Step 4: find the starting position of MDIA S = f 1,23. Step 5: construct minimal DFA from the table. minimal DFA diagram. (2) a + bb method-1: Step 1: Partion the States Porto accepting and non-accepting states Po = (ABC) (D) 61 62 Step 2: find the successor of State A, B, C, D. & Spirt, no. Split operation. A & B NO P & C & no. split.

B & B NO P & C & no. split.

C & D - Split. D by -Step 3: There & contain sylit. operation. 1 - Squittent $P_1 = (AB)(C)(D)$ $G_1 G_2 G_3$ B & B Joint B & C J Spirit 2- equivalent $P_2 = (AB)(C)(D)$ Pn = (AB) (C) (D) (State A - State B) minimal DFA. DFA Table modified DrA table Pp b a a b State Stare B C Á A C BA C BA dupliente C D C \mathfrak{D} D D

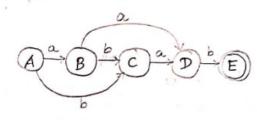
(3) (alb) ab.

set of states that can be reached from states through E-transition.

· Ilp	Starting	ending
a	1,5	2,6
b	3,6	417.

Apply Input 'a' on state (A). E-closure (2) = $10.53 \rightarrow 6$ Apply input 'b' on State (A), ε -closure (4) = $\xi^4 \dot{\xi} \dot{\chi} \rightarrow \hat{c}$ Apply input 'a' on state (B), s-closure (6) = fby $\rightarrow \bigcirc$ Apply input b' on state (B), E-closure (-) = (Apply input b' on state (c). E-closure (6) = (5) Apply input 161 on state (C), E-closure (-) biotie (4) - (4) DFA diagram. DEA! Table a-D=(-)

וווע	ħ. 201	
State	a	b
A	В	C
В	D	-
C	D	-
D	_	E
E	_	-



(4) ab (a1b)

Set of states that can be reached from States through E-transition.

 ε -closure (o) = $\{0\} \hookrightarrow (A)$

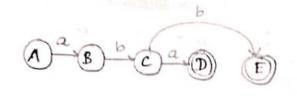
r p	Starting node	ending
a	0,3	1,4
b	1,5	216

Apply input 'a' on State (A), E-closure (1) - (13 - B) Apply input b' an State (A), E-closure (-) = input 'a' on state (B), E-closure (-) = Apply Apply input 16 on state (B), E-closure (2) = {213,59 - 0 Apply input la' on state (c), E-closure (4) = 14573 -> 1 Apply input b' on state (c), s-closure (6) =16,73 -> 1 Apply input 'a' on state (D), E-closure (-) = _ Apply input b' an State (D), s-(losure (-) = input 'a' on state (F), s-closure (-) = Apply Apply input 16' on State (F) . E-closure (-)

(2)

DEA	Table	
state 9p	a	b
A	В	-
В	_	C
_c	D	F
D	_	_
E *	-	_

DEA diagram.



(5) (alb) aaa (alb).

Set of states that can be beached from states through e-transition.

TIP	Starting	ending node.
a	1,5,6,7,9	2,4,6,1,8,
b	3,11	4112

Priput 'a' on State (A), E-closure (2) - { 215} > (B) Apply Propur 16 on State (A), E-closure (4) = 84,53 -> @ Apply input 1a' on state (B), E-closure (6) = 464 \rightarrow D Apply Input 16 on State (B), E-closure (-) = -Apply Apply input la' on state (a), s. closure (6) = -> 10 Apply input 'b' an state (c), E-closure (-) = -Apply inpute a' on state (D), E-closure (7) = fry -> 1 input 16' on State (D), E-closure (-) = -Apply input 'a' on state (E), E-closure (8) = 18,9,113 -> (5) APPIY input b' on State (E), &-closure () = -Apply Apply input 'a' on State (F), 5-closure (10) = {10,13} -> 6 input 1 b' on state (F), E-(losure (12) = {12,133} -> (F) Apply input 'a' on strite (6), &-closure C-) - -Apply Input 'b' on state (ca) . = - closure (-) = -Apply input 'a' on State (H), 5-closure () = -Apply Pripur 16 on state (4), E-(bosure (-) = -Apply

(2) (a) b)ab.

