Assignment-01 (Part-C)

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Course Title : Automata & Computability

Course Code : CSE331

Section : 20

No. of group member : 01 (solo)

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Part - C

Ans. to the Q. NO - 01 (a)

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

$L_2 = \{w : w$ does not contain any $y \in L_1$ as a substring$\}$

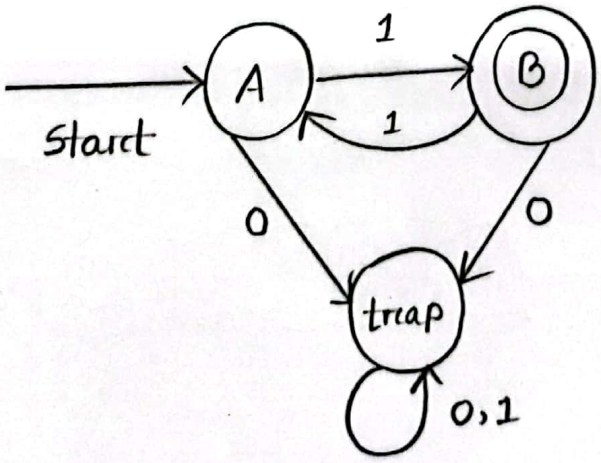
a 6 length string that is in L_2 : 110000

[because, it has only even - length sequences of '1's]

Ans. to the Q. NO - 01 (b)

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

$L_1 = \{w : w = 1^m$ where m is odd$\}$



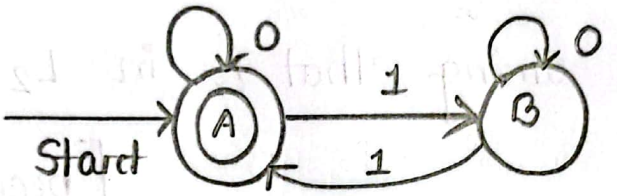
[P.T.O.]

Ans. to the Q. NO- 01(c)

Given,

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

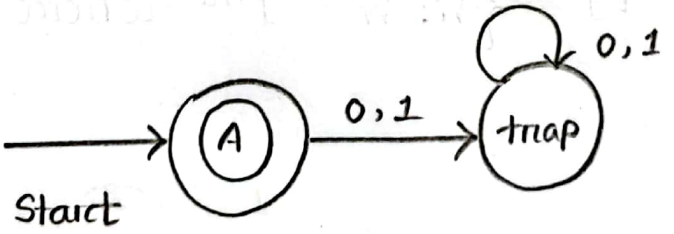
$L_2 = \{w : w$ does not contain any $y \in L_1$ as a substring$\}$



Ans. to the Q. NO- 01 (d)

for $L_1 \cap L_2$,

$\Rightarrow$ # generates an empty set, (ε)



[P.T.O.]

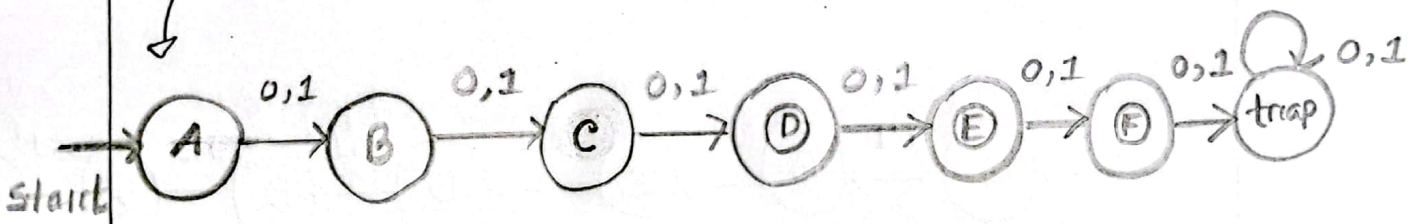
Ans. to the Q. NO-02 (a)

Given,

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

$A = \{w:$ the length of w is greater than or equal to 3 but less than or equal to $5\}$

