - RRRRRR

$\rightarrow [P \dots \dots \dots P]$

$a, c \rightarrow a(b)c$

মাথায়ানে যে ক্ষেত্রে

$[S \dots S]$ Symbol / Letter উপরে
সাধে-

$a^*c \rightarrow$ মানুষের যে ক্ষেত্রে Symbol

যে ক্ষেত্রে তার মানুষের
letter

[CT-Syllabus]

Article 3.3(1) সম্পর্ক,

[S-A]

akhare
BIRE

E' Day
Cycle-07

11.12.18

Chap-3 (CT -D2 syllabus)

Ans 3.1.1

3.1.2 \rightarrow Proof

Example - 3.2

3.1.3

3.2.1

Example 3.5

Ex 3.6

3.2.3

3.3

$M = M P$

Theorem 3.4 (যেকোনো একটা যথো
র্থে বাস্তব/আসল ঘাণে)

Associative & Commutative Law

$1+2=2+1 \rightarrow$ Commutative

$(1+2)+3 = 1+(2+3) \rightarrow$ Associative

For RE,

$$\rightarrow L + M = M + L$$

$$\rightarrow (L + M) + N = L + (M + N)$$

$$(LM)N = L(MN) \rightarrow$$
 Concatenation \rightarrow or \rightarrow Associative
 \rightarrow or Commutative law \rightarrow

Identity: In math $5 \times 1 = 5$ like this in PE-

$$L \cdot e = L$$

Annihilators

$$L \ominus M = M$$

(যে কোনো Operator এর পাশে, তাৰে M ইতু

Annihilators

$$L \cdot \phi = \phi \rightarrow \text{ফলৰ } \phi \text{ Annihilator}$$

(যা দিয়ে কোনো ক্ষতি না হ'ব ক্ষতি না হ'ব)

Distributive law:

$$L(M+N) = LM + LN$$

$$(LM)N = LN + MN$$

$$= MN + LN \quad [\text{applying Commutative}]$$

$$(L^*)^* = L^*$$

$$L^+ = L \cdot L^* \quad (\text{এটি সাধাৰণত্ব})$$

$$L? = \epsilon + L$$

$$\phi^* = \epsilon$$

$$\epsilon^* = \epsilon$$

$$(L+M)^* = \{ \{ \dots \} \cup \{ \dots \} \}^*$$

$$= (L^* M^*)^* \quad [\text{Derive কোনো সাধাৰণত্ব}]$$

$$(I+O)^* I = I (I^* O^*)^* I$$

Proof দিবে এই type
জুড়ো side equal

কিনা হব, হত

মহসুস দিবে না, আচো-

- কষুড় Difficulties

দিবো

4 day

cycle-08

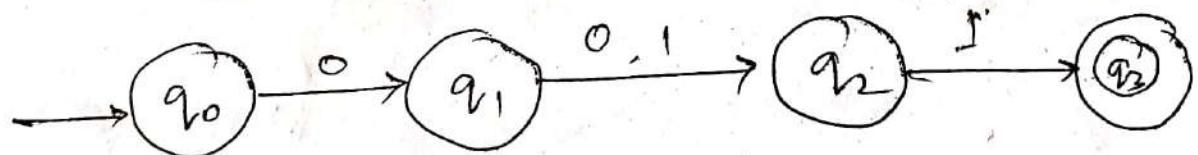
LAB - 04

Input

1. No. of inputs
2. Transition table
3. Starting state
4. Final state

Output:

Regular Expression between start & final.



State	0	1
q_0	q_1	\emptyset
q_1	q_2	q_2
q_2	\emptyset	q_3
q_3	\emptyset	\emptyset

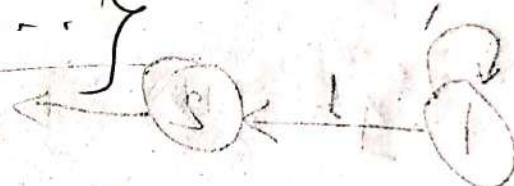
Pumping Lemma

যদি n state ব্যাখ্যা একটি DFA আরে শর্কারো-

n' state দ্বারা বিভিন্ন Pattern

like -

$$L = \{ 0, 01, 0101, \dots \}$$



Let,
w একটি input comb. like $w = "01011101"$

সুন্দর
 $|w| > n$ হলু

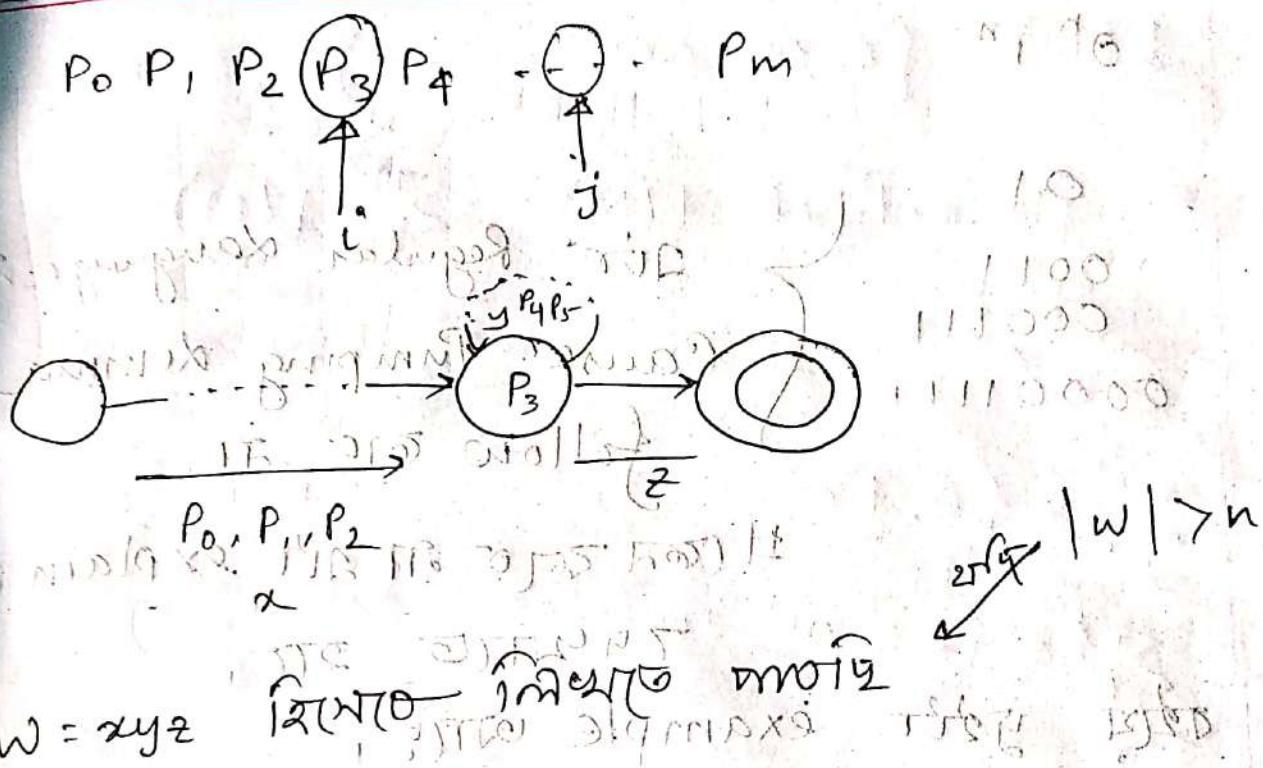
$0, 1, 2, 3, 4, \dots, m$

$0 \leq i < j \leq m$

$p_0, p_1, p_2, \dots, p_m$

$(0-m)$ state সংকেত

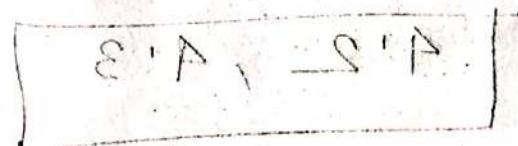
$$p_i = p_j$$



Here,

$$\textcircled{1} \quad y \neq \epsilon$$

$$\textcircled{2} \quad |xy| < n$$



যদি xyz এবং xy^kz হিসেবে প্রক্রিয়া, তাহলে $y \neq \epsilon$ এবং

$|y| > 0$ অর্থাৎ $|xy| > 0$ এবং $k > 0$

সু, কোনো DFA যদি Property (এভাবে এই
নামেও) follows করে আবেদন করে তাহলে
Regular Language এবং এটো স্থূল না।