NFA:

(alb)ab - faib's ab

(6) (a1b) "

Set of states that can be reached from states through a transition.

e-closu	(o) gr		10,197	3 -	1
E - Closu	(o) gr	*	10,1,7	7 -5	

fp storeting and ting node.

2 2 3

b 4 5

oture (2) = \$1.23.4.6.11 → €

Apply input to on state (1), ε -closure (2) = ilegistrate (1) $\rightarrow \mathbb{C}$ Apply input to on state (1), ε -closure (2) $\rightarrow \mathbb{C}$ Apply input to on state (2), ε -closure (3) $\rightarrow \mathbb{C}$ DEF +28/ ε -Closure (3) $\rightarrow \mathbb{C}$

Apply input 12' on state (1), 5-closure (1)-10

DEA chagram.

'b' on	De (2) grutols-2, (3) stote
rom.	5
(1)0	60°

roce	0.	6
A	8	c
3	3	c
C	18	5

(7) (alb) * ab.

Set of States That can be reached from states through &-transition.

			-	
Cotosure to)	=	€0,	1,2,4,3.	->(A)

Stort fing	and fing
2,7	378
418	5,9
	217

Apply input a on state (A), \mathcal{E} -desure (3), \mathcal{E} -desure (3), \mathcal{E} -desure (3), \mathcal{E} -desure (5), \mathcal{E} -desure (6), $\mathcal{$

Apply input to on state (8), Extorne(50) = (12) 41516,7193 - (12)

Apply Popus 16' on State (1), E-(losure(2)) - D

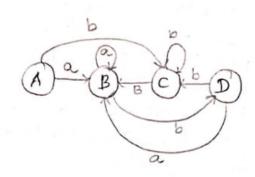
Apply Popus 16' on State (1), E-(losure(2)) = D

while when the con state (D) + E-closure (C(8) = (B) Apply input 'b' On State (D), E-closure (g) = fay -> E Apply input of on state to, catosure (+) Apply import b' on state (E), Ecclosure (a) a-

DEA Table

granilp	a	Ь
×	B	C
B	В	D
c	В	С
_ D	B -	С

DEA diagram.



(8) (alb) * abb

sets of states that can be reached from States Through E. transition

1	star ting node	ending
a	217	3,8
b	4,8,9	5,9,10

Apply 9p la' on State (A), Eclosure (3,8)= \$ 1,2,3,4,6,7,8 \ -> B Apply input 'b' on State (B), E-closure (5) = {11214,516,73 -> @

Apply input 'a' on state(B). E-closure (3,8) -> B

Apply input 16' on State (B), E-dosure (S19) = {1,2,4,5,6,7,9} → (D)

Apply input la' on state (c), &-closure (3,8) -> (B)

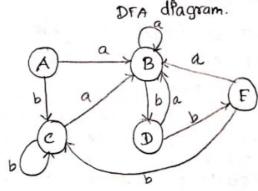
Apply input 'b' on state (c), 5-closure (5) -> @

Apply Input 'b' on State (D), E-closure (510)=(1,2,4,5,6,719,10) - 1

Apply input 'be on State (D), E-closure (318) -> (B)

Apply input a on State (F), E-closure (318) -> (B) Apply input b' on State (F), E-closure (5) -0

DIA Table		
a	b	
В	C	
B	D	
В	C	
В	F	
В	C	
	B B B	



(9) abb (alb) * Sot of states that can be reached States through 5-transition

tp	Starting mode	ending nodo.
a	0,5	1,6
b	,1,2,7	21318

s-closuro (o) = foy → (A)

Proput 'a' on State (A), E-closure (1) = fig -> (B) Apply

Apply Proput 16' on State (A), 8-closure (-) - -

Apply input 'a' on state (B). 5 closure (-) = -

Apply input 'b' on state (B), &-dosure (2) = 123 -> 0

Apply Paper 'a' on State (1), E-closure (-) = -

Apply Paper 16 on slate (c), 5-closure (3) = {3,4,5,7,10} -> 5

Apply input 'a' on state (D), E-dosure (b) = 14,5,6,7,9,104 -> 1 Apply input b' on state (0), s-closure (8) = \$4,5,7,8,9,109 -> 1