$\therefore$ Accepted length for $A = \{3, 4, 5\}$



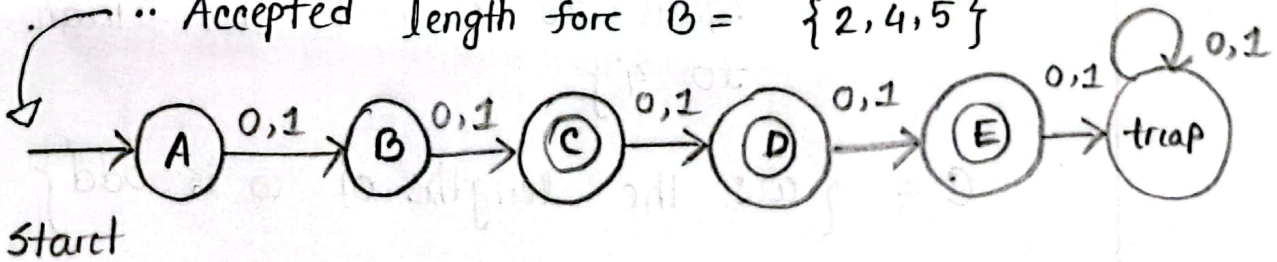
Ans. to the Q. NO-02 (b)

Given,

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

$B = \{w:$ the length of w is greater than or equal to 2 but less than or equal to $4\}$

$\therefore$ Accepted length for $B = \{2, 4, 5\}$



[P.T.O.]

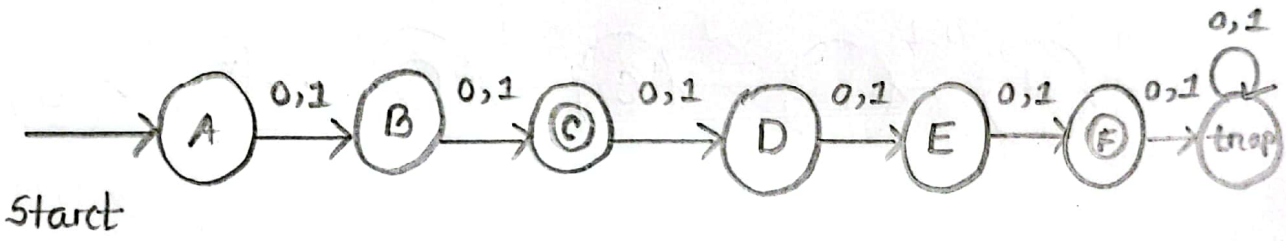
Ans. to the Q. NO - 02 (c)

from 'a' and 'b',

$$A = \{3, 4, 5\}$$
$$B = \{2, 3, 4\}$$

$\therefore A \Delta B = \{2, 5\}$

It will only accept those strings with length of 2 or more and 5 or less.



Ans. to the Q. NO - 02 (d)

Given,

$A = \{w$: the length of w is greater than or equal to 3 but less than or equal to $5\}$

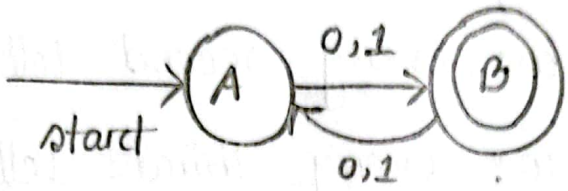
$B = \{w$: the length of w is greater than or equal to 2 but less than or equal to $4\}$

$C = \{w$: the length of w is odd$\}$

[P.T.O.]

Here,

state diagram for C,



from ('C'),

we get,

no. of states for A Δ B = 7

And here, no. of states C = 2

∴ no. of states needed for (A Δ B) ∪ C

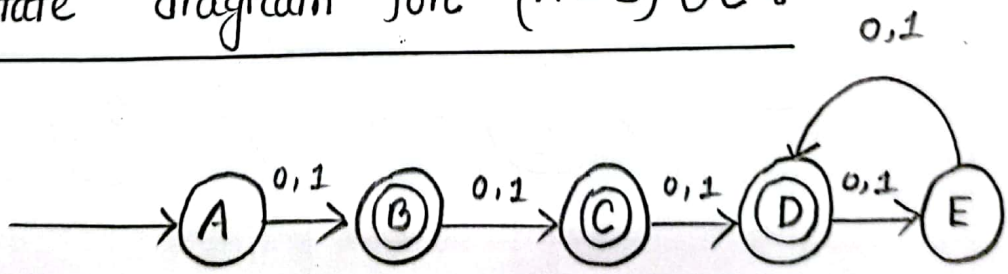
= 7 × 2

= 14

(Ans:)

Ans. to the Q. NO- 02 (e)

5- state diagram for (A Δ B) ∪ C :



[P.T.O.]

