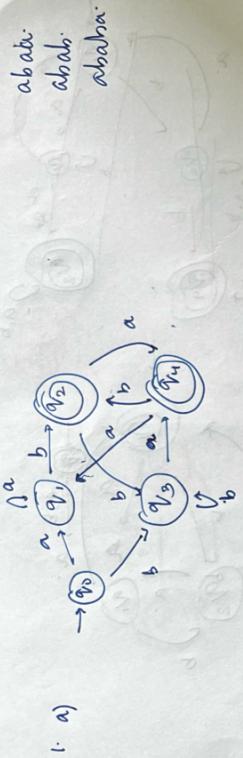
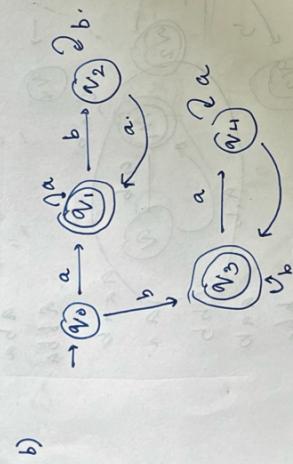


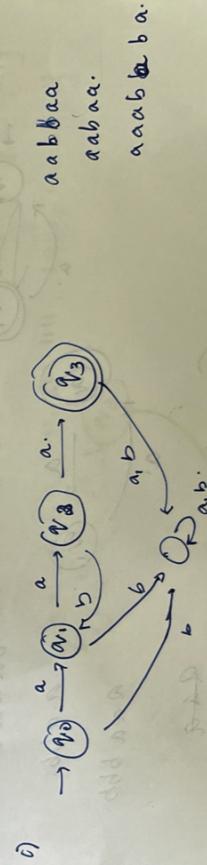
Tutorial - 1



$L = \{ \text{set of all strings that end in 'ab' for 'aba'} \}$



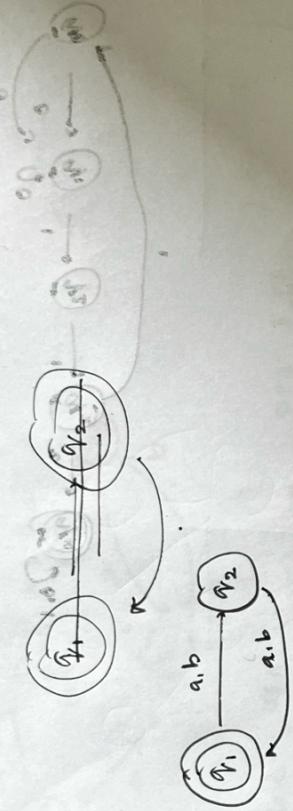
$L = \{ \text{set of all strings that end in either 'a' or 'b'} \}$



$L = \{ \text{set of all strings that start and end with 'aa' with no termination by 'a'}$

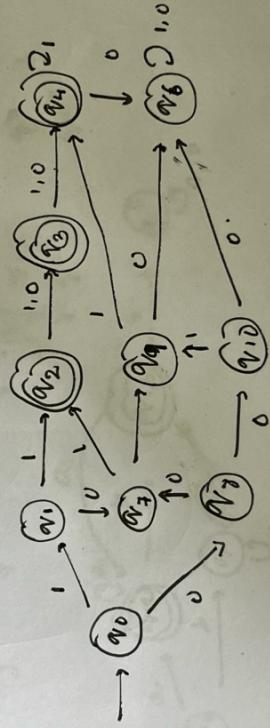
$L = \{ \text{set of a string that condition satisfying "aa" with no}$

a) $L = \{ \text{contains even no. of } a's \text{ and } b's \} \quad \Sigma = \{a, b\}$

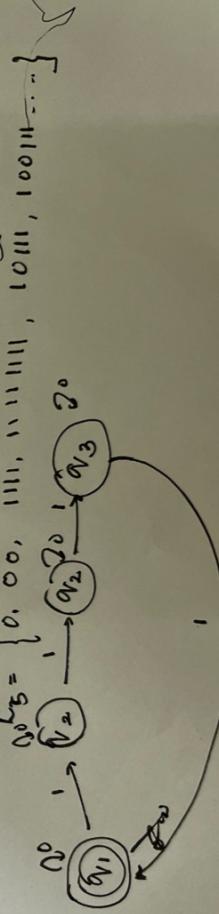


b) $L_3 = \{ \text{word is a binary string with at least two ones and at most two zeros} \}$

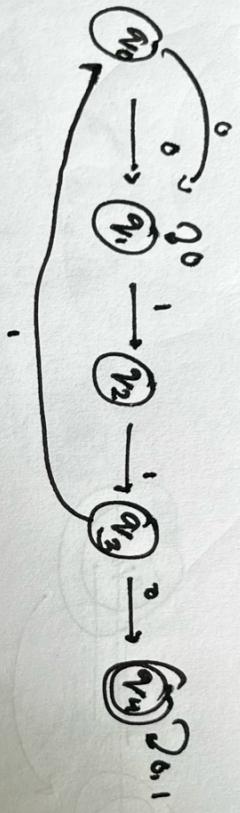
$$\Sigma = \{0, 1\}$$



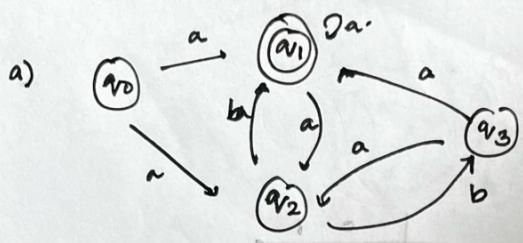
c) $L_5 = \{ \text{No. of consecutive 1's is odd in 0 or a multiple of 4} \} \quad \Sigma = \{0, 1\}$



b) $\lambda_2 = \{\omega_1 \omega_2\} = \{101, 010, 100, 001\}, \Sigma = \{0, 1\}$