$0^n 1^n$

01
0011
000111
00001111

বাৰ্গ Regular language না,

Cause Pumping lemma
follow কৈতোৱে,

পঁজেন কৈতোৱে বাবুৰ explain কৈতোৱে

বৈধ প্ৰমাণ হৈতোৱে,
বাবুৰ মুহূৰ্ত example আছে,

4.2, 4.3

$a^2 b^2 c^2$

Scanned by CamScanner

$$L(M) = \{0, 00, 000, \dots\}$$

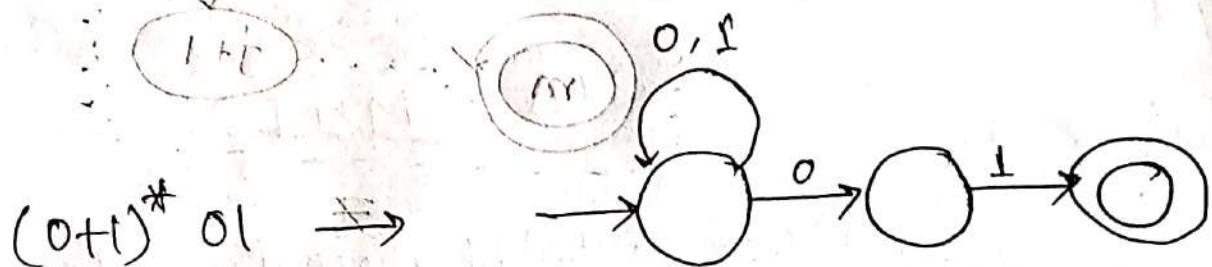
Complement of $L(M) = \sum^* - L(M)$

$$\sum = \epsilon$$

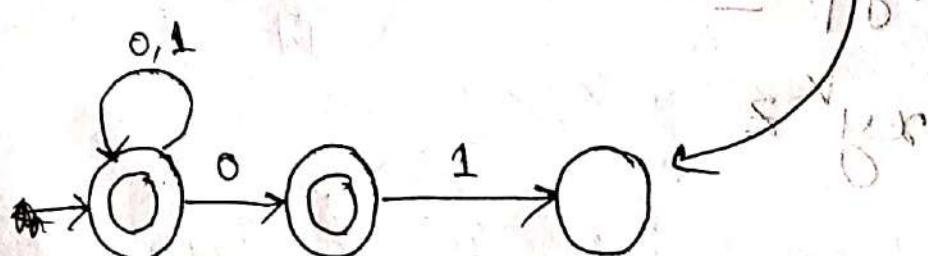
$$\Sigma' = \{0, 1\}$$

$$\Sigma = \{0, 1\}^{|W|}$$

$$\sum_{k=1}^2 E \in \{00, 01, 10, 11\}$$



⇨ ଏହି ପରିମାଣ ଏକ ଅନ୍ତର୍ଗତ ଅନୁକରଣ କାର୍ଯ୍ୟ ହେଉଥିଲା ।



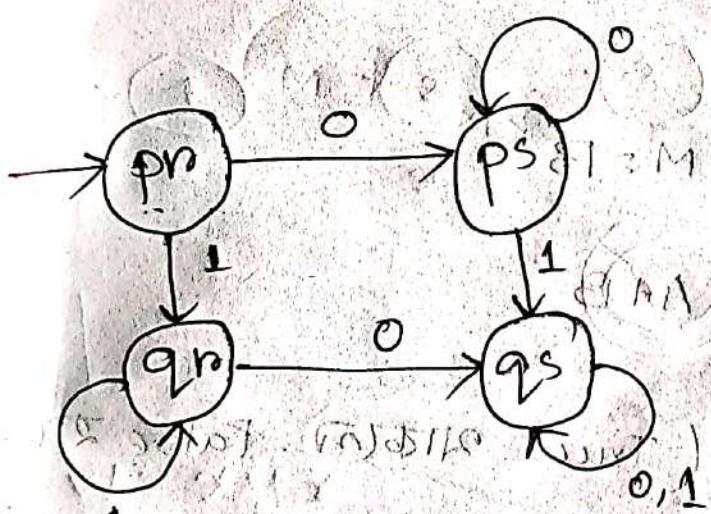
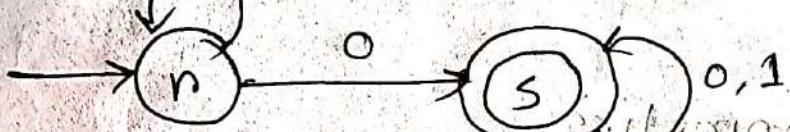
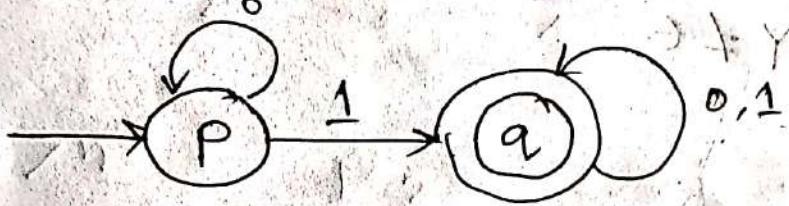
Regular language go complement

Regular language 20

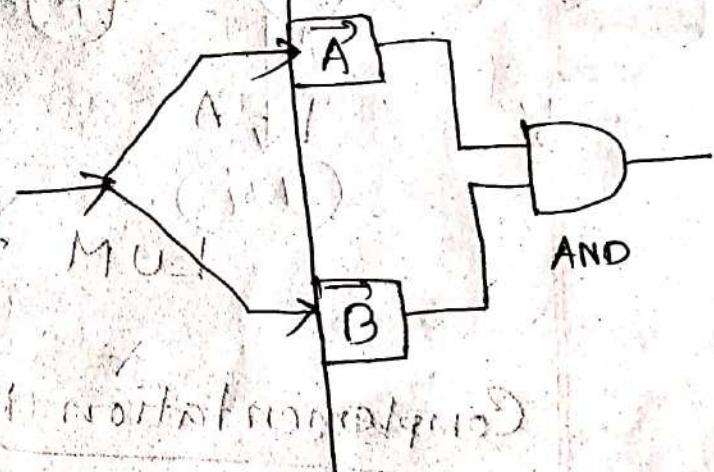
intersection

$$L(M) \cup L(N) = L(M+N)$$

$$L(M) \cap L(N)$$

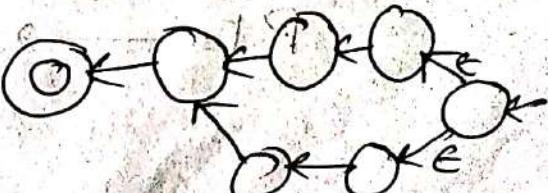
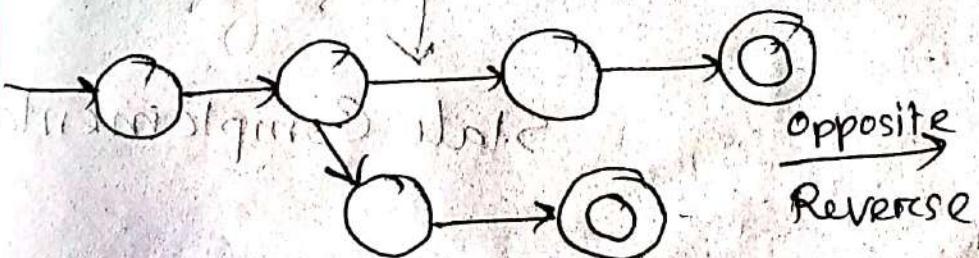


Input



A intersection B

Pseudocode: $A \cap B \leftarrow A \cap B$



Shakthare
SIRE

'B' Day
Cycle - 09

15.1.19

n

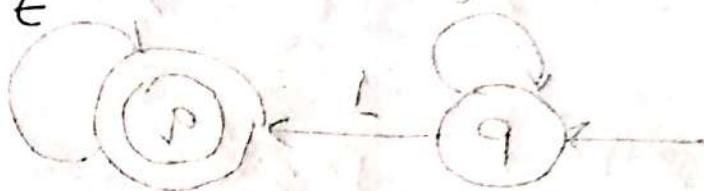
$$(n+M) \leq (n) + (M)$$

$$(n) \leq (n) + (M)$$

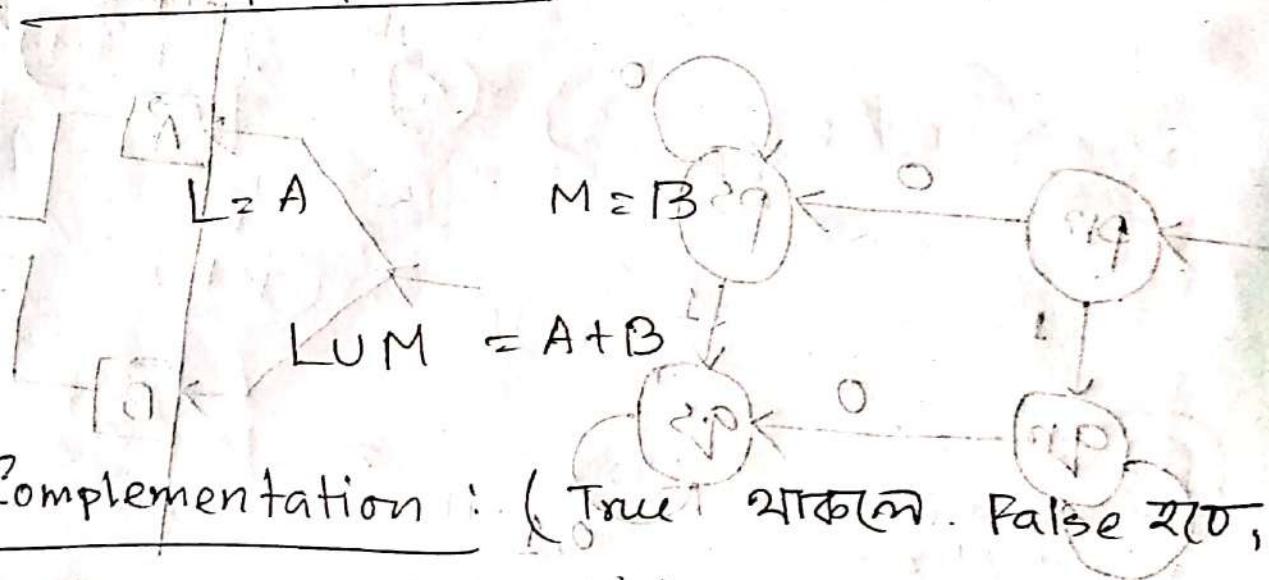
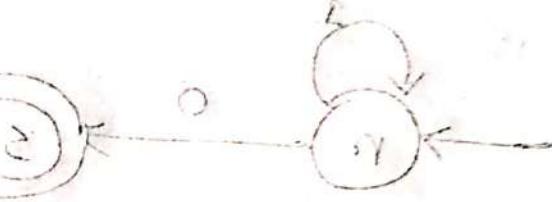
$$W = xyz \quad y \neq \epsilon$$

$$|xy| \leq n$$

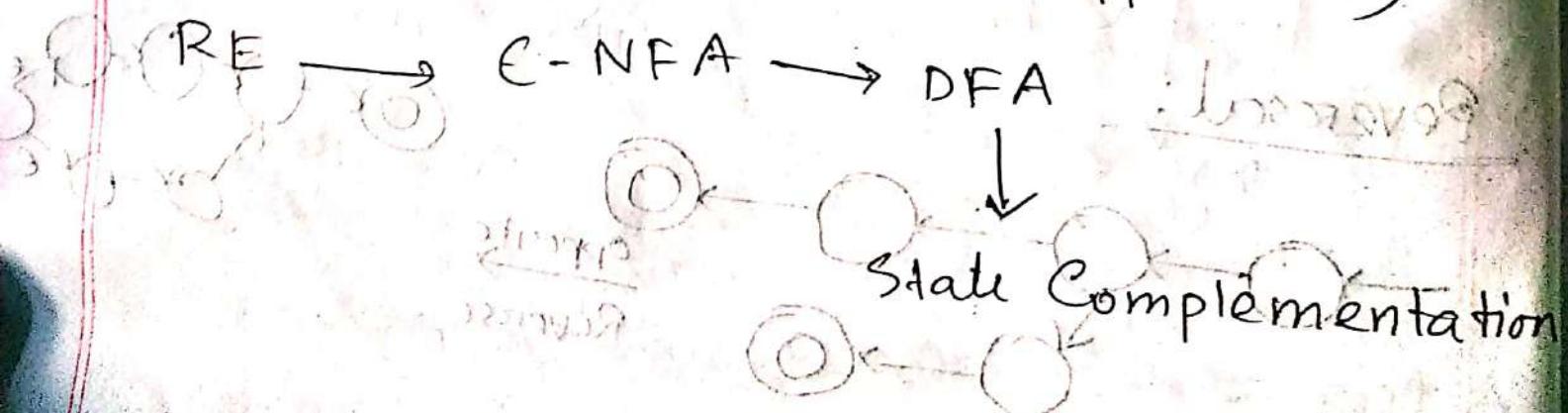
$$xy^k z \text{ for } k > 0.$$



Closure properties



Complementation: (True આનંદ, False ઝડપ,
સ્વાત્મક 2025 Opposite 2020)



