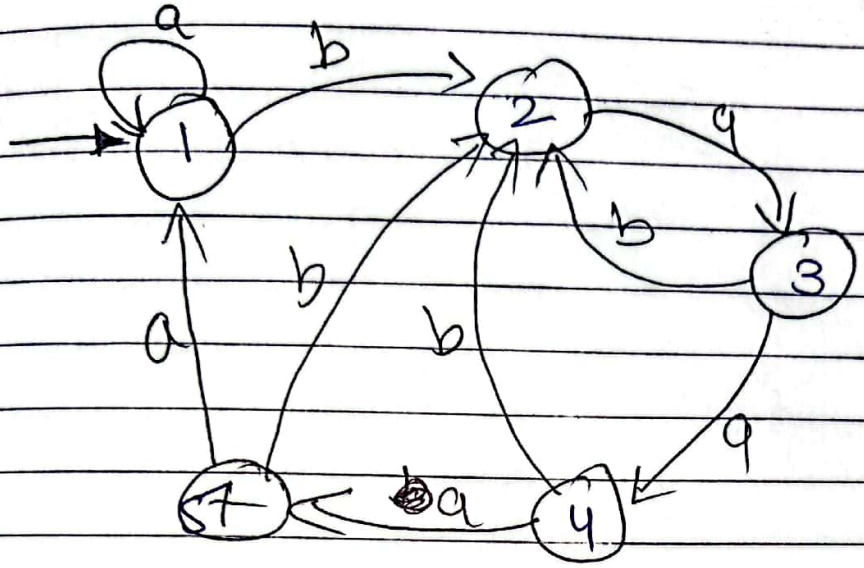
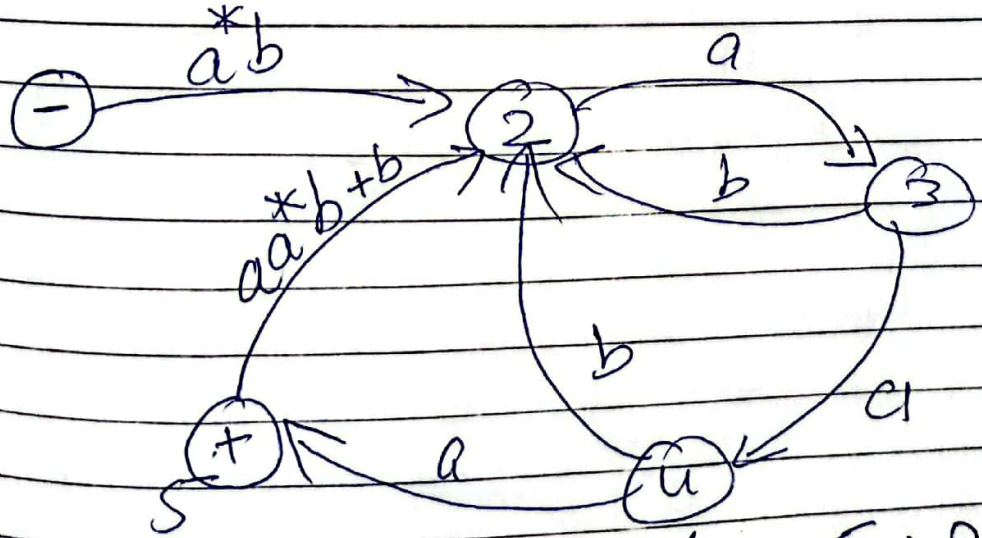
Q. find regular expressions corresponding to following FA.

a.

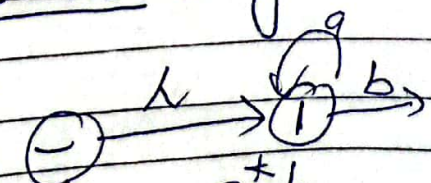


Solution :-

Step-1 : Eliminate State-1 (Introduce λ-transition)