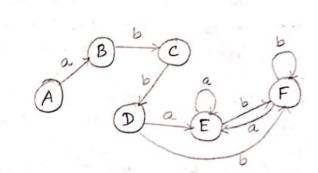
Apply input a on state (F), E-closure (6) -> @

Apply inpu. 'b' on slate (F), E-dosure (8) -> (F) Apply input 'a' on state (F), E-closure (6) -> (E)

Apply Popul b' on State (F), E-closure (8) -> (E)

DI A	Tuble	
State	a	Ь
A	В	-
B	e	C
<u>C</u>	-	C
D	F	F
E	E	F
F	-	

DrA diagram.



(10) a1 b4

dot of states that can be reached from states through c-transfron

lp_	Starting	ending node.
a	2	3
b	6	٦

E-closure (b) = {0,1,2,4,5,6,8,93 -> 1

Apply input 'a1 on state (A), S-closure (3) = f^{213} , 4, $97 \rightarrow \textcircled{B}$ Apply input 'b' on state (A), S-40sure (7) = f^{617} , $8199 \rightarrow \textcircled{C}$ Apply input 191 on state (B), s. dosure (3) -> 13

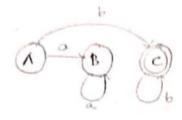
Apply input 161 on state (B), 5-closure (-) = -

DrA table

Apply input 'n' on state (c), s-closure (-1) - @

DrA diagram.

Slates	a	6
Λ	В	C
_D	B	bin
C	-	C



set of states that can be reached from states through.

E-transfillion.

ip.	Rtarting	endtng nocle
α	.1	3

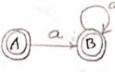
Apply input 'a' on state (B), & closure (3) - { 1,2,3,4,5 } - (B)

DFA Table

B

State	Input
٨	В

DIA diagram.



B

Set of states that can be reached from states through stransition selosure (0) = $\{0,1,23 \rightarrow A\}$

TIP	Starting hode	ending
a	1,3	2,4

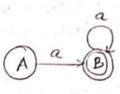
Apply Input 'a' on State (A), &-closure (2,4) = (1,2,3,4) -> B)

Apply Input la' on State (B), 5-closure (3,4) -> B)

DFA Table

State	à
A	B
В	B ·

DIA diagram.



(13) (a* |b*) abb

reached from states through E-transition.

e-closure(0) = {0,1,2,4,5,6,8,9}

Tlp	Starting node	ending node
a	219	3,10
b	6,10,11	7,19,12

Apply input 10' on state (A), E. closure (3,10) = {2,3,4,9,10} -> (B)

Apply input 16' on state (A), s.closure (7) = (6,7,8,9) -0

Apply input 'a' on state (B). E closure (3,10) = -> (B)

Apply input 'b' on state (B), E-closure (11) = {11} - 10

Apply input 'a' on state (c), s. dosure (10) = floy - F

Apply input 'b' on state (1), E-closure (7) = ->@

Apply input 'a' on State (D), E-closure (-) = -

Apply input 'b' on state (D), E-closure (12) = {124 -> @

Apply input ia on state (F), s-dosure (-) = -

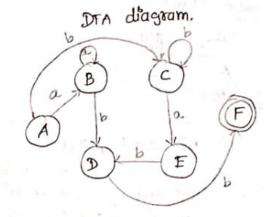
Apply Input 16' on State (F). Eclosure (11) -> (D)

Apply input 'a' on state (F), E-closure (-)-

Apply Paper 'b' on State (F), 5-dosure (-) - -

DFA table

State	a	- b
A	В	C
В	В	D
c	E	С
c D	-	F
E	1-1-	D
F	7	_



(14) (a* (b*)*

Set of States that can be reached from States through 8-transition. E-closure (0) = {0,1,2,3,5,6,7,9,10,119