5-tuple

$$A = (Q, \Sigma, \delta, q_0, F)$$

↓ ↓ ↑ initial state ↗ set of
 States Set of Transition Final States
 ↓ ↓
 Input Function
 Symbols

$$\text{Complement of } A \rightarrow A' = (Q, \Sigma, \delta, q_0, Q - F)$$

↗ F एकत्र
 वाले
 States या अन्य
 एकत्र
 Final States

Intersection:

L, M दो Regular language हों। L, M

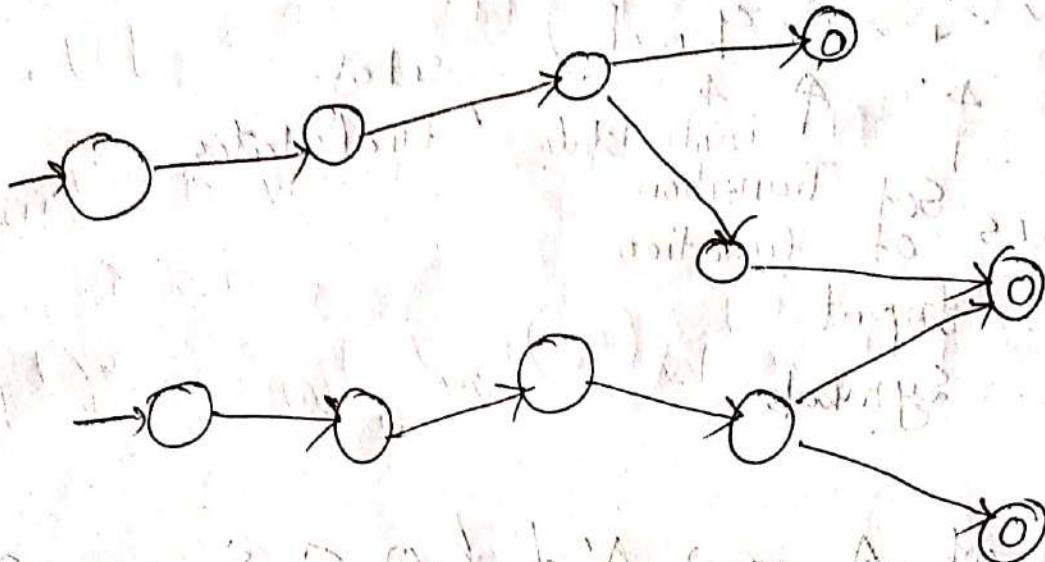
एवं $L \cap M$ का Intersection होगा।

Common (वाले) accepting states जिनमें दोनों accepted हों।

$$L = \{0, 01, 10, 11\} \quad M = \{1, 10, 11, 00\}$$

$$L \cap M = \{0, 1, 01, 10, 11, 00\}$$

$$L \cap M = \{10, 11\}$$



$$L = (Q_L, \Sigma_L, \delta_L, q_L, F_L)$$

$$M = (Q_M, \Sigma_M, \delta_M, q_M, F_M)$$

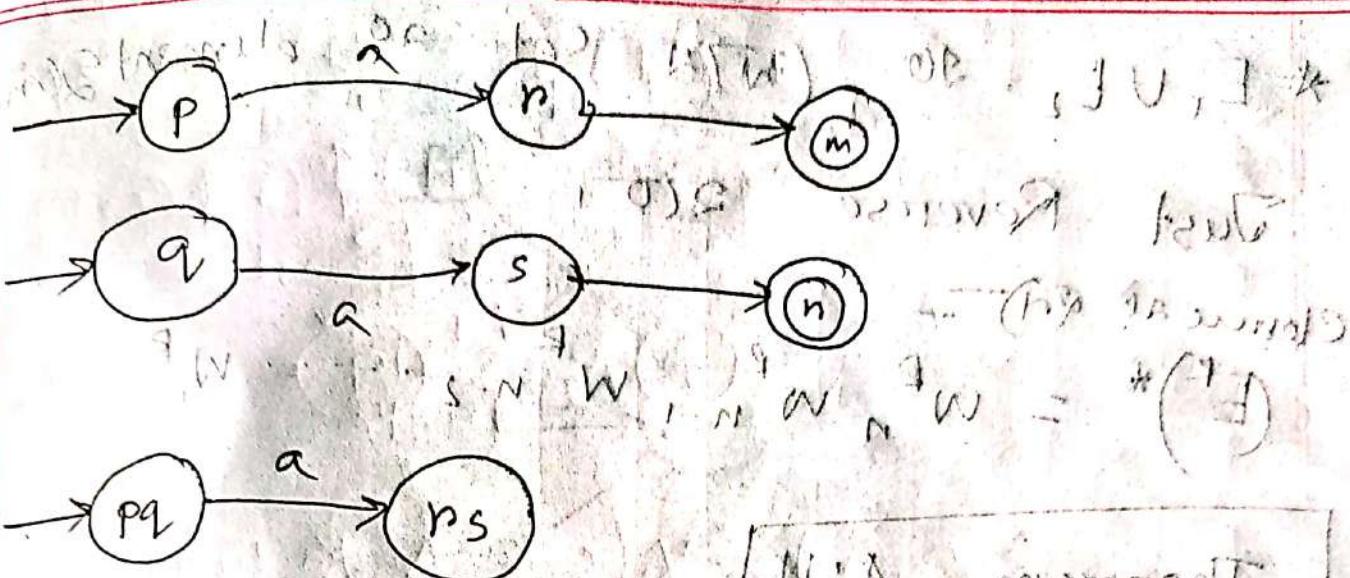
Let,

Σ_L and Σ_M same

$$\Sigma = \Sigma_L \oplus \Sigma_M$$

Same π & τ ,

$$\Sigma = \Sigma_L \cup \Sigma_M$$



$L \cap M = (Q_1 \times Q_M, \Sigma, \delta_{Q_1 \times Q_M}, \alpha \times \alpha_M, F_1 \times F_M)$

Reversal:

$$L = \emptyset$$

$$L^R = \emptyset$$

$$L = \emptyset$$

$$L^R = \emptyset$$

$$L = a$$

$$L^R = a$$

Basin Case 2

Base 2 η^R

$$E_1 = 10\phi$$

$$E_2 = 1100$$

$$\begin{aligned} E &= E_1 + E_2 \\ E^R &\Rightarrow E_2^R + E_1^R \end{aligned}$$

$$E_1^R = 1101$$

$$E_2^R = 0011$$

$$\begin{aligned} C &= 0011 + 1101 \\ &= 00111101 \end{aligned}$$

Regular language go Reverse 3

* E, UE_2 go (anti) set go element $267V$

Just Reverse 270°

closure $20^\circ Q_1$ —

$$(E^R)^* = w_n^R w_{n-1}^R w_{n-2}^R \dots w_1^R$$

Theorem - 4.11

$$\left(\begin{matrix} M & N \\ M & N \end{matrix} \right) = MN$$

1920-1921

$$\begin{array}{lll} \theta = 1 & \phi = 1 & \psi = 1 \\ \theta = 91 & \phi = 91 & \psi = 91 \end{array}$$

1. **प्राणी विद्युत्** एवं विद्युत् विद्युत्

101 815 0611101 1978

100 100 100

1014-1108

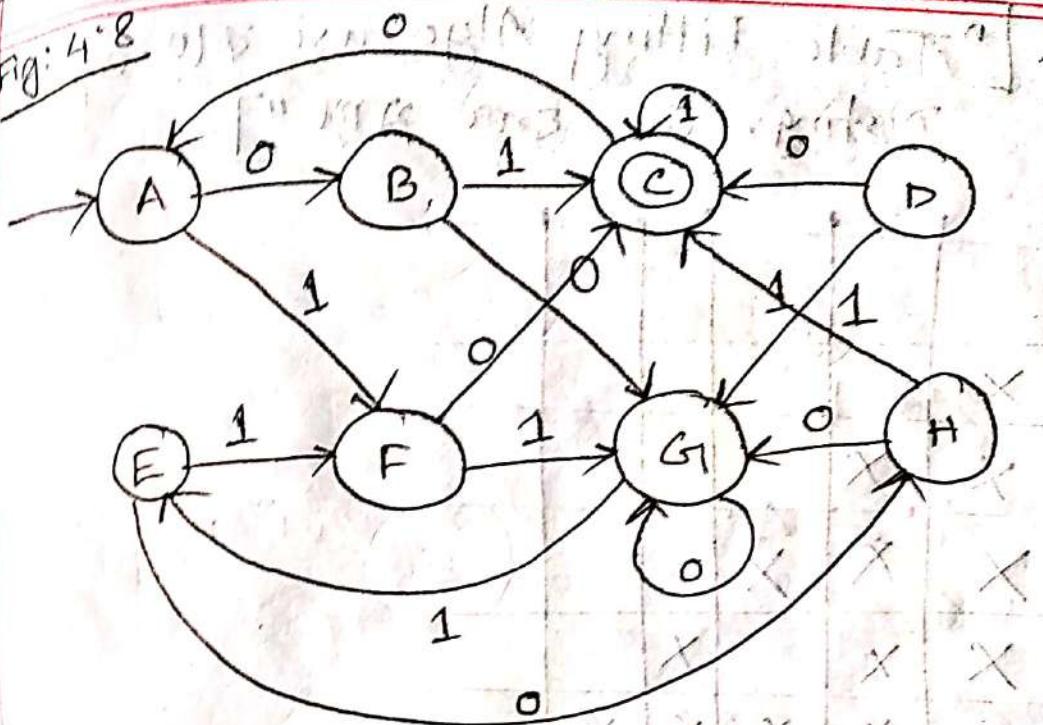
16/1/19 F/Day

cycle - 10

27.1.19

Shankar
3rd.