⇒ There were 2-ways from 5 → 2 ① by 'b' other through ① by aa^*b

⇒ λ transition before removal ⇒ 

So, ⊖ → 2 will be $\lambda a^*b = a^*b$

Step-2 :- Eliminate State-2

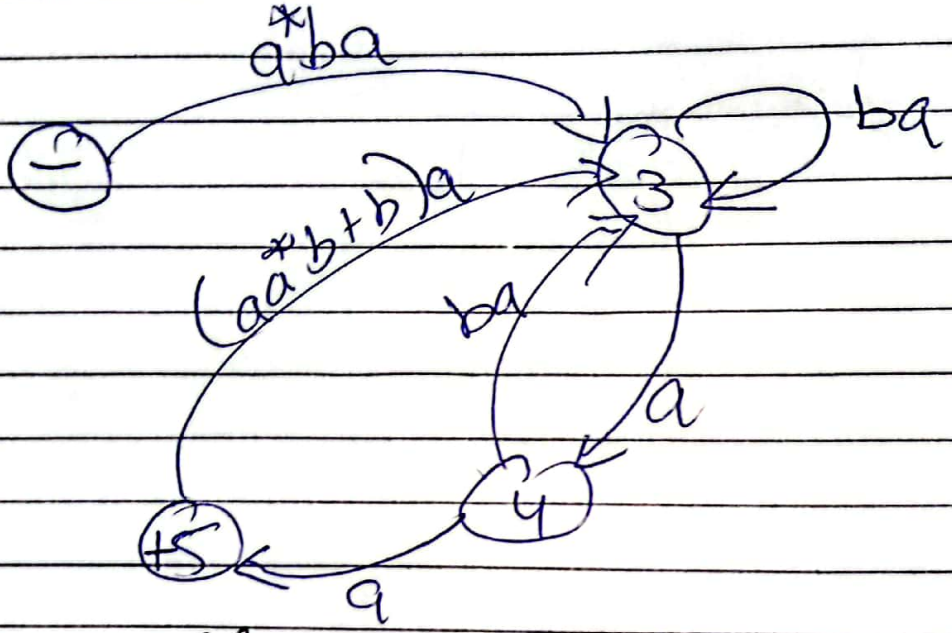
Ways

1 — 2 — 3 ⇒ a^*ba

5 — 2 — 3 ⇒ $(aa^*b+b)a$

4 — 2 — 3 ⇒ ba

3 — 2 — 3 ⇒ ba



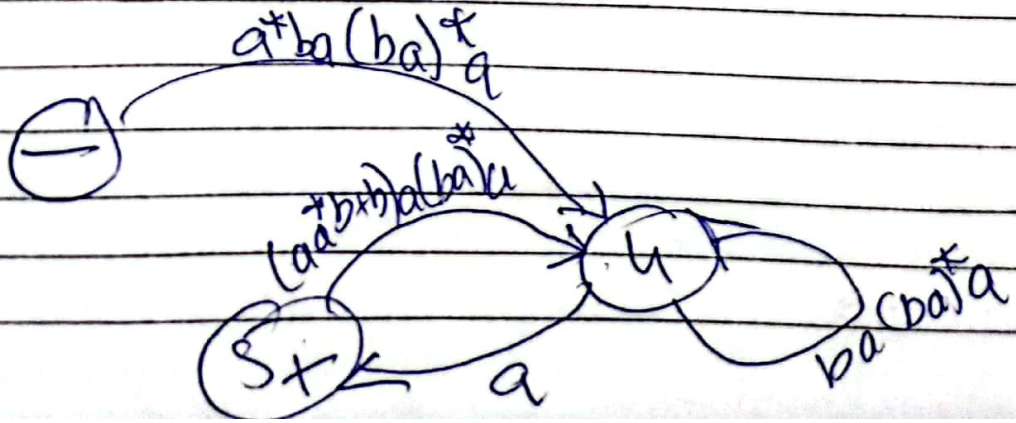
Step-3 :- Eliminate State-3

Ways

1 → 3 → 4 $a^*ba(ba)^*a$

5 → 3 → 4 $(aa^*b+b)a(ba)^*a$

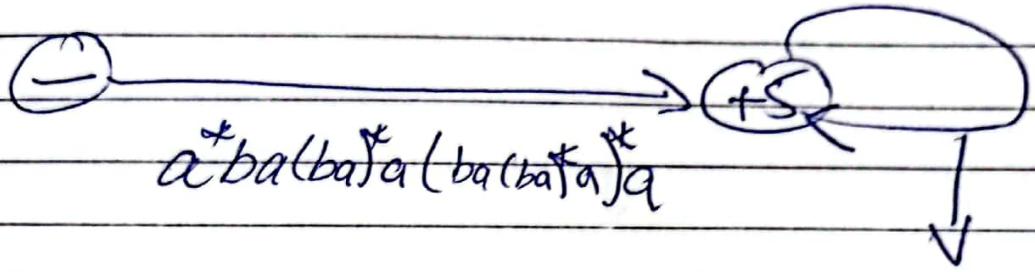
4 → 3 → 4 $ba(ba)^*a$



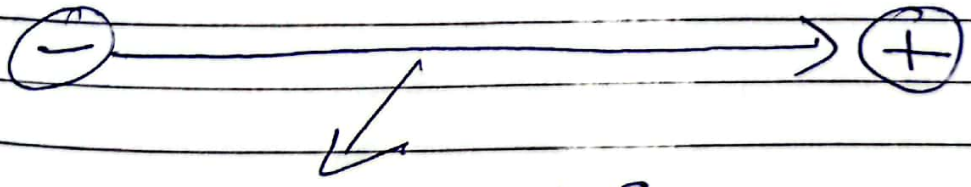
Step-4 :- Eliminate State-4

Way's :- $\ominus \longrightarrow 4 \longrightarrow 5 \Rightarrow a^*ba(ba)^*a \,(ba(ba)^*a)^*a$

$5 \longrightarrow 4 \longrightarrow 5$



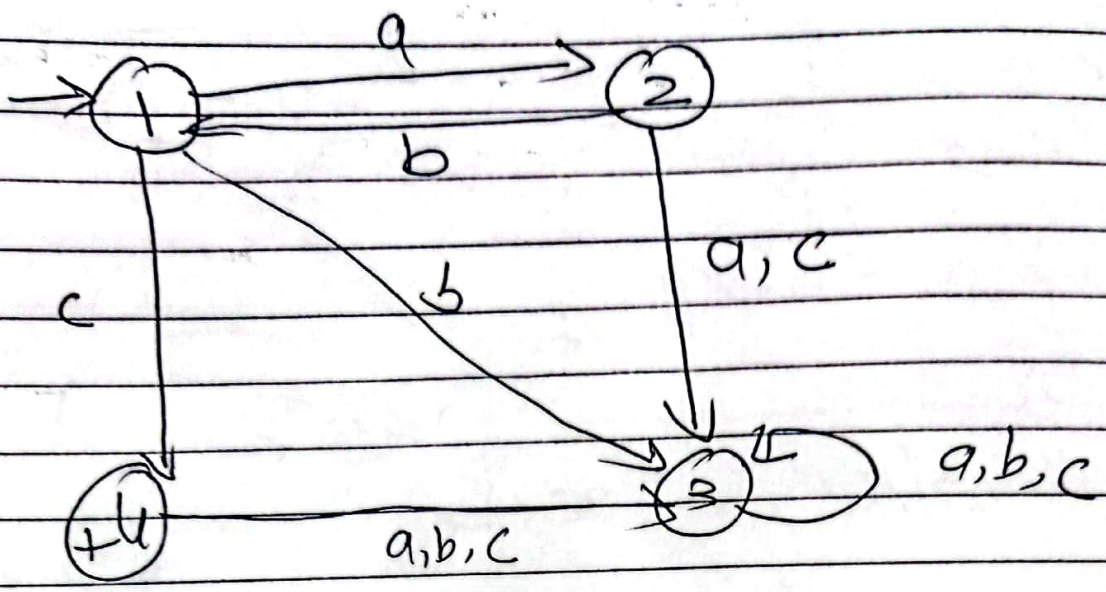
Step-5 :- Eliminate State-5



$a^*ba(ba)^*a(ba(ba)^*a)^*a\,[(aa^*b+b)a(ba)^*a(ba(ba)^*a)^*a]^*$

Final - RE

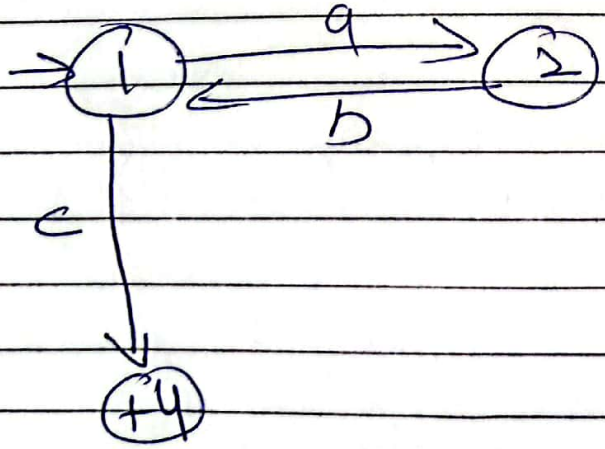
b



Solution:-

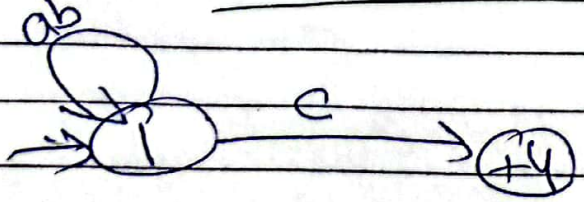
Step-1 :- Eliminate State-3

No paths — Trap-State



Step-2 :- Eliminate State-2

way — 1 — 2 — 1



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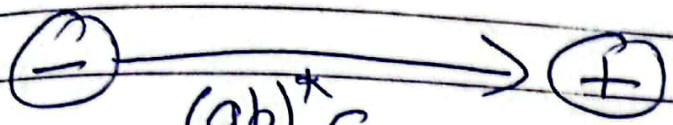
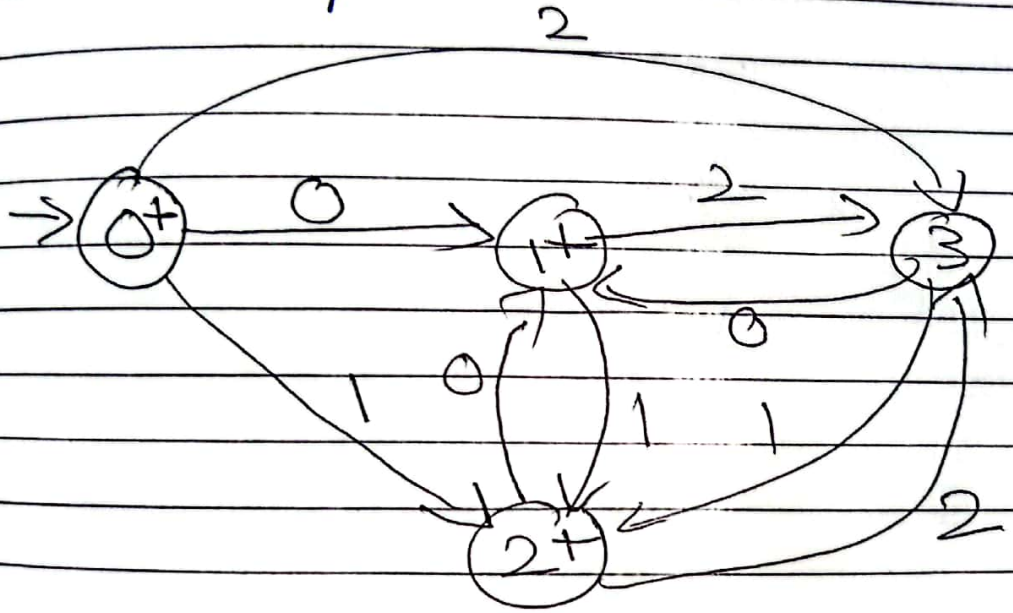
Step-3 Include λ-transitions



$(ab)^*c$

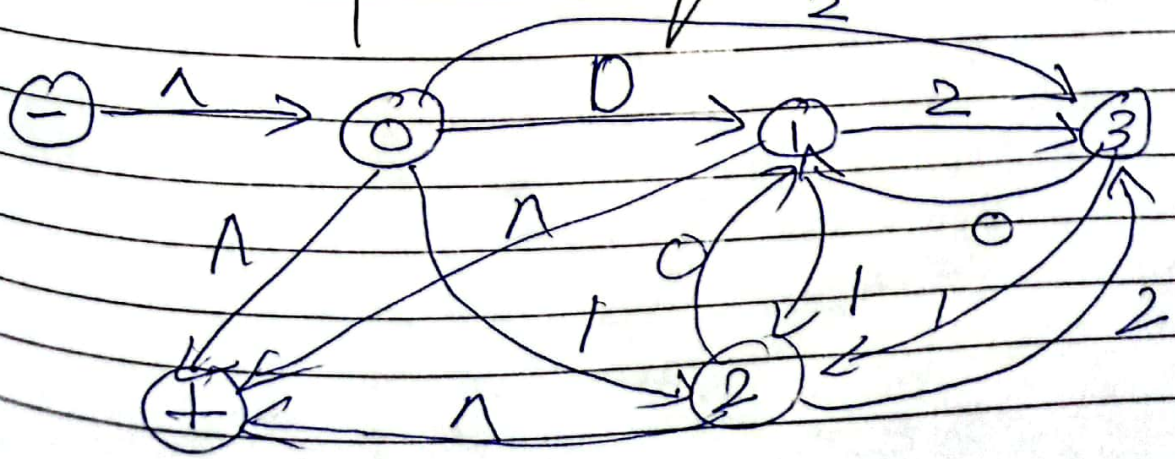
final RE



Solution

Step-1 :- ~~Eliminate State 1~~

Make Unique Start - Stop & State



Step-2 :- Eliminate State-0

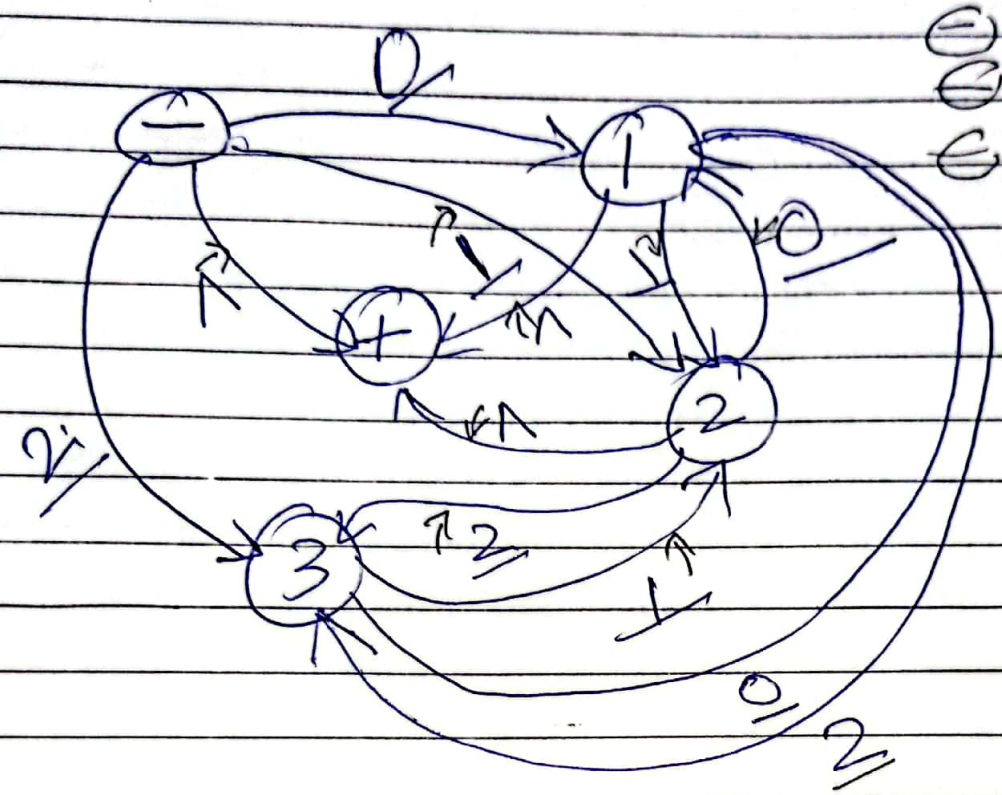
Way's

⊖ — 0 → 3

⊖ → 0 → 1 → 1

⊖ → 0 → 2

⊖ → 0 → + → ∞



Step-3 Eliminate State-1

Way's

⊖ — 1 — ⊕ ✓

⊖ — 1 — 2 ✓

⊖ — 1 — 3 ✓

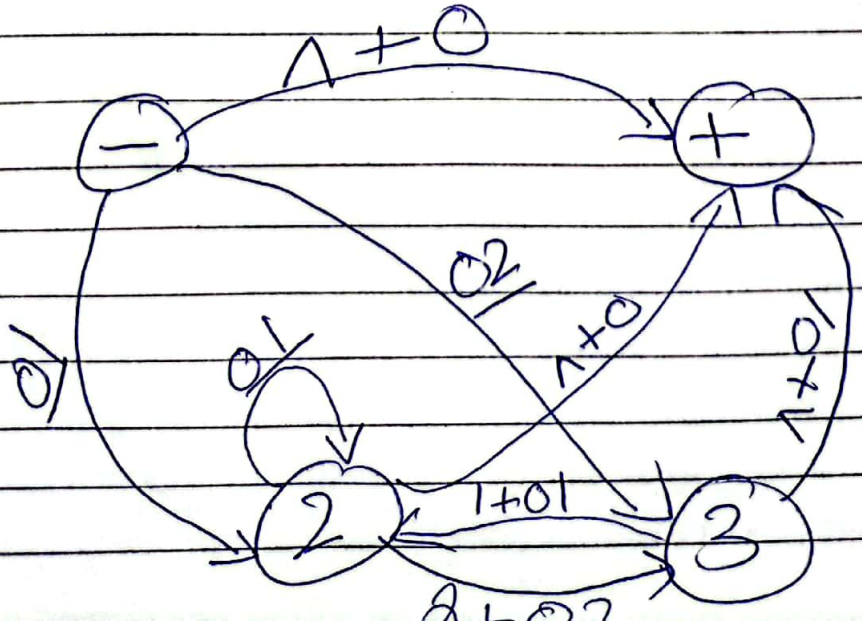
2 — 1 — ⊕ ✓

2 — 1 — 2 ✓

2 — 1 — 3 ✓

3 — 1 — + ✓

3 — 1 — 2



Step-4 :- Eliminate State 2

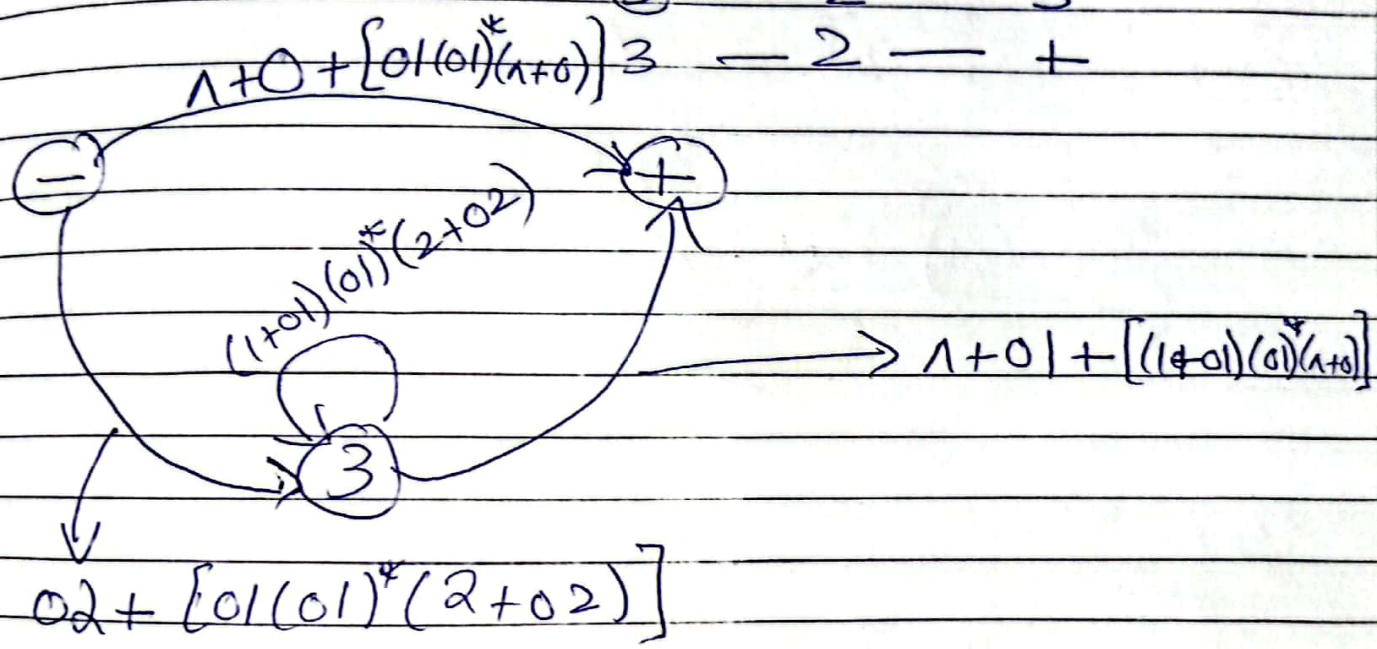
Way's

⊖ — 2 — + ✓

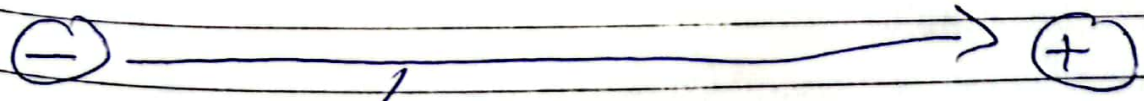
⊖ — 2 — 3 ✓

③ — 2 — 3

3 — 2 — +



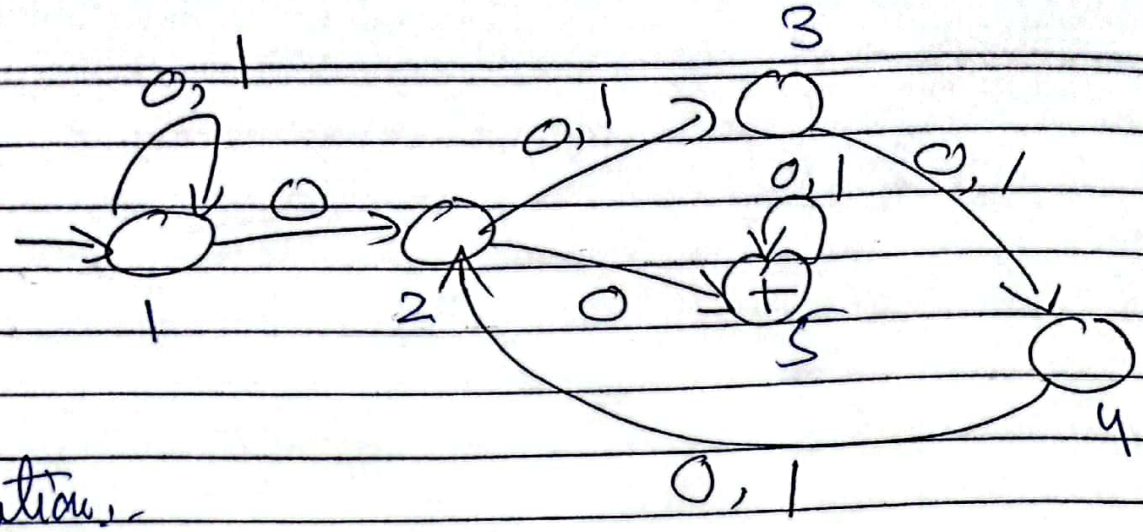
Step-5 Eliminate State-3 ⊖ — 3 — ⊕



$$\Lambda+0+(01)(01)^*(\Lambda+0)+\left[(02+[01(01)^*(2+02)][1+01(01)^*(2+02)]^*[\Lambda+01+(1+01)(01)^*(\Lambda+0)]\right]$$

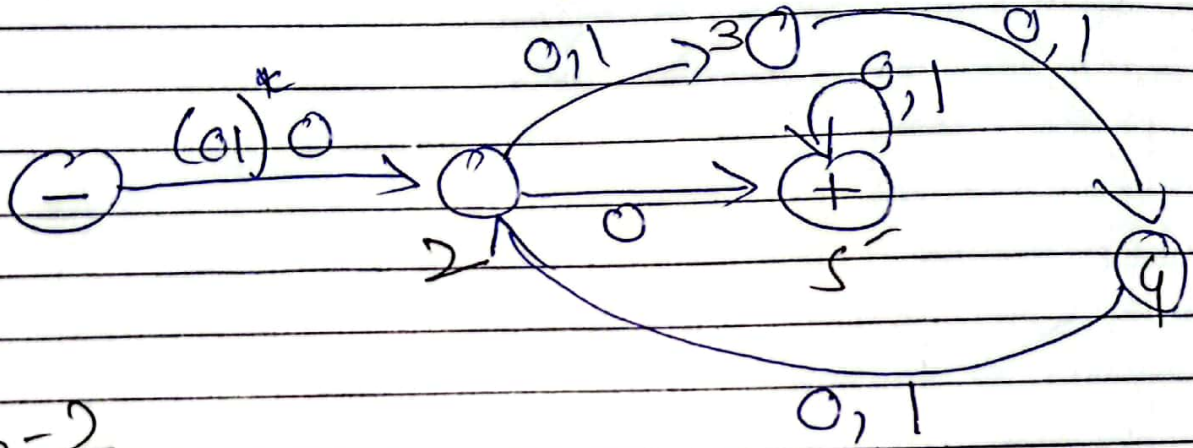
final - RE

d



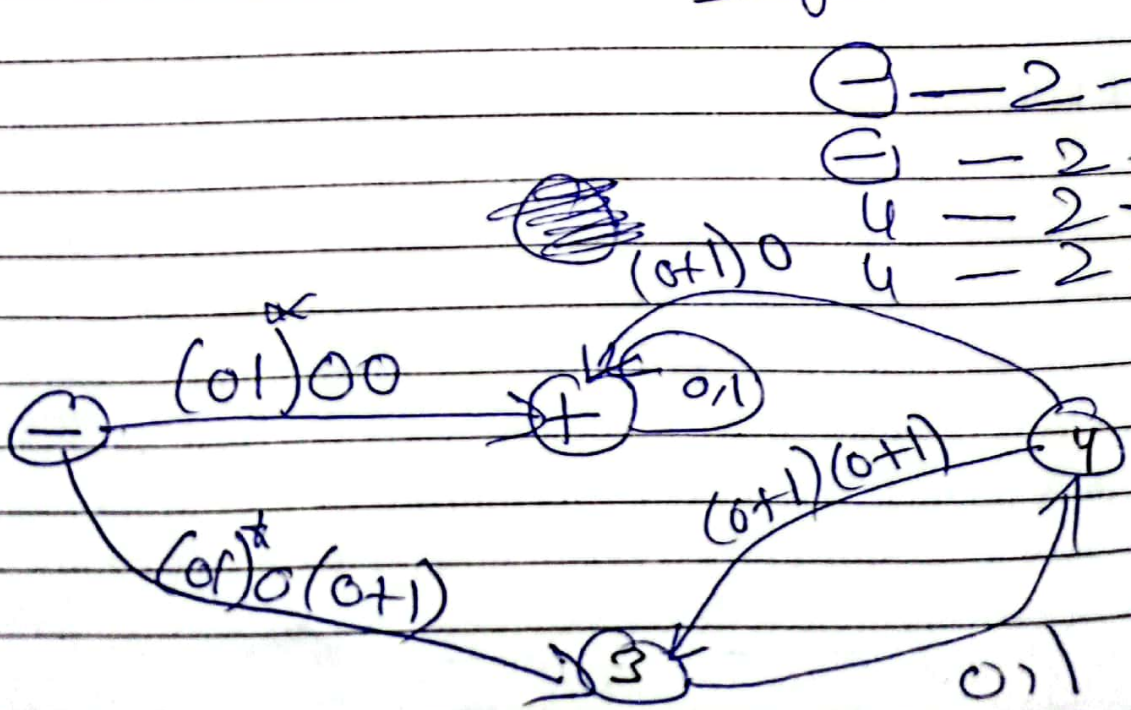
Solution:-

Step 1 :- Introduce λ-transition, Eliminate S_1



Step-2

eliminate S_2



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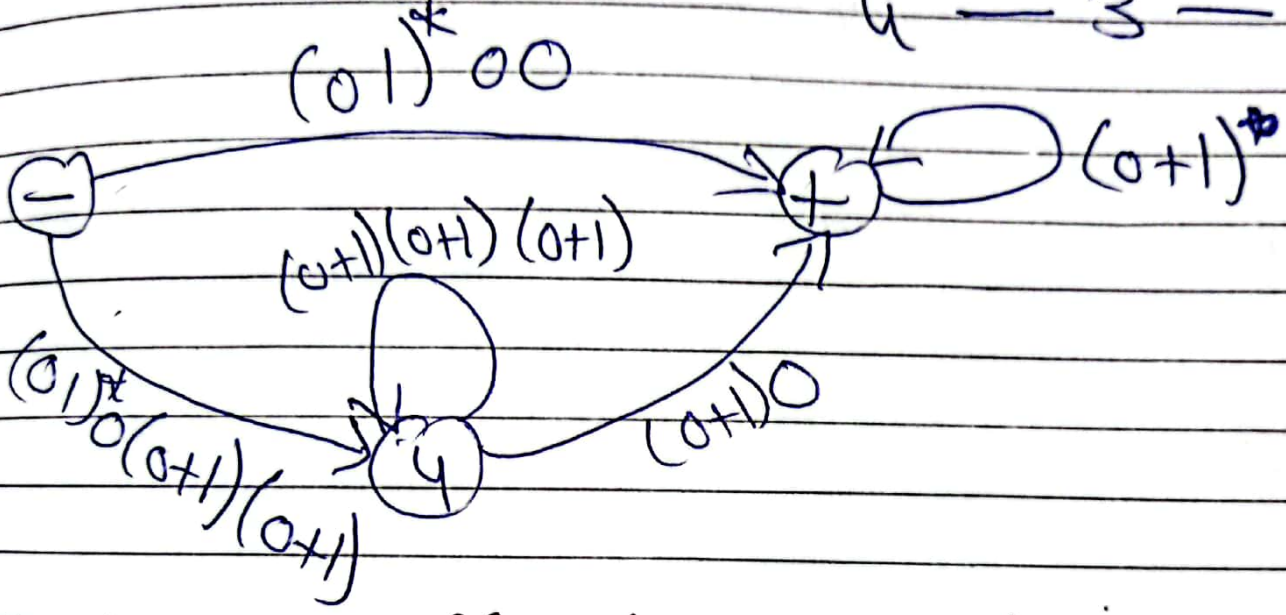
Step-3 Elimate S-3

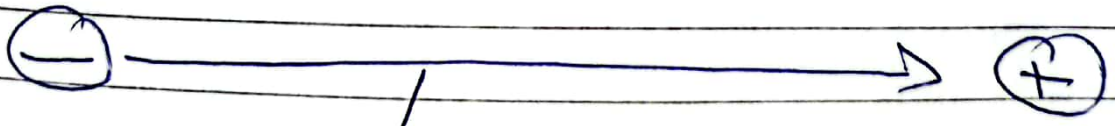
Way's

$\ominus$ — 3 — 4

4 — 3 — 4



Step-4 Elimate S-4

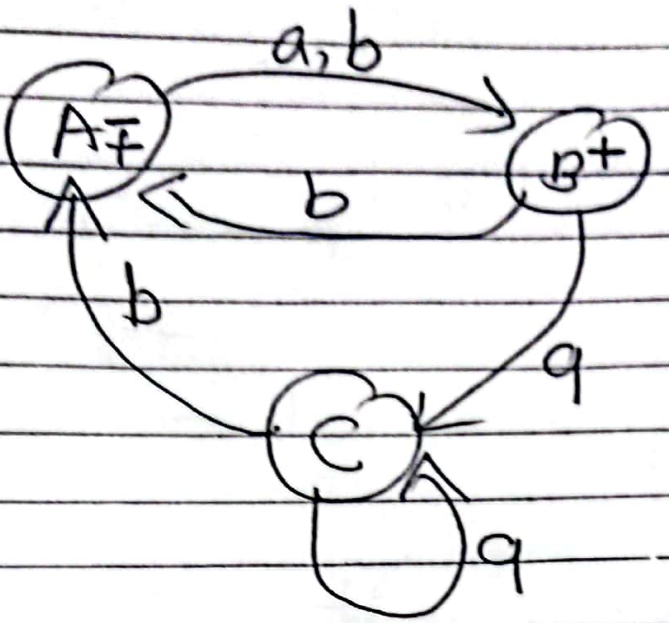


$$\cancel{(01)^* 00(0+1)^* + [(01)^* 0(0+1)(0+1)[(0+1)^3]^*}$$

$$(01)^* 00(0+1)^* + [(01)^* 0(0+1)(0+1)[(0+1)^3]^*(0+1)0(0+1)^*]$$

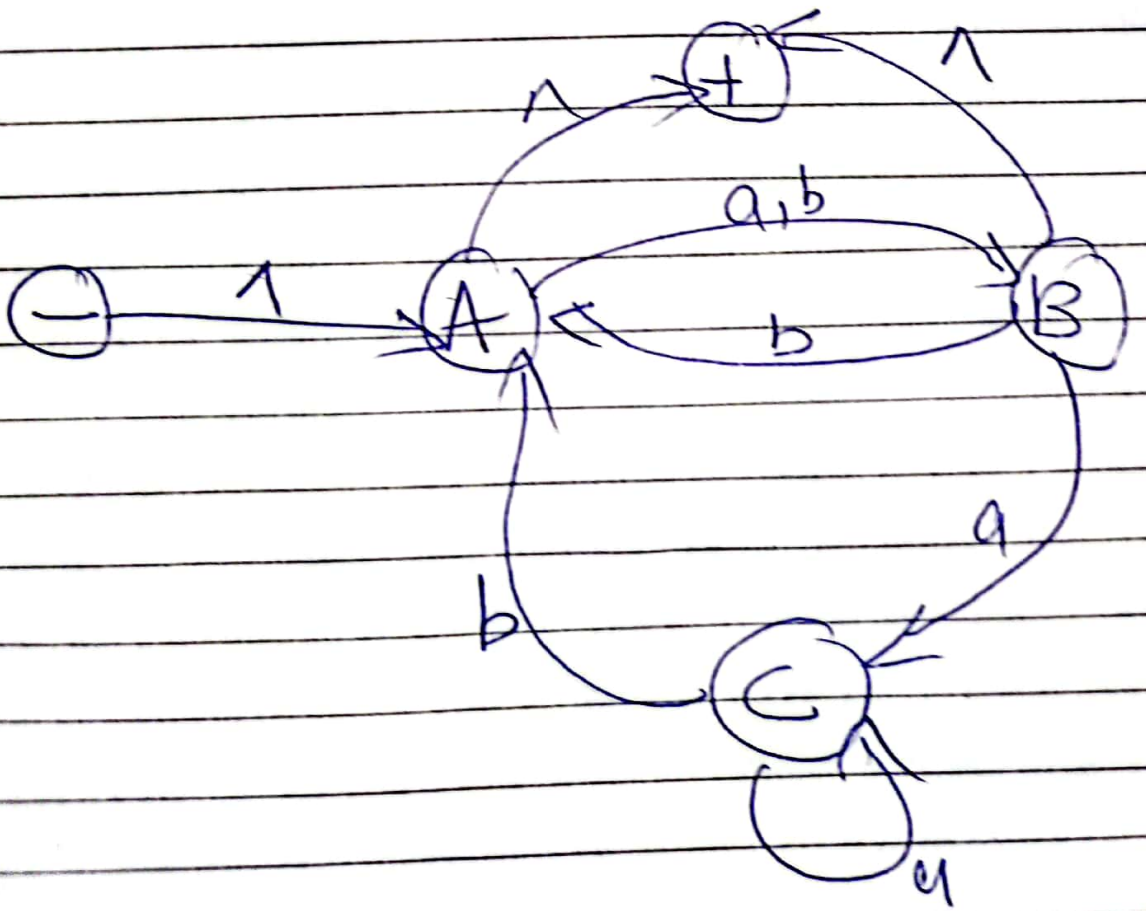
final-RE

Q Convert FA/TG → RE



Solution :-

Step-1 Unique Start/Feed State



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Step-2 Eliminate — A

Way's B — A — +

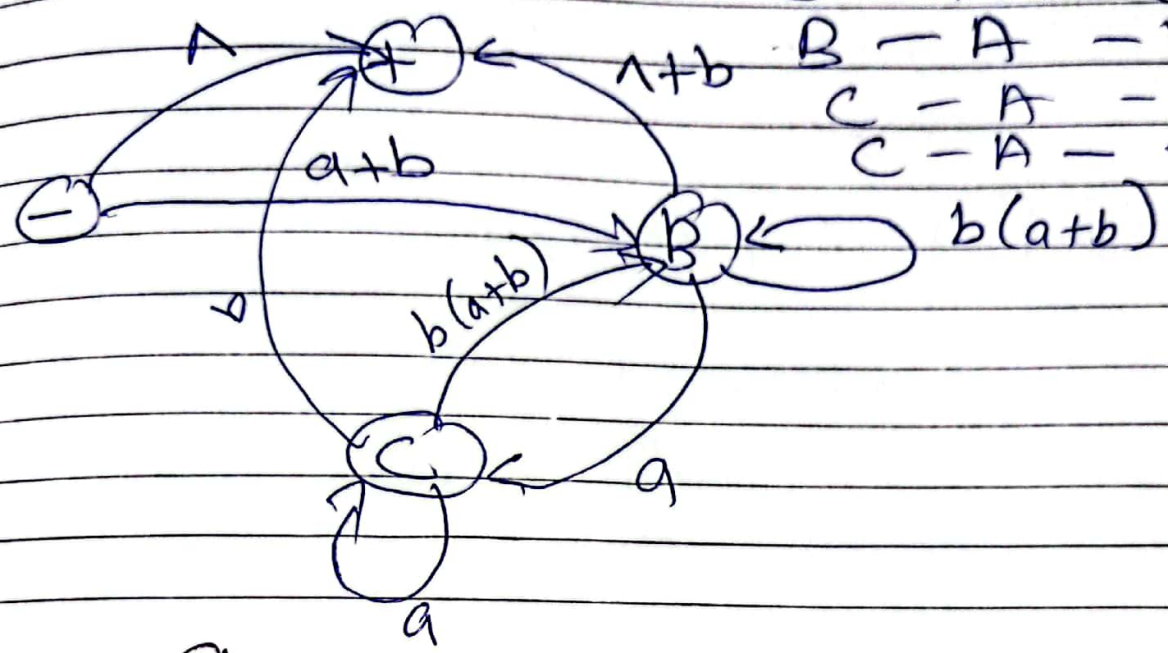
⊖ — A — B

⊖ — A — ⊕

B — A — B

C — A — B

C — A — +



Step-3 Eliminate — B

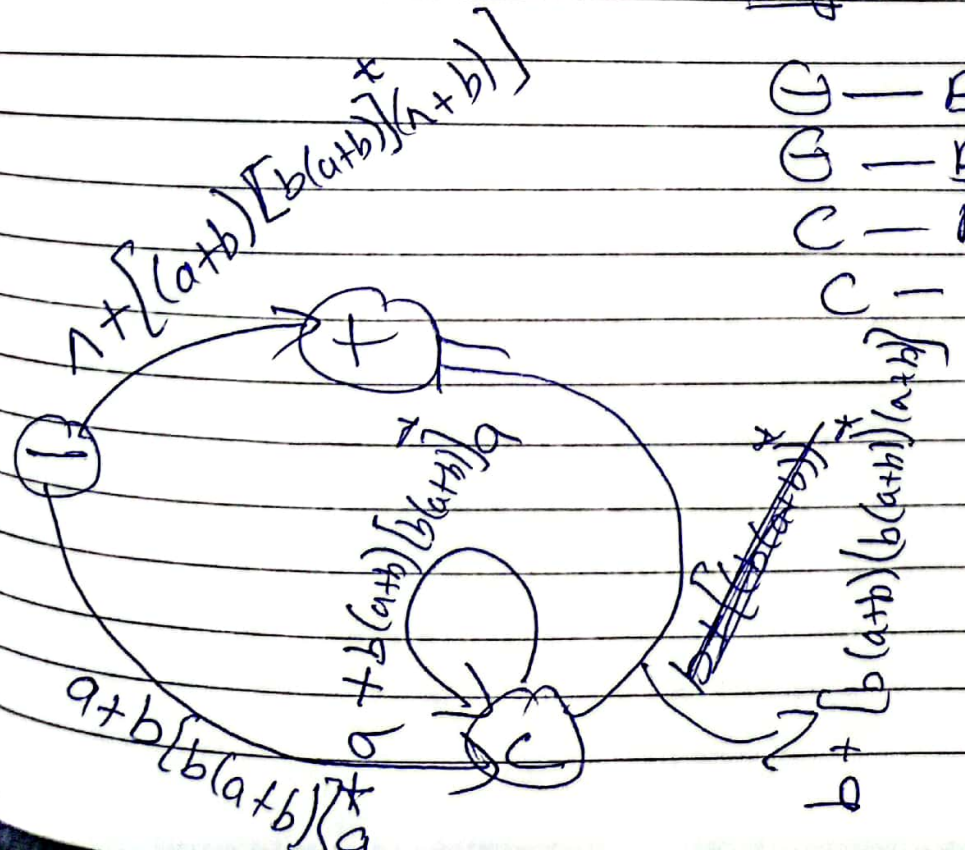
Way's

⊖ — B — +

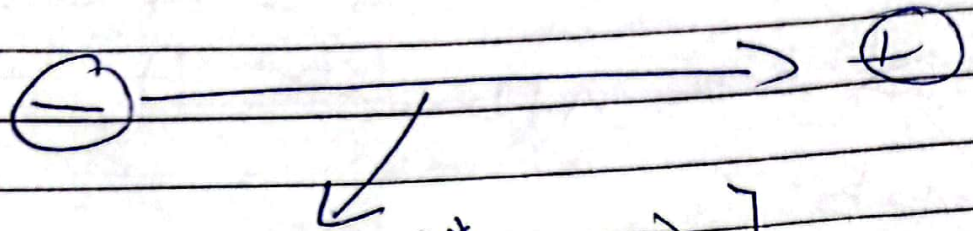
⊖ — B — C

C — B — C

C — B — +



Step-4 → Eliminate C



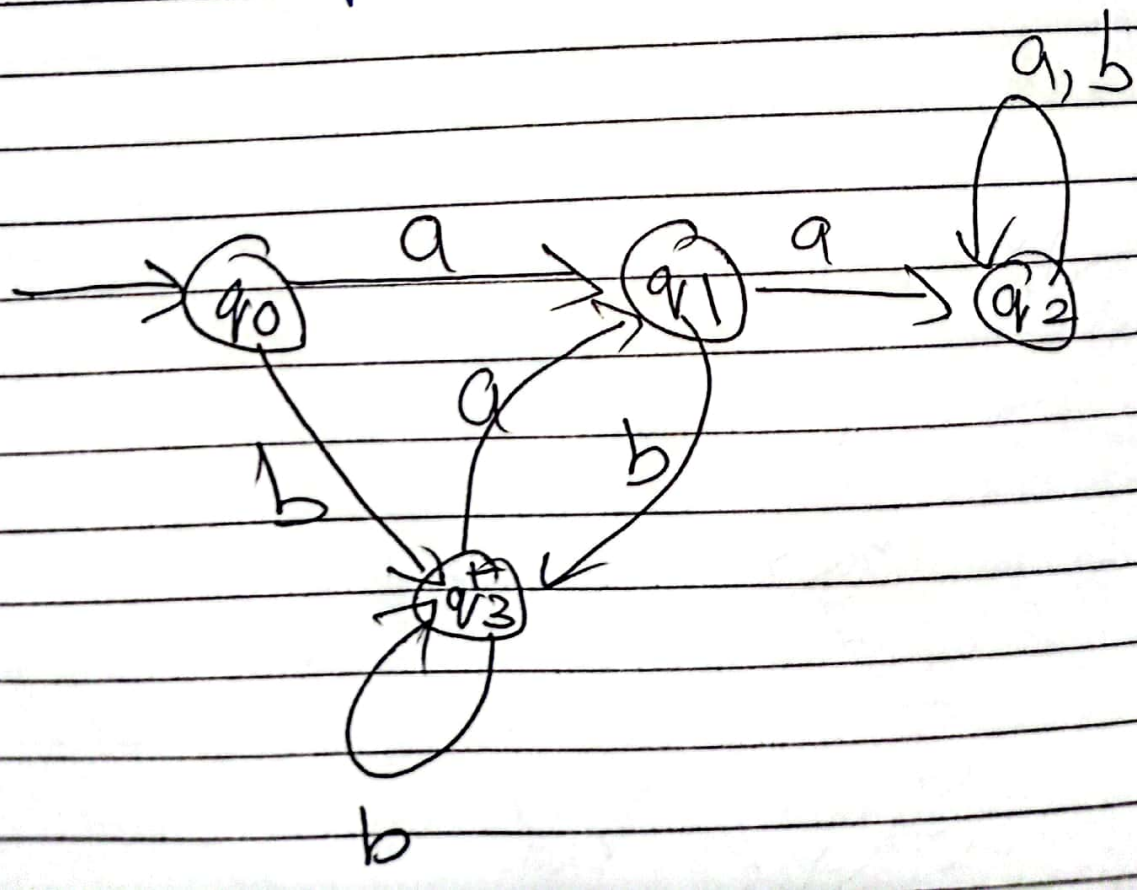
$\Lambda + (a+b)(b(a+b))^*(\Lambda+b))] +$

$[(a+b)(b(a+b))^* a(a+(b(a+b))(b(a+b))^* a)^*(b+$

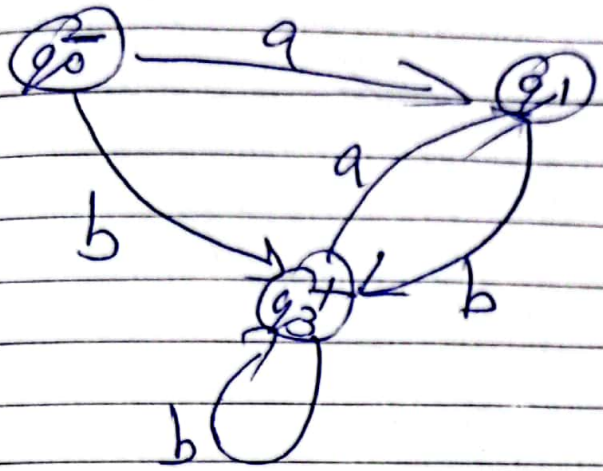
$(b(a+b))(b(a+b))^*(a+b))]$

find RE

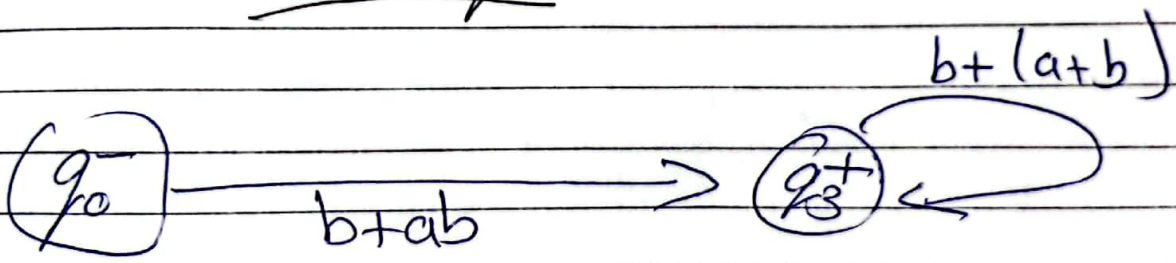
Q



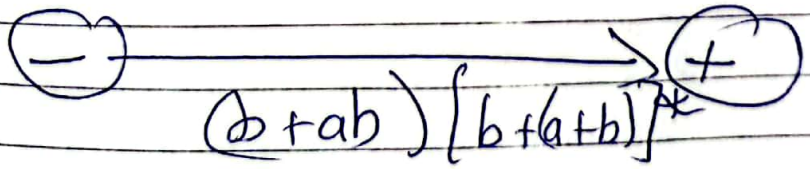
Step-1 Remove q_2 trap-State



Step-2 Remove q_1



Step-3 Remove q_3 & λ ~~transitions~~



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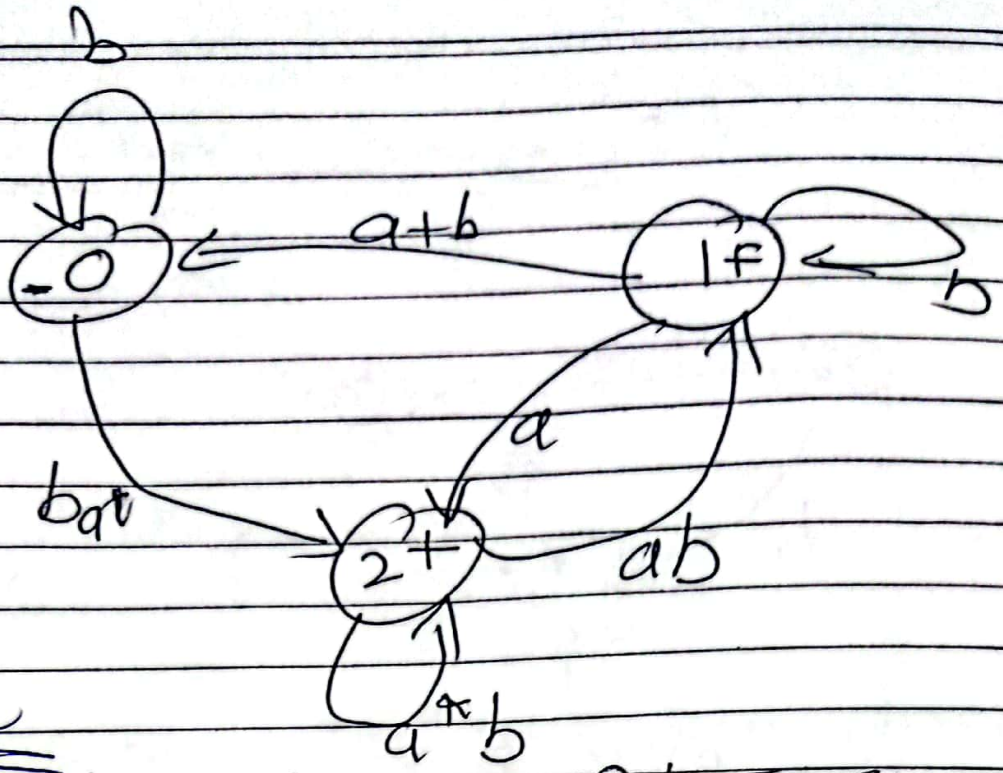
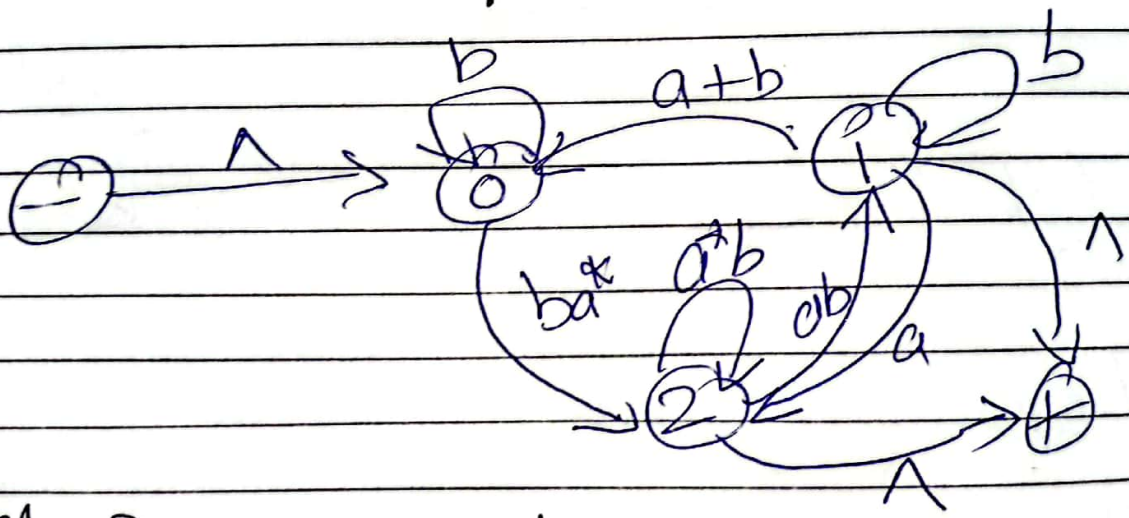
Q//

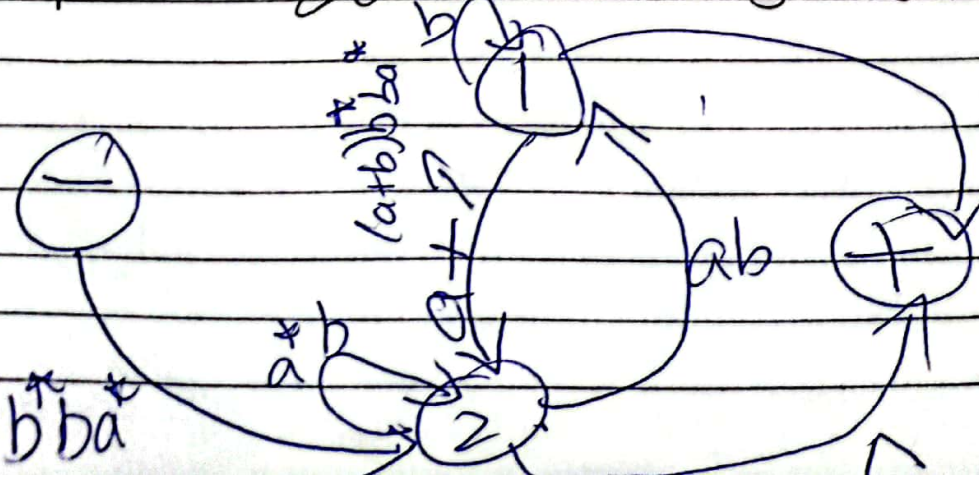


Solution

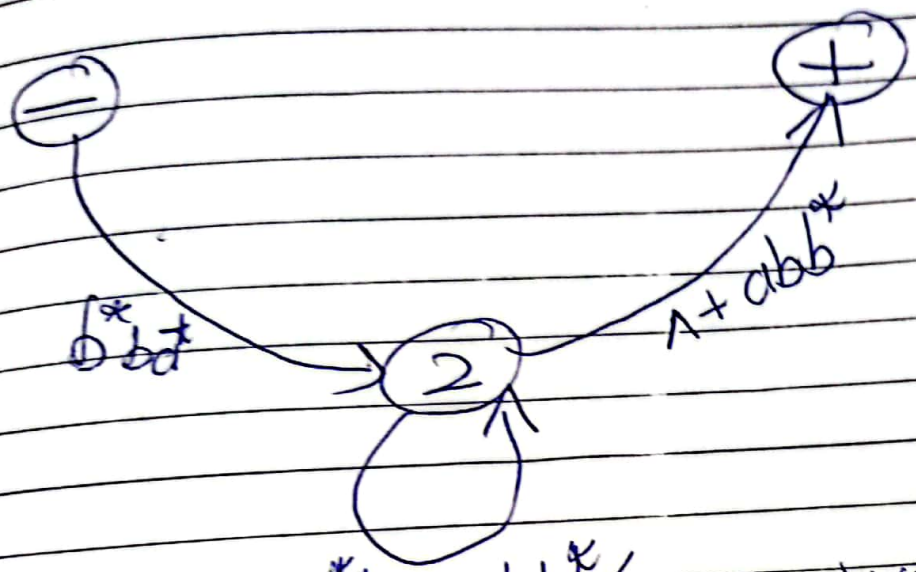
Step-1 Unique S/ST State



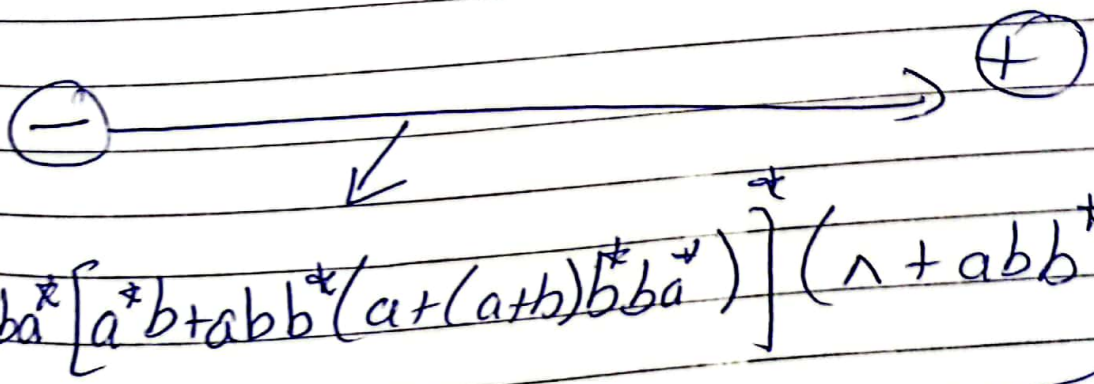
Step-2 Eliminate start - 0



Step-3 Eliminate State-1



Step-4 Rem-2



Final - RE