TRANSITION FUNCTION | EXTENDED TRANSITION FUNCTION

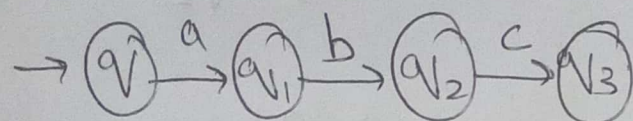$$\rightarrow \boxed{q} \xrightarrow{a} \boxed{q_1} \xrightarrow{b} \boxed{q_2} \xrightarrow{c} \boxed{q_3}$$

String $= abc$

$$\delta : Q \times \Sigma \rightarrow Q$$

$$(q_0, a) \rightarrow q_1$$

$$(q_1, b) \rightarrow q_2$$

$$(q_2, c) \rightarrow q_3$$

$$q \rightarrow abc \xrightarrow{a} q_3$$

$$\hat{\delta} : Q \times \overset{*}{\underset{\displaystyle \Sigma}{}} \rightarrow Q \quad \leftarrow \text{All possible strings}$$

All possible string $= \varepsilon, a, b, aa, aba \dots$

$$(q, abc) \rightarrow q_3$$

$$\hat{\delta} \cdot (q_0, \varepsilon) = q_0$$

$$\hat{\delta}(q, Ya) = \delta(\hat{\delta}(q, Y), a) \qquad Y \in \overset{*}{\Sigma} \leftarrow \text{string}$$

$$a \in \Sigma$$

$\hookrightarrow$ Alphabet : ℓ

$$\hat{\delta}(q_0, abc) = \delta(\hat{\delta}(q, ab), c)$$

$$\delta(\delta(\hat{\delta}(q, a), b), c)$$

$$\delta(\delta(\hat{\delta}(q, \varepsilon \cdot a), b), c)$$

$$\delta(\delta(\delta(\hat{\delta}(q, \varepsilon)a), b), c)$$

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

$$\delta(\delta(\delta(q, a), b), c) \rightarrow q_1$$

$$\delta\left(\delta(q_1, b), c\right)$$

$$\delta(q_2, c) \longrightarrow q_3$$

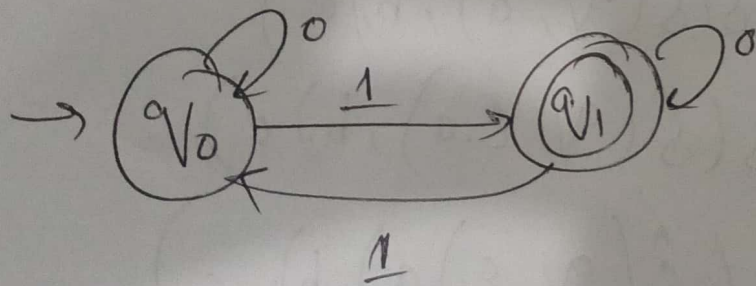## CLOSURE PROPERTY OF DFA :-

① UNION ② INTERSECTION ③ DIFFERENCE
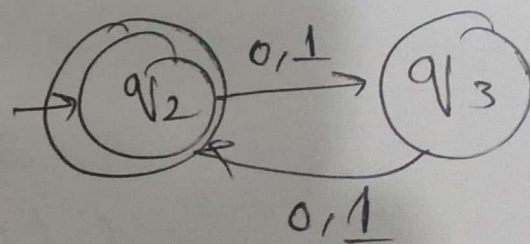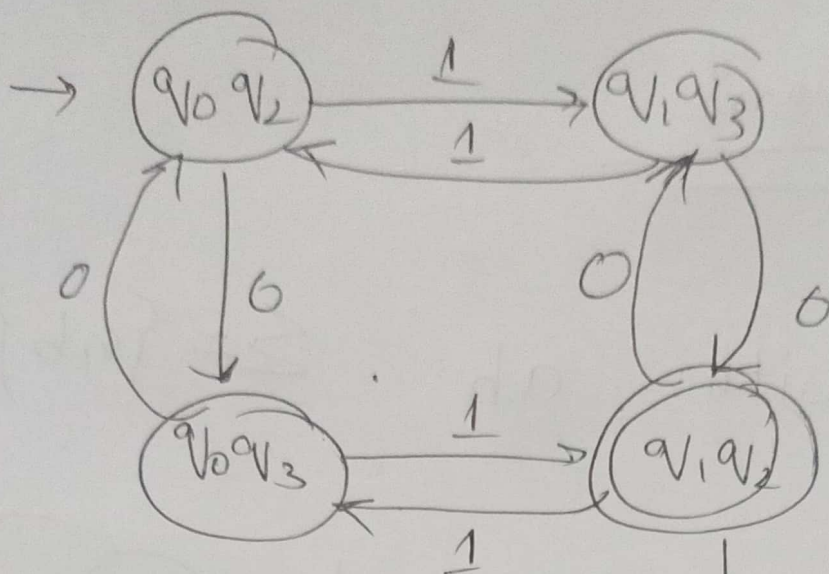
④ COMPLIMENT

Question :-

An odd num of 1's and an even length

An odd num of 1's

An even legth

→ Final state.