Fig: 4.8



① If two states give same output for all inputs then they are non-accepting equivalent states. Otherwise, distinguishable.

Example:

$$\begin{aligned}\delta(A, 0) &= B \\ \delta(G, 0) &= G\end{aligned} \quad \text{so, equivalent}$$

because

$$\begin{aligned}\delta(A, 01) &= C \\ \delta(G, 01) &= E\end{aligned} \quad \begin{array}{l} \text{distinguishable} \\ \text{as } C \text{ is accepting state} \end{array}$$

S.I. I.T.S
8T exam

Date: 20-07-2022

[Table Fitting Algo. use के तो equiv.
disting., C.R.P., error 25%]

B	X					
C	X	X				
D	X	X	X			
E		X	X	X		
F	X	X	X		X	
G	X	X	X	X	X	X
H	X		X	X	X	X
A	B	C	D	E	F	G

(यद्यपि equiv. C.R.P. error 25%)

Basically box का 25% error.

Following is the diagram of the table fitting algorithm:

Following is the diagram of the table fitting algorithm:

B	X					
C	X	X				
D	X	X	X			
E		X	X	X		
F	X	X	X		X	
G	X	X	X	X	X	X
H	X		X	X	X	X
A	B	C	D	E	F	G

Homomorphism:

(Quadratic)

20.10

1011001

$h(0) = ab$ ~~for 0~~ of अन्तर्वाला नियम-

$h(1) \in E$) Replace $0 \rightarrow 1$

2nd 11 अन्तर्वाला नियम- Replace
 $h(0) \rightarrow 1$ अन्तर्वाला Homomorphism

अब 1011001 के homo. apply हो-

ababab

(कम. Proof देखा नहीं है। Just def,
example)

④ inverse homo. इसे $h^{-1}(0)$ कहा जाता है

ababab (2nd 1011001 के बारे में,

CT-03 Syllabus

Chap-4:

Article - 4.1.1*

4.2, 4.3

(* VBT MTC, ORBTCA

4.2.1

10 marks common

Theorem - 4.1

4.6

4.7

4.8

4.9

4.2.2

4.11*

4.2.3

4.2.4

4.4.1*

4.19

shankar
sir

'B' Day
cycle-11

29.1.10

Context Free Grammar:

$\Sigma = \{0, 1\}$ Δ Pallindrome $w = w^R$?

Base Case:

$$L = \epsilon \quad L = L^R$$

0

00

000

0000

00000

000000

0000000

format: $\epsilon, 00, 000, 0000$ or Two

Here, w be the pallindrome too

Start Symbol

* Right Rule $P \rightarrow$ define

rule 1. $P \rightarrow \epsilon$

2. $P \rightarrow 0$

3. $P \rightarrow 1$

4. $P \rightarrow 0P0$

5. $P \rightarrow 1P1$

* Left Rule $G \rightarrow$ define

* C. F. G \rightarrow Recursive way $G \rightarrow$ define

Grammer \rightarrow Language

Context free Grammer & Free Symbol

2T FG language Build 2001 21

Symbol 2m Terminal Symbol.

C.F.G A 2T 2T nT -

(input symbol
2 set)

1. Terminal Symbol

Like {0, 1}

2. Variables

(OPO (O P 2m Var.)

Non terminal Symbol

multiple Variable 2m

(A B C D E F G H)

3. Start Symbol (sentr 2m) first Variable +

4. Production / Rules

प्रैराम: $\frac{a^* (b+a)}{B^* C}$ (Mul. Var. 2m)

A →
Start Symbol

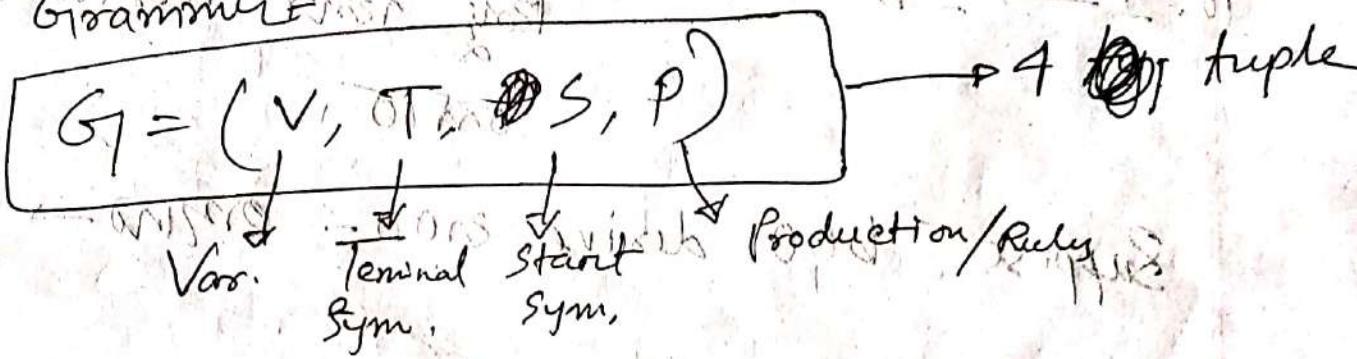
Context Free Grammar

Definition

Rule Criteria →

- 1) वाच्य सिम्बल वर्ग (Non-terminal symbols) द्वारा विकल्प लिखा जाता है - P
- 2) → (Arrow)
- 3) कठोर वर्णन वाच्य वर्ग (Non-terminal symbols) के लिए वाच्य सिम्बल (Non-terminal symbols) का विकल्प दिया जाता है - Variable (उपरी प्रक्रिया)
- 4) वाच्य सिम्बल वर्ग वाच्य वर्ग (Non-terminal symbols) के लिए वाच्य सिम्बल (Non-terminal symbols) का विकल्प दिया जाता है - Production Rule

So, Grammar



$(a+b)^n (a+b+0+1)^m$ Context free Grammar

धूमर-

जून्हें E धूमर-

1. $E \rightarrow I$ [I एवं फ्रेम वाच्य वर्ग a, b, 0, 1 वाच्य वर्ग (Non-terminal symbols) के लिए अप्रत्यक्ष विकल्प दिया जाता है]
2. $E \rightarrow E+E$ [$a+b$ वाच्य वर्ग (Non-terminal symbols) के लिए अप्रत्यक्ष विकल्प दिया जाता है]
3. $E \rightarrow E \cdot E$ [$(a+b+0+1)^m$ वाच्य वर्ग (Non-terminal symbols) के लिए अप्रत्यक्ष विकल्प दिया जाता है]
4. $E \rightarrow (E)$ [Bracket वाच्य वर्ग (Non-terminal symbols) के लिए अप्रत्यक्ष विकल्प दिया जाता है]

- (continues)
5. $I \rightarrow a$ (also ab gives first key answer)
 6. $I \rightarrow b$ or cause first $\Rightarrow (ab)$
 7. $I \rightarrow IO$ (more)
 8. $I \rightarrow I1$ [so, $I \rightarrow IO$ & $I \rightarrow I$ 2nd part]
 9. $I \rightarrow Ia$ * Exam \Rightarrow Rule (more)
 10. $I \rightarrow Ib$ Key enter derive more
- $(a, b, IO, I) = P$

Suppose $b00$ derive $2000 - \text{original} \rightarrow$

- $E \rightarrow I$ (extra) $\Rightarrow (I + 0 + 0) (I + 0)$
- $\Rightarrow E \rightarrow IO$
- $\Rightarrow E \rightarrow I00$
- $\Rightarrow E \rightarrow b00$ [as above]
- [Extra condition] $E \leftarrow I \leftarrow E$
- [Extra condition] $E \leftarrow E \leftarrow E$

2nd MGT \rightarrow 1st MGT
 @ (at+boo) desire env.

V.V.G

String Inferred	For language	Production/ Rule Used	String Used
a	I	5	
b	I	6	
bo	I	7	(ii)
<u>boo</u>	I	7	(iii)
a	E	1	(i)
boo	E	1	(iv)
atboo	E	2	(v), (vi)
(atboo)	E	4	(vii)
at (atboo)	E	3	(v), (viii)

Ex (E+E) format ~ Pro.

~~freedom~~

(left most derivation)

at left side (2725 20^o angle)

a * (a + b o o)

$$E = E * E \Rightarrow E = I * E$$

$$\Rightarrow E = a * E$$

$$\Rightarrow E = a * (E)$$

$$\Rightarrow E = a * (E + E)$$

$$\Rightarrow E = a * (I + E)$$

$$\Rightarrow E = a * (a + E)$$

$$\Rightarrow E = a * (a + I)$$

$$\Rightarrow E = a * (a + I O)$$

$$\Rightarrow E = a * (a + b o o)$$

Right side (2725 20^o angle Right
most derivation

(Right most derivation)

like -

$$E = E \wedge E$$

$$\Rightarrow E = E \wedge (E)$$

$$\Rightarrow E = E \wedge (E \wedge E)$$

$$\Rightarrow E = E \wedge (E \wedge I)$$

$$\Rightarrow E = E \wedge (E \wedge I^0)$$

ACR(D).