3. Convert NFA to DFA.

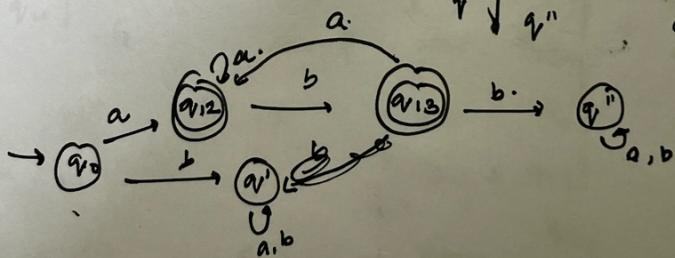


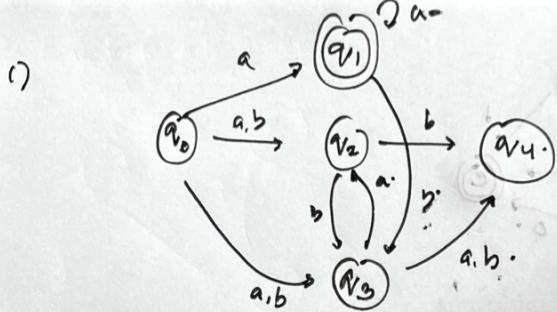
Transition table - NFA

| | a | b |
|-------------------|----------------|----------------|
| $\rightarrow q_0$ | $\{q_1, q_2\}$ | \emptyset |
| $\rightarrow q_1$ | $\{q_1, q_3\}$ | q |
| q_2 | q | $\{q_1, q_3\}$ |
| q_3 | $\{q_1, q_2\}$ | q |

DFA table:

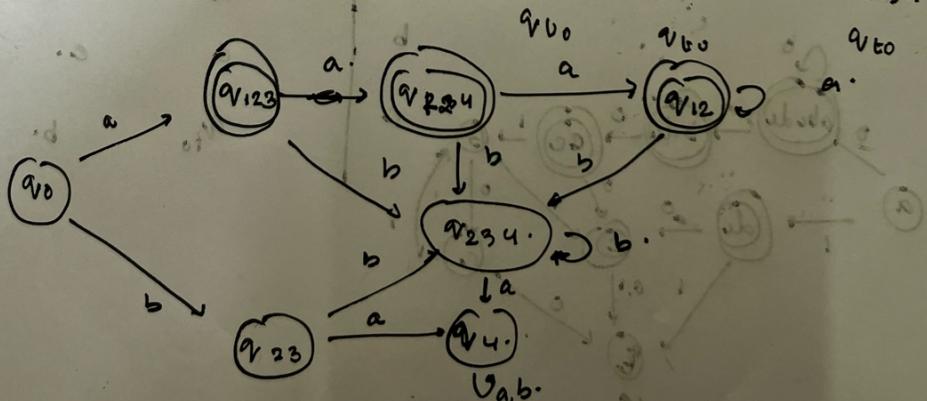
| | a | b |
|----------------------|----------|----------|
| $\rightarrow q_0$ | q_{12} | q_1 |
| $\rightarrow q_{12}$ | q_{12} | q_{13} |
| q_1 | q^1 | q^1 |
| q_{13} | q_{12} | q^2 |
| q^1 | q^1 | q^1 |
| q^2 | q^2 | q^2 |



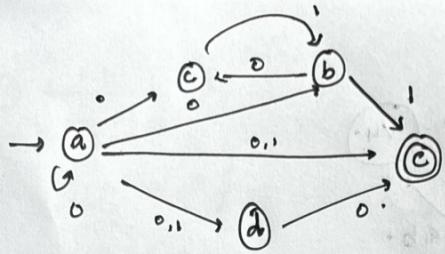


NFA

| | a | b | c | | a | b | c | |
|-------------------|---------------------|----------------|---|-------------------|---------------------|---------------------|---------------|-----------|
| $\rightarrow q_0$ | $\{q_1, q_2, q_3\}$ | $\{q_2, q_3\}$ | | $\rightarrow q_0$ | $\{q_1, q_2, q_3\}$ | $\{q_2, q_3\}$ | | |
| $x \quad q_1$ | $\{q_1, q_2\}$ | $\{q_2, q_3\}$ | | $* \quad q_{123}$ | $\{q_1, q_2, q_3\}$ | $\{q_1, q_2, q_3\}$ | | |
| q_2 | | $\{q_3, q_4\}$ | | q_{23} | | $q_{12} q_3 q_4$ | | |
| q_3 | q_H | $\{q_1, q_4\}$ | | $* \quad q_{124}$ | | q_4 | $q_2 q_3 q_4$ | |
| q_4 | | | | q_{234} | | q_{12} | q_{234} | |
| | | | | $* \quad q_{12}$ | | q_4 | q_{12} | q_{60} |
| | | | | q_{12} | | q_{12} | q_{12} | q_{234} |
| | | | | | | | | |



d)



NFA.

| | 0 | 1 |
|-----|-----------|-------|
| → a | {a,b,c,d} | {d,e} |
| b | c | c. |
| c | φ | b. |
| d | e | φ