AND → INTERSECTION

Final state :- $\{q_1\}$ $\{q_2\}$

$\{q_1, q_2\}$ ——→ Final state.

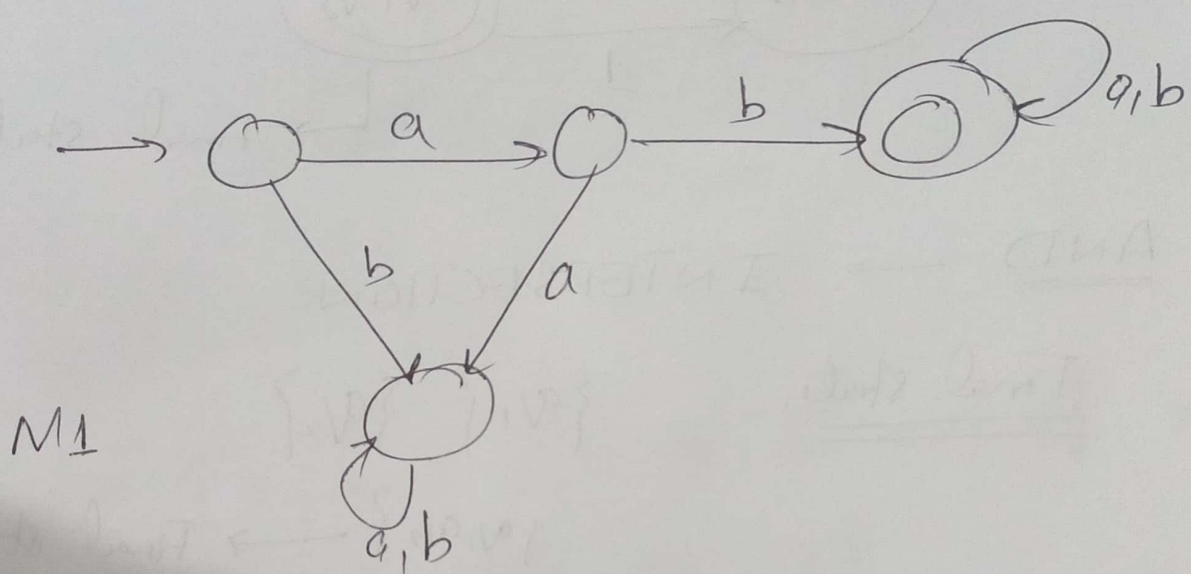
OR   UNION

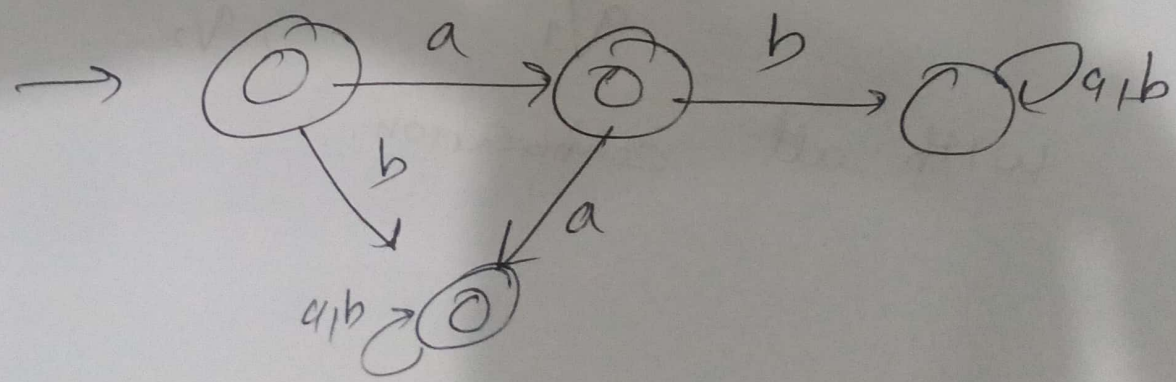Final state

q_1 , q_2

with all combination.

Compliment :-

Start with ab $\Sigma = \{a, b\}$

M1

compliment

$\overline{M1}$ = Final state $\longrightarrow$ Non final ?

Non-final $\longrightarrow$ Final state

Difference.

$$L_1 - L_2 = M_1 - M_2$$

$$= M_1 \cap \overline{M_2}$$

Practise Problem:-

① $L = \{x \mid x \in \Sigma^* : x \text{ \& som of } x$

is divisible by $2\}$

② $L_1 = \{x \mid 00 \text{ is not a substring}$

of $x\}$

$L_2 = \{x \mid x \text{ ends with } 01\}$