3/2/19

Shakhar
Sir

'E' Day
Cycle - II

(With notes from 18th)

1. $E \rightarrow I$
2. $E \rightarrow E + E$
3. $E \rightarrow E * E$
4. $E \rightarrow (E)$
5. $I \rightarrow a$
6. $I \rightarrow b$
7. $I \rightarrow I_a$
8. $I \rightarrow I_b$
9. $I \rightarrow I_0$
10. $I \rightarrow I_1$

(E) $A = I \rightarrow E$

(E+E) $\wedge E = E$

(E+E) $* E = E$

(O E+E) $* E = E$

END

Parse Tree:

(re), p., U)

$$B \in \mathbb{R}^{(a+b) \times n}$$

1 A 1 F)

1

一

150/18

P. 144 x 9

May 2008 - 1998

DRAFTS

(dead-node) \rightarrow

$$a * (a + b \circ \circ)$$

✓(70-191)

Vivisection

Stonewall

Application of E.F.G:

→ Parser in Compiler Designing

Tool: YACC

Language: LEX

lex & code is like -

Exp: Id

Exp '+' Exp

Exp '*' Exp

(' Exp ')

একটি

example

বাটু, 3rd year
২ মার্কে

Extensible
Markup XML (এখানে যেকোনো tag ব্যবহৃত থায়)
(good to) XD

language <contact>

<Name> something </Name>

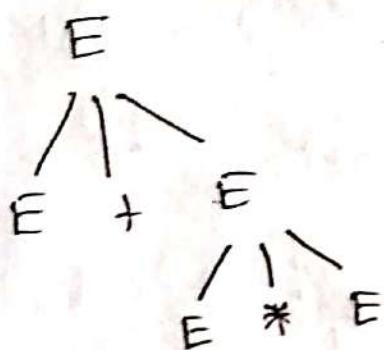
<Phone> . . . </Phone>

</contact>

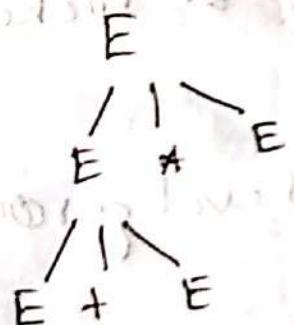
142*3

$$(E \Rightarrow E+E \Rightarrow E+E*E)$$

1.



2.



$$(E \Rightarrow E*E \Rightarrow E+E*E)$$

④

AUT Ambiguous Grammar. യൂണിഫോർമ്മ് Str
Grammar എന്നും multiple Derivation എന്നും

യാഥു, യൂണിഫോർമ്മ് Ambiguous Grammar എന്നും

Reason of Ambiguosity:

1) Precedences

2) Wrongly grouping

Factor \rightarrow Id } Can not be broken
(\rightarrow F R T } \rightarrow Parenthesis)

Term \rightarrow String with same level of grouping

Like $\rightarrow a * E * E \rightarrow (a * E) * E$

but $\rightarrow a + E * E$ can't be grouped

$I \rightarrow a \mid b \mid I_a \mid I_b \mid I_1 \mid I_0$

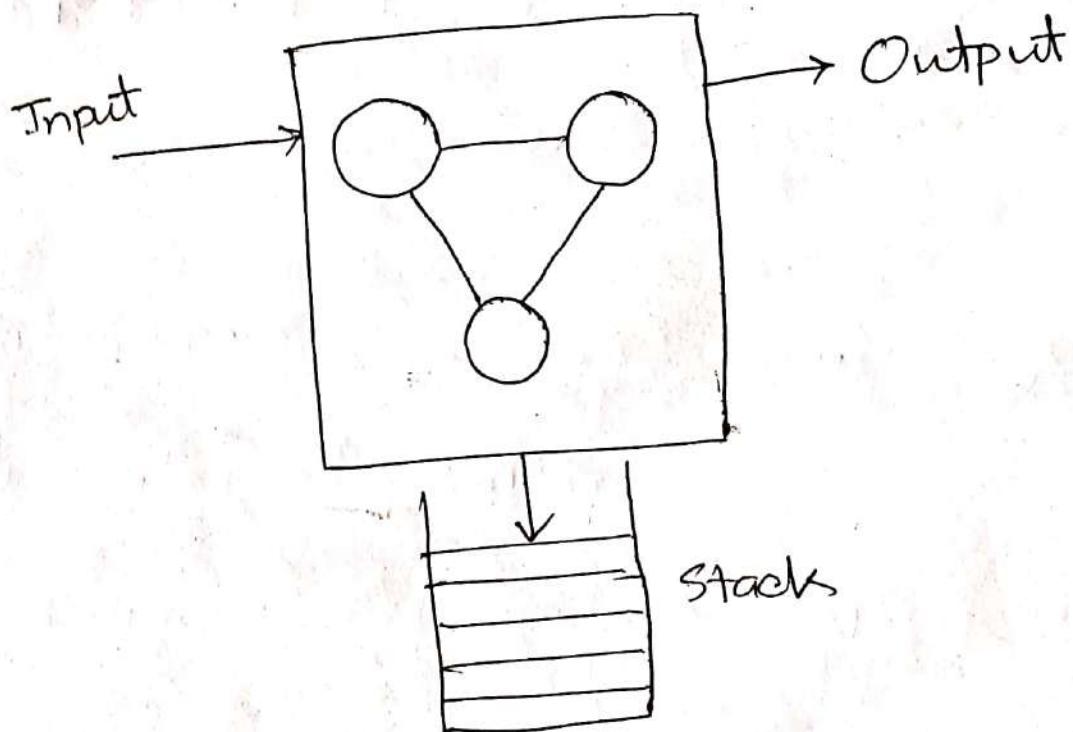
$F \rightarrow I \mid (E) ; F = \text{Factor}$

$T \rightarrow F \mid T * F ; T = \text{Term}$

$E \rightarrow T \mid E + T , E = \text{Expression}$

Push Down Automata (PDA):

E-NFA ଟଙ୍କ- PDA . ଏଥାନେ ଯଦୁ ପକ୍ଷଟି Stack
 add କରୁଣେ, ଫଳେ ଆଗେ କି, କୋଟ୍ଟାଇ Travers
 କରୁଣେ ମଧ୍ୟ ମନେ କ୍ରାନ୍ତିକ ପାଇଁ,



$\Rightarrow (Q, \Sigma, \delta, q_0, F)$ ଆଗେ ଦିଲ

ନତୁନତା ଥିବେ PDA = $(Q, \Sigma, \Gamma, \delta, q_0, z_0, F)$

ଏବଂ δ (to change ଆବଶ୍ୟକ)

Stack ଏ ଦ୍ୟାନ୍ତିକ Symbol
 ଏଥିର ଉଦ୍ଦେଶ୍ୟ set

④ δ প্রাপ্ত হিল (current state, input)

এবং δ = (current state, input, stack)

৫ একটি ডেব প্রাপ্ত করা

δ(q, a, x)

q = current state

a = input symbol

x = stack

→ get return pop(γ) (P, δ)

→ pop stack এর জন্য

γ = x এলে γ stack
এর মান বর্তন কর

γ = ϵ এলে pop কর

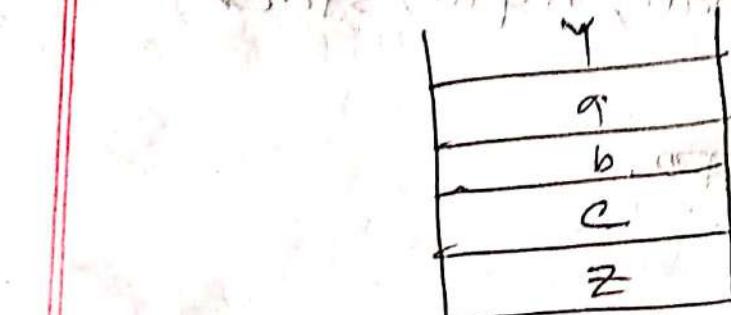
γ = χz এরকে প্রদর্শন

z টাকে χ এর মান কর

Replace γ , χ এর

Stack এ χ এর মান কর

z এর মান এর top এর মান

like, what happens) first 1000 3
Y = Yabez in Stack A error zero
(Dont begin stack) : 3 5 10


(X, P, P) 3.

white board p

beginning p

empty x

(X, P) some numbers 100

beginning

empty p

beginning

empty p

empty p

empty p

empty p

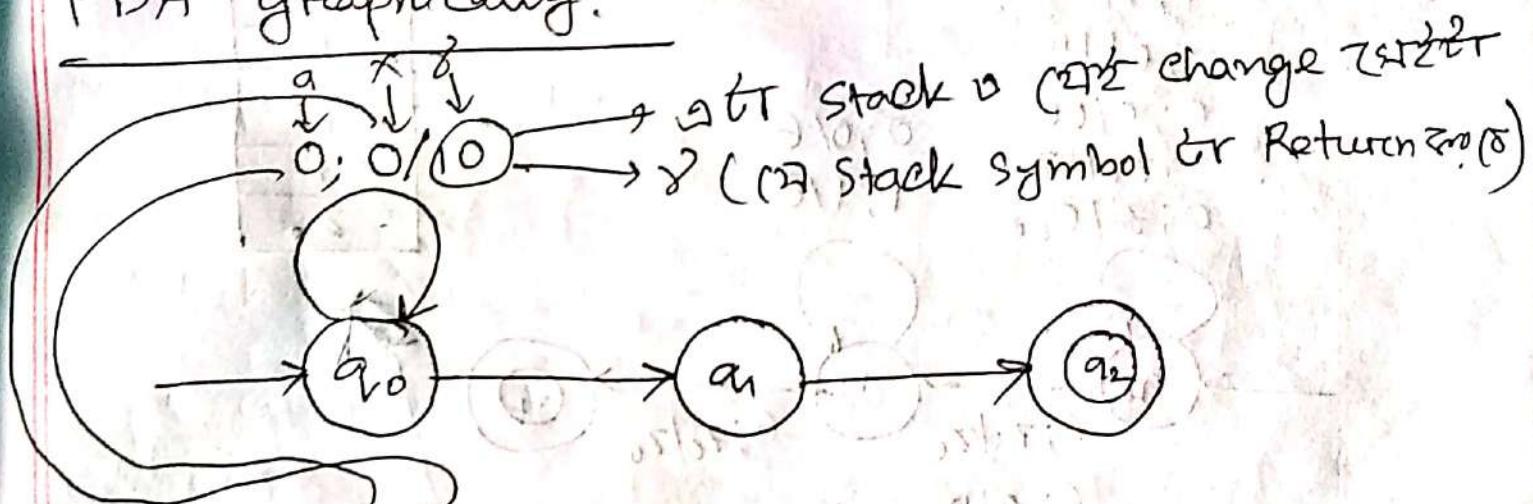
Shankar
sir

'B' Day
Cycle-12

5.2.19

stack symbol
 $(Q, \Sigma, \Gamma, \delta, q_0, z_0, F)$ \rightarrow Stack's Start Symbol

PDA graphically:



$\delta(q_0, a, \gamma)$

$\delta(q_0, a, \gamma) \rightarrow (q_0, \gamma z_0)$

$1; 0/10$ (current stack A for element 10 (56A))
 $0; 0/00$

$1; z_0/1z_0$

$0; z_0/0z_0$

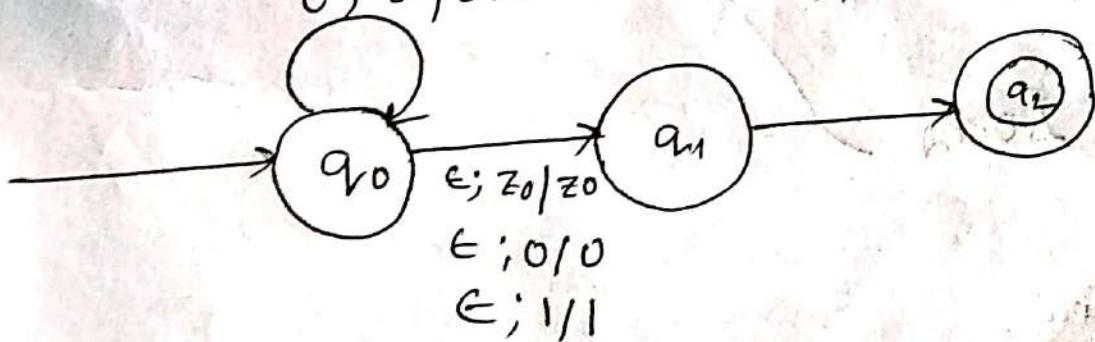
DMZ(M)

δ

$(q_0, \gamma z_0)$

$\delta(q_0, a, \gamma) \rightarrow (q_0, \gamma z_0)$ element 10 (56A)

$\delta(q_0, a, \gamma) \rightarrow (q_0, \gamma z_0)$



$\epsilon; z_0/z_0$

$\epsilon; 0/0$

$\epsilon; 1/1$

Fully draw Z_0 —

$0; 1/01$

$1; 1/11$

$1; 0/10$

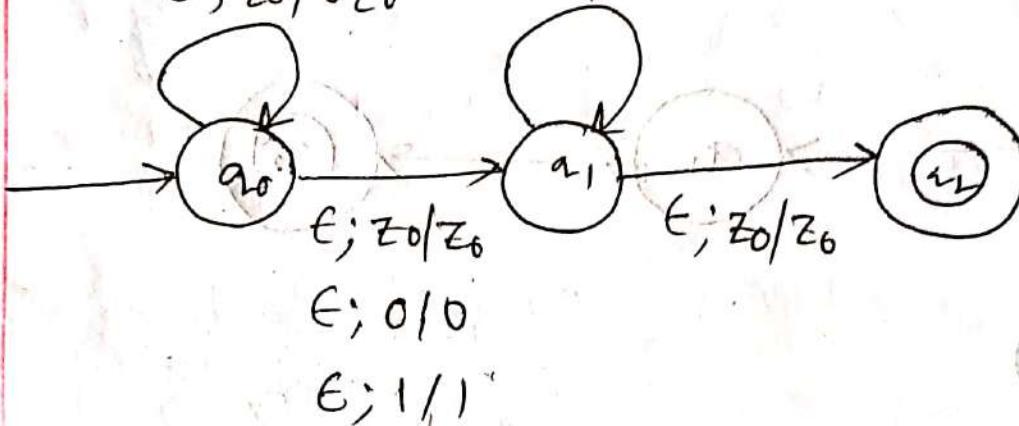
$0; 0/00$

$1; z_0/1z_0$

$0; z_0/0z_0$

$0; 0/\epsilon$

$1; 1/\epsilon$



111 z_0 3 तरी

④ एकत्रित करने का तरीका यह है कि z_0 को एक बोर्ड पर लिया जाए।

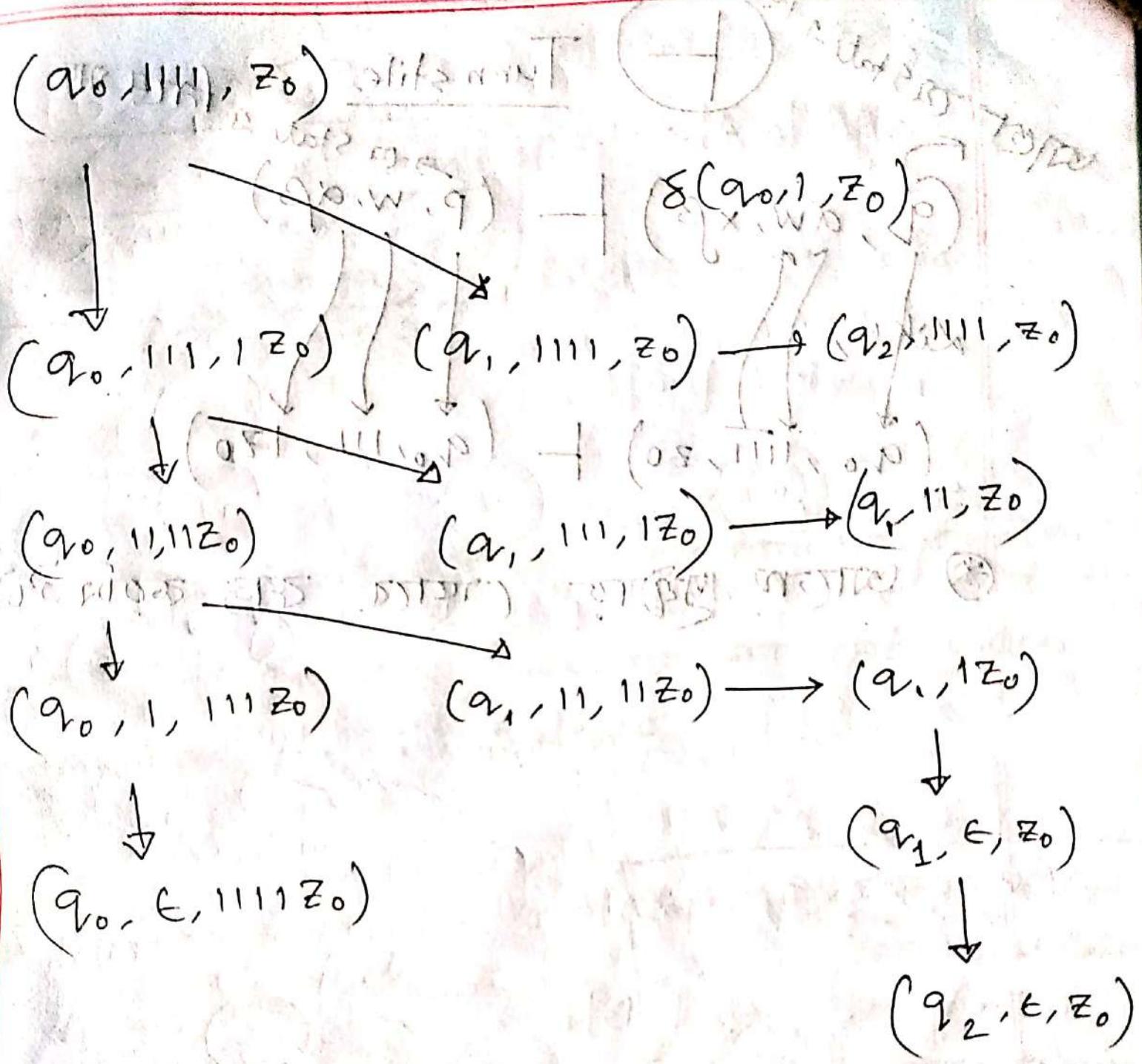
स्टैक z_0 का

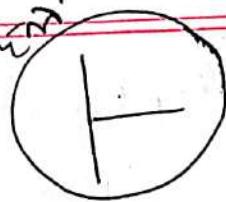
⑤ z_0 को एक बोर्ड पर लिया जाए।

z_0

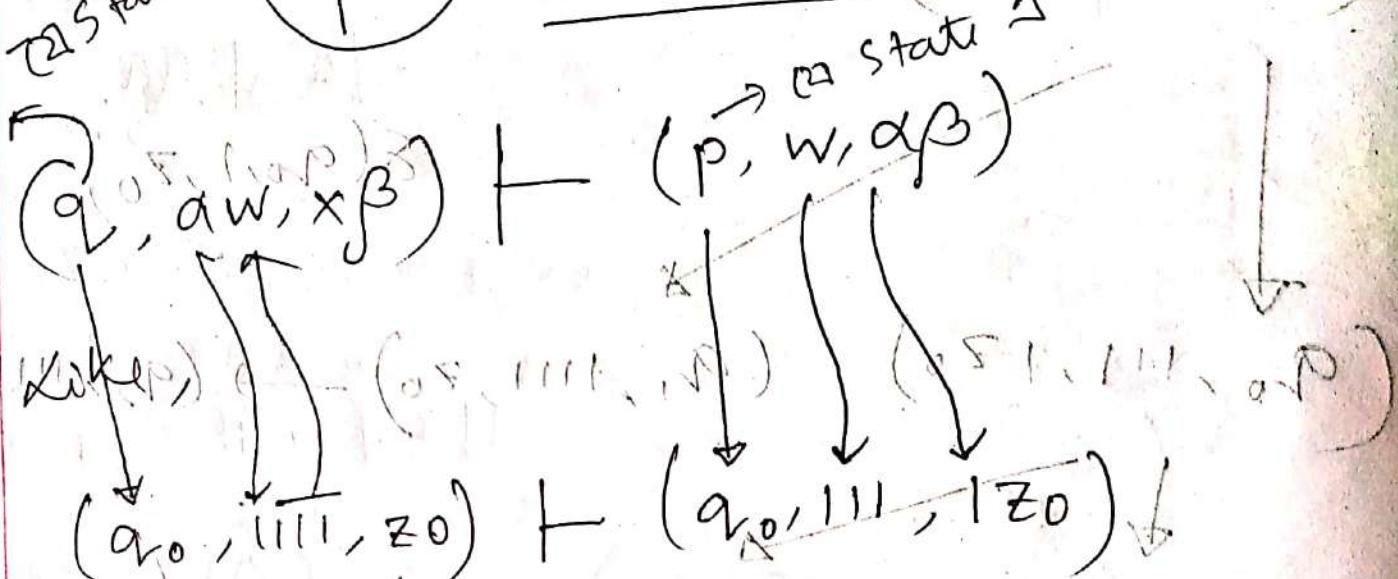
111

0/0
1/1





Turn stile (স্টেট পর্স)