Ilp	Starting hode	ending
a	3	4
6	٦	8

Apply input 'a' on State (A), E-dosure (4) = {1,2,3,4,5,6,7,9,10,113} Apply input 'b' on State (A), E-dosure (B) = {1,2,3,4,5,6,7,9,10,113} (C)

Apply input 'a' on State (B), E-dosure (A) = (B)

Apply input 'b' on State (B), E-dosure (B) = (B)

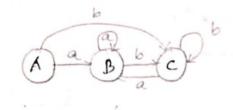
0

Apply input 'a' on state (c), Σ -closure (4) $\rightarrow \mathbb{B}$ Apply input 'b' on state (c), Σ -closure (8) $\rightarrow \mathbb{C}$

DFA Table

DFA dragram

State	a	Ь
A	В	С
В	В	С
С	В	c



(15) (a*b")

set of States that can be reached from States through E-transition.

Ilp	Starting node	Ending node
a	1	2
b	4	5

Apply input 'a' on state (A), E-closure (2) - {1,2,3,4,63 -> @

Apply input 'b' on state (A), E-closure (5) - {4,5,63 -> @

Apply input 'a' on State (B), s. closure (2) = -> (B)
Apply input 'b' on State (B), s. closure (5) -> (C)

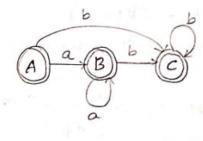
Apply input 'a' on state (c), E-closure (-) = -

Apply input b' on state (a), E-closure (b) -> (C)

DFA Table

DFA diagram.

State	a	b
A	В	c
В	В	С
С		С



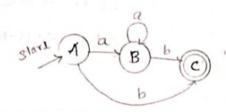
Construction of minimal DFA (or) Peducol DFA Hethod - 1. (1) a 1 b Step 1: parallition the states into accepting and non-accepting states. Po = (accepting). (non-accepting) Po - (NB) (c) groups (marpa. Step 2: Find encessor of state tie.c when input all are applied. BAB Sont BAC Sont step 2: there is used no split operation : Pn = (AB) (c) (State A = State P). modified DFA Table minimal DIA DTA Table TIP ilp b a b a State State NA A C 81 C duplicate. E method - 2 (directly). Step 1: Add # symbol out and of regular expression a * b #. Assign the position including # symbol. Step 2: Step 3: construct postton and follow portition using table. follow, position. position atb# - { 8, a, aa, aaa, aaaa } b# f1,27 = { b, ab, aab, aaab, aaaab ... } #+ {34 2 = {23,123,1123,11123,111123...} 3

(3)

Apply input 'a' on state (c), E-closure (-) -
Apply input 'b' on state (c), E-closure (-) =
DEA Table:

ilp ilp	a	b
A	13	С
B	В	c
С	_	_

DFA diagram:



(2) a * bb

set of States that can be reached from States through E-transition.

Ilp	Starting	onding node.
a	1	2
Ь	3,4	415

Apply input 'a' on State (1), \mathcal{E} -closure (2) = $\{1,2,3\} \rightarrow \mathbb{E}$ Apply input 'b' on State (1), \mathcal{E} -closure (4) = $\{4\} \rightarrow \mathbb{C}$ Apply input 'a' on State (B), \mathcal{E} -closure (2) = \mathbb{E} .

Apply input 'b' on State (B), \mathcal{E} -closure (4) = \mathbb{E} .

Apply input 'a' on State (C), \mathcal{E} -closure (-) = \mathbb{E} .

Apply input 'a' on State (E), \mathcal{E} -closure (F) = $\{5\} \rightarrow \mathbb{D}$ Apply input 'a' on State (F), \mathcal{E} -closure (F) = \mathbb{E} Apply input 'a' on State (D), \mathcal{E} -closure (-) = \mathbb{E} Apply input 'b' on State (D), \mathcal{E} -closure (-) = \mathbb{E}

DFA Table:

DFA diagram:

a	b
В	C
В	C
-	D
-	-
	В