Ans. to the Q. NO - 03 (a)

Given,

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

$L_1 = \{w:$ every second letter of w is $0\}$

$L_2 = \{w:$ every third letter of w is $1\}$

Now,

length 5 string in $L_1 \cap L_2$,

00 101

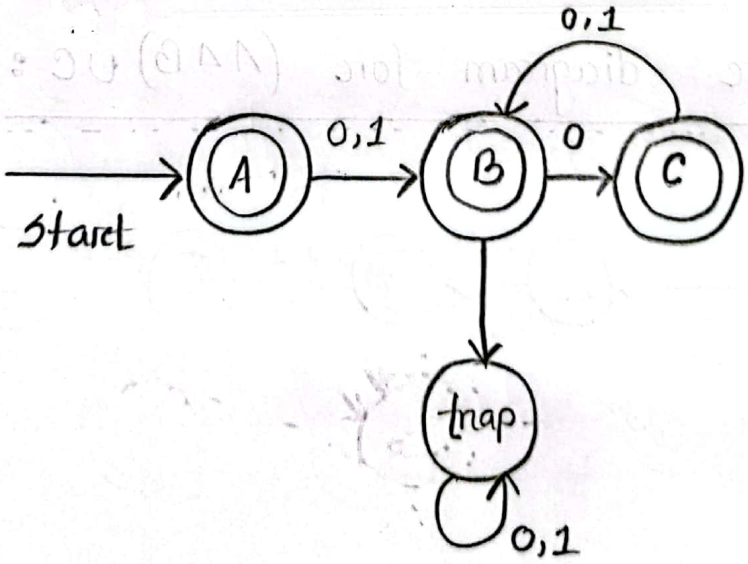
(Ans:)

Ans. to the Q. NO - 03(b)

Given,

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

$L_1 = \{w:$ every second letter of w is $0\}$

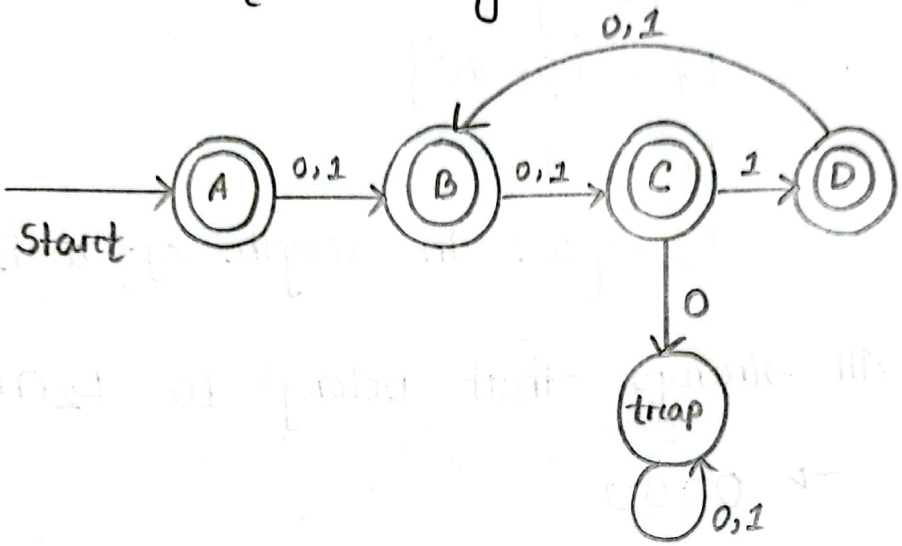


[P.T.O.]