⊗ অন্তর্ভুক্ত (যাতে ক্ষতি হচ্ছে)



shahnawaz
SIR

E Day
Cycle-12

11.2.19

(V, T, P, S)

Chomsky Normal form

$A \rightarrow BC$ (variable)

$A \rightarrow a$ (terminal)

$S \rightarrow AB \mid a \rightarrow a$

$A \rightarrow b$

$S \rightarrow a$

$A \rightarrow b \rightarrow a$ বাপ দিয়ে নির্দিত সার্ট অবশ্যই useless inputs।

এই symbol ক্ষমতার মধ্যে হচ্ছে এই যেকোনো useless symbol কে বাপ দিয়ে নির্দিত সার্ট।

$S \rightarrow AB$

$A \rightarrow aAA \mid c$

$B \rightarrow bBB \mid c$

$A \rightarrow c$ নির্দিত সার্ট
অন্ত নির্দিত সার্ট
যেকোনো অন্ত
নির্দিত সার্ট

যেমন $A \rightarrow aAA$ (যদে)

$A \rightarrow aA$ নির্ধারণ
সার্ট, $\rightarrow A \rightarrow a$

So,

$$A \rightarrow aAA \mid aA \mid a$$

এবং B এর মৌল

$$B \rightarrow bBB \mid bB \mid b$$

মুক্ত সূত্র A বিন্দু

(অধিনাম) ΣA

(ভৱিষ্যত) $\Sigma A'$

$\Sigma A \rightarrow \Sigma A'$

So, S কে মিথলে

$$S \rightarrow AB \mid A \mid B$$

So, System টি নতুন করে মিথলে-

$$S \rightarrow AB \mid A \mid B$$

$$A \rightarrow aAA \mid aA \mid a$$

$$B \rightarrow bBB \mid bB \mid b$$

AND ΣA

$$I \rightarrow a | b | I_a | I_b | I^1 | I^0$$

$$F \rightarrow I | (E)$$

$$T \rightarrow F | T * F$$

$$E \rightarrow T | E + T$$

Unit Production: एक वार्ड जिसमें एक एकल सिंगल

वार्ड (एक दिलचस्पी) - $E \rightarrow E$, $E \rightarrow F$

उदाहरण-

$$(E, E) E \rightarrow T(E, T) T + T | \alpha T \leftarrow \beta$$

$$(E, T) T \rightarrow F (E, F)$$

$$(E, F) F \rightarrow I (E, I)$$

(~~DDDD~~)

(T, T) T → F (T, F)

(T, F) F → I (T, I)

(F, F) F → I (F, I)

(I) I ← T

T & I / I ← T

ବ୍ୟାକ୍ସନ୍ କରି ହୁଏ ଏବଂ Unit Production Rule
Remove error,

I → a | b | Ia | Ib | I0 | I1

F → I | E

T → F | T * F

E → T~~*~~ | E + T (T, F + T (I, I))

(I, I) * T (I, I)

(T, I) + T (I, I)

(I, I)

Removal of U.P.

Pair	V. P. eliminate any one
(E, E)	$E \rightarrow E + T$
(E, T)	$E \rightarrow T * F$
(E, F)	$E \rightarrow C(E)$
(E, I)	$E \rightarrow a b I_a I_b T^* I_1$

So,

$$E \rightarrow E + T \mid T * F \mid C(E) \mid a \mid b \mid I_a \mid I_b \mid T^* \mid I_1 \quad \text{---} \textcircled{1}$$

From table

Pair	V. P. eliminate any one
(T, T)	$T \rightarrow T * F \mid T^*$
(T, F)	$T \rightarrow (E)$
(T, I)	$T \rightarrow a \mid b \mid I_a \mid I_b \mid T^* \mid I_1$

$$T \rightarrow T * F \mid (E) \mid a \mid b \mid I_a \mid I_b \mid T^* \mid I_1 \quad \text{---} \textcircled{1}$$

Same way (\emptyset , (F, F) ~~are~~, (F, I) are),

$\Omega \Sigma \Gamma$ ~~is~~ \emptyset ,

$F \rightarrow (E) \mid a \mid b \mid I_a \mid I_b \mid I_0 \mid I_1$

$I \rightarrow a \mid b \mid I_a \mid I_b \mid I_0 \mid I_1$

$\Omega \Sigma \Gamma$, Given Grammar ~~(2/8 U.P Removed)~~

2A,

Steps:

① Remove Useless Symbol

② ϵ Epsilon

③ Unit Production

ক্ষেত্র (১) Terminal Symbol : {a, b, 0, 1, +, -, *,

Variable : E, F, T, I

A → a
B → b
C → 0
D → 1

G E → () | a c | d / s | 0 r o | N | M | T ← \$

H D →) E, T, F, I এবং অন্য নথি | N T ← "

J B → + মেঘ এবং অন্য

K A → A Variable কাৰ্য , | 0 r o ← Replace

সমূহ ① ② ③ ১ ২ ৩

E → E J T | T K F | G E H | a | b | I A | I B | I C | I D

T → T K F | G E H | a | b | I A | I B | I C | I D

F → G E H | a | b | I A | I B | I C | I D

I → a | b | I A | I B | I C | I D

TC ← M

N ← N

H T ← O

M N A . . .

পুরু পুরুলৈ Replace
বুলু বুলুলৈ

କେ ଅନ୍ତର୍ଜାଲ ଏକାଦଶମୁଖୀୟ ପରିଷଦ୍ ଯାତ୍ରାରେ ।

ପ୍ରଦୀପ ମାତ୍ରା-୫୦, କିମ୍ବା

M → JT

$N \rightarrow KF$

$O \rightarrow EH$

S. 8257 -

$E \rightarrow EM | TN | GO | a/b | IA | IB | IC | I \beta | D$

$T \rightarrow TN | GOR$ 8.2 200-500

~~50~~ from the Dept. of Justice

$F \rightarrow G \otimes I$, ..., $\otimes I \otimes \dots \otimes I$ (the Andreief rule)

T → -100

9519791 AET/ADT 14/02/1992 FWT 75-1 e-7
9519791 AET/ADT 14/02/1992 FWT 75-1 e-7
9519791 AET/ADT 14/02/1992 FWT 75-1 e-7

Alka Khare
Sirc

'A' Day
Cycle-13

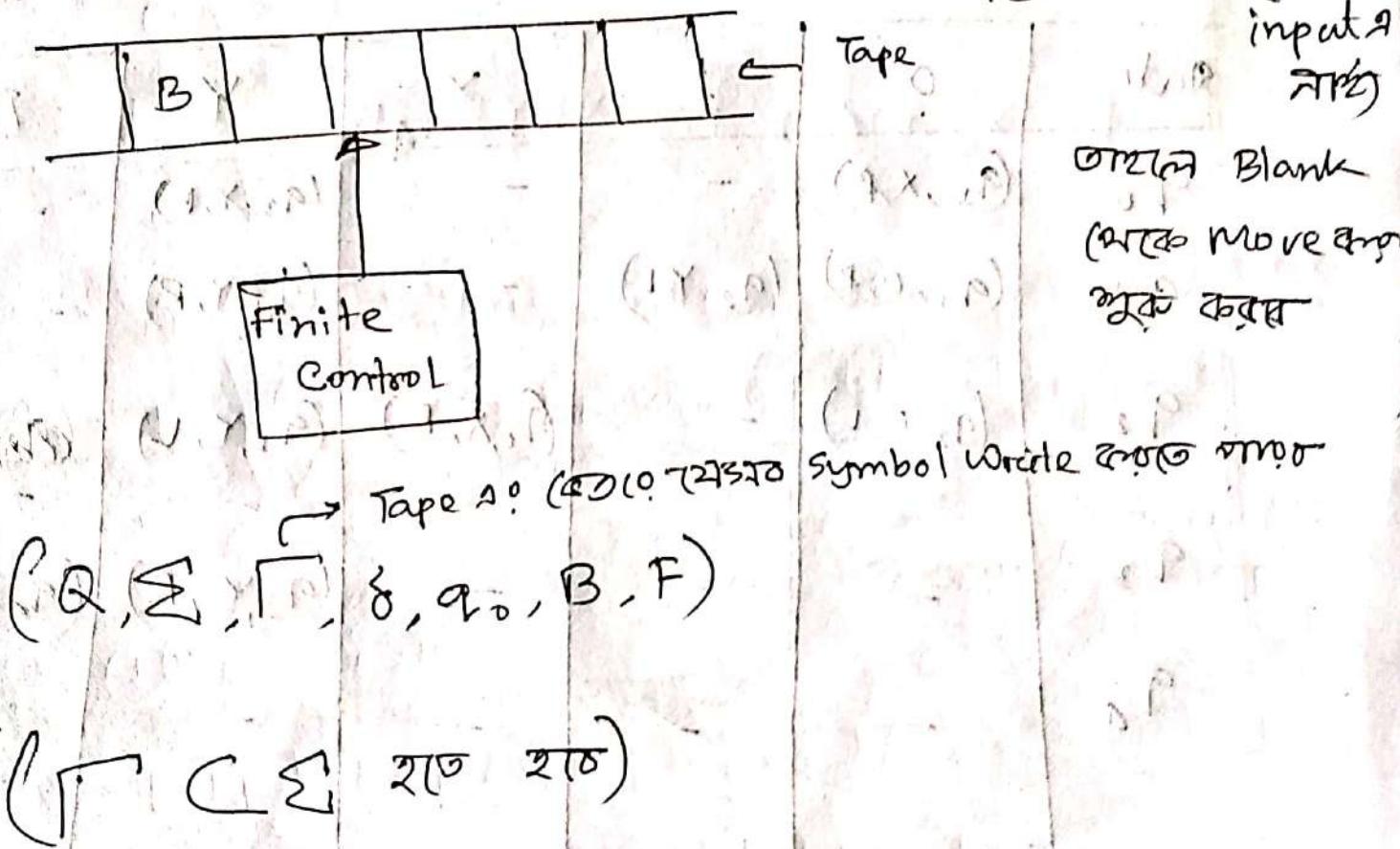
12.2.19

Undecidability:

$$x^n + y^n = z^n \rightarrow n > 2 \text{ হলে } x, y, z \text{ কেবলো } \\ \text{পারিব না}$$

Turing Machine (DFA + Infinite Model)

B → Blank (বাট
input নাই)



ট্যাপে Blank
থেকে Move আঁচনি
যুক্ত করব

* $(\Gamma \subset \Sigma \text{ এবং } \Gamma \cap \Sigma = \emptyset)$
(Γ এবং Σ এর প্রতি প্রতি symbol আছে Blank Symbol)

* $\Gamma \text{ এবং } \Sigma$ এর প্রতি প্রতি symbol আছে Blank Symbol
যেহেতু Σ তে নাই

ପ୍ରକାଶ ଓ ଅନ୍ତର୍ଗତ କାମ କରିବାର ସଂଖ୍ୟା:

$\delta(q_0, a) = (p, \text{X}, L)$

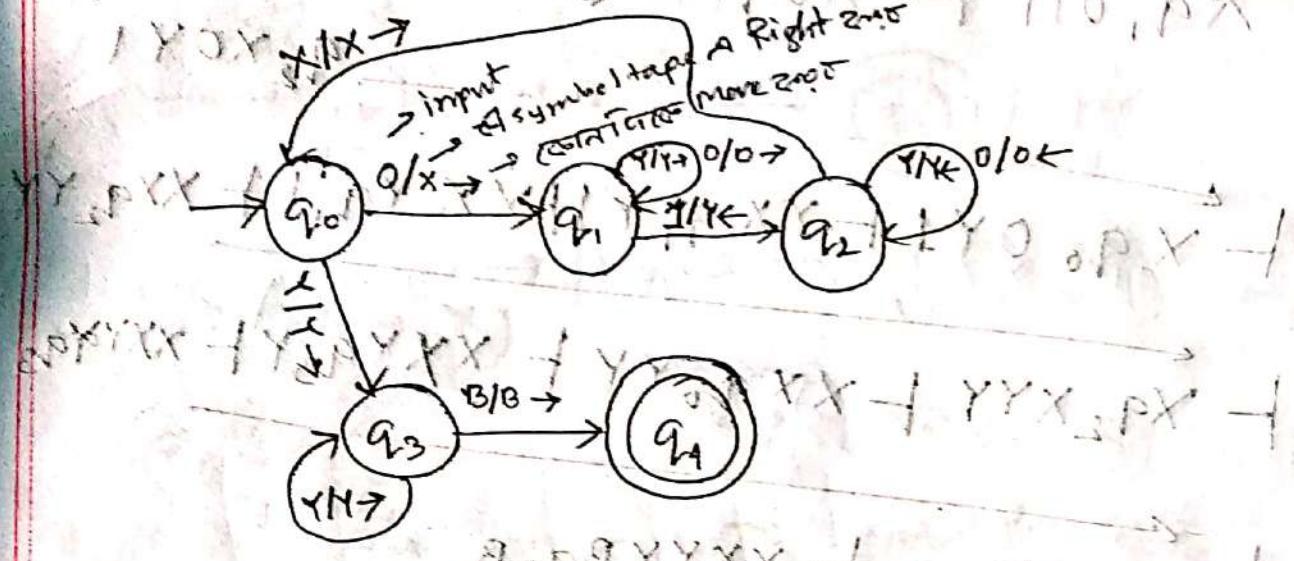
↓
Input
Current symbol
State

↓
ଏହି ସଂଖ୍ୟା
ଏହି ସଂଖ୍ୟାକୁ ଲିଖିବା
ଏହି ସଂଖ୍ୟା ଲିଖିବା, head A
ଏହି ସଂଖ୍ୟା ଲିଖିବା, write B
L R

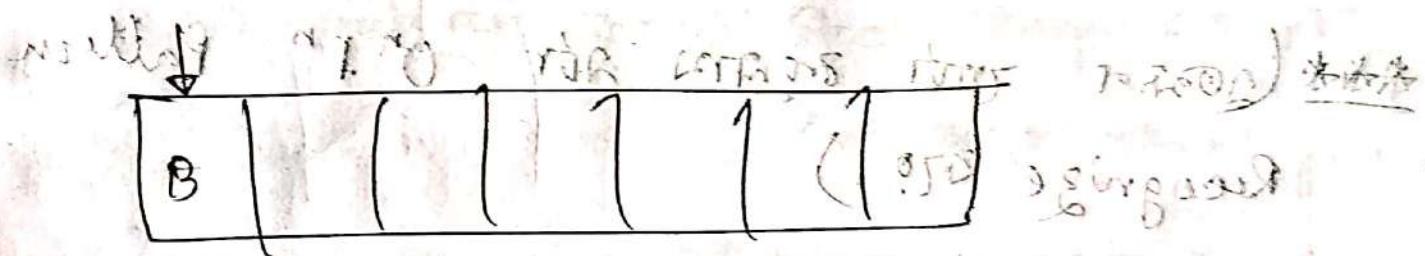
→ direction (head to left or right)
Right ?
Right କାମ
R R

State	0	1	X	Y	B
q_0	(q_1, X, R)	-	-	(q_3, Y, R)	-
q_1	$(q_1, 0, R)$	(q_2, Y, L)	-	(q_1, Y, R)	-
q_2	$(q_2, 0, L)$	-	(q_0, X, R)	(q_2, Y, L)	(q_1, B, R)
q_3	-	-	-	(q_3, Y, R)	(q_4, B, R)
q_4	-	-	-	-	-

$(\{q_0, q_1, q_2, q_3, q_4\}, \{0, 1\}, \{0, 1, X, Y, B\}, \delta, q_0, B, F)$
 $\{q_1\}$



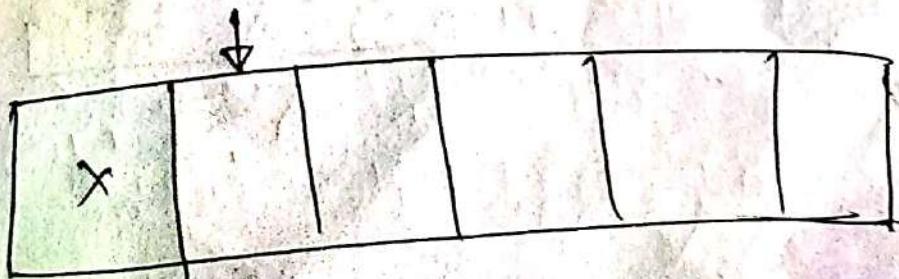
തുടർ തുട്ട് Tape -



✳️ ഫോർമാൾ Input Process എന്ന് പറയുന്നു

Turing Machine ആ തന്ത്രം -

$q_0 0011 \xrightarrow{\delta} q_1 011$

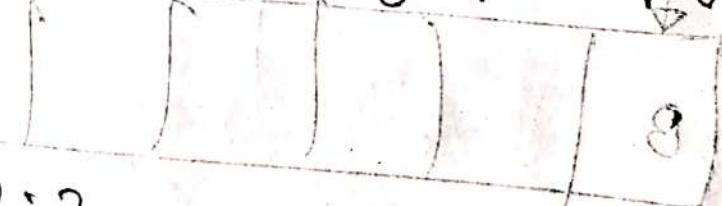


$\vdash x_{q_1, 011} + x_{0q_1, 11} \vdash x_{q_2, 0XY11}$
 $\vdash x_{q_0, 0Y1} \vdash xx_{q_1, Y1} x_{q_2, 1} + xx_{q_2, YY}$
 $\vdash x_{q_2, XY} + xx_{q_0, YY} \vdash xx_{q_3, Y} + xx_{q_3, YY}$
 $\vdash xx_{q_3, B} + xx_{YYB} q_4 B$

प्रत्येक अवधि एक वर्ष

एकान्त भूमि संलग्न गत्र On Pattern
Recognize के।)

8.2, 8.2.2



10.3 2020 मध्ये 11.00 ठिकाण

→ तीव्र वाढी विनाश बढ़ावा

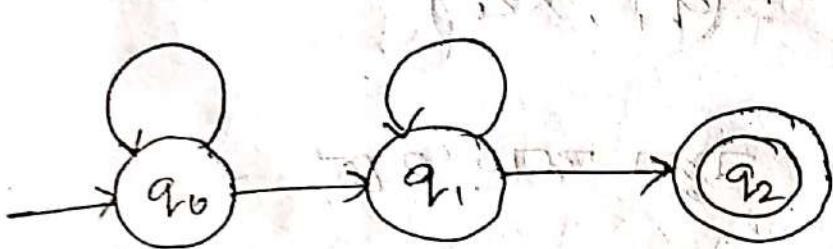
11.00 X + 11.00 वर्ष



skalmar
Sire

'A' Day
Cycle - 14

19.2.19



$\delta(q_0, a, x) \rightarrow$ stack top (p, s_x, u, v)

$= (p, \gamma)$

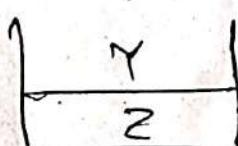
\hookrightarrow stack γ symbol \in কৃতি

$\gamma = x$ return করলে stack change হবে না

$\gamma = e$ u u Pop করলে top নোট এলেমেন্ট

$\gamma = YZ$ u u প্রথমে Z তাও আসবে যখন

প্রথমে Y আসবে তাও আসবে



(q_0, u_0, z_0)

ID

$$\delta(q_0, 1, z_0) = (q_1, xz_0)$$

ক্রম ID অনুন - ২০১০.২৮০

$$(q_1, \text{III}, xz_0)$$

Page - 248, 249, 247

(F, D) =

প্রাপ্ত কোর্টের প্রতি গুণাত্মক

II. এর প্রস্তাৱ কোর্ট স্বীকৃত কৰিব। $x = \frac{1}{2}$

বাবু পাপি ও কুমুদী - ১. ২. ৩. ৪. ৫. ৬. ৭. ৮.

কোর্টের মতো প্রাপ্ত প্রতি গুণাত্মক $SY = \frac{1}{2}$

$\left[\begin{array}{|c|c|} \hline & 1 \\ \hline 2 & \\ \hline \end{array} \right]$

কোর্টের মতো মূল ফর্মুলা

$$(x, \text{III}, oP)$$

টেক্স