Ans. to the Q. NO - 03 (c)

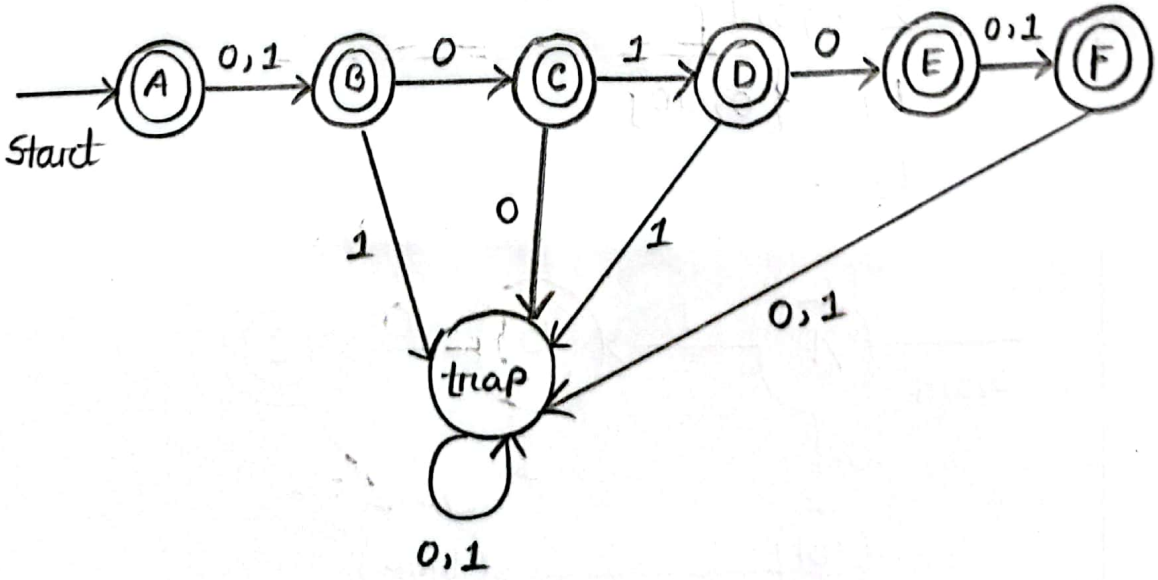
Given,

$L_2 = \{\omega :$ every third letter of ω is $1\}$



Ans. to the Q. NO - 03 (d)

For $L_1 \cap L_2$,



[P.T.O.]

Ans. to the Q. NO-04 (a)

Given,

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

$L_1 = \{0, 10\}$

$L_2 = L_1^*$

$L_3 = \{\omega :$ the length of ω is four$\}$

∴

All strings that belong to $L_2 \cap L_3$:

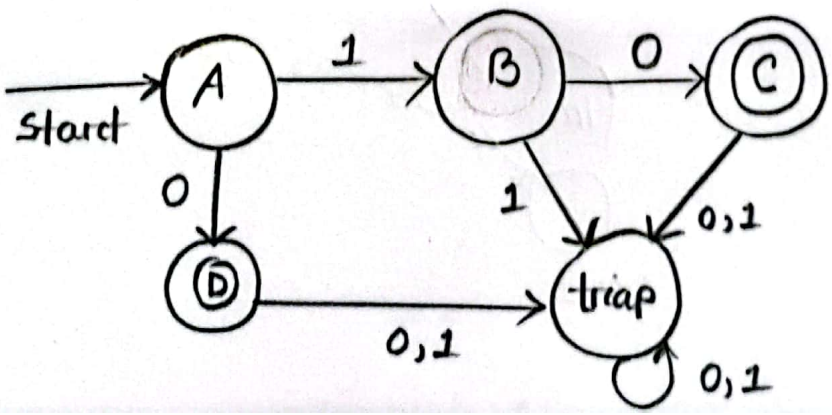
- 0000
- 0010
- 1010
- 1000

Ans. to the Q. NO-04 (b)

Given,

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

$L_1 = \{0, 10\}$



Ans. to the Q. NO- 04(c)

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

$L_1 = \{0, 10\}$

$L_2 = L_1^*$ → [concatenate "0" and "10" any number of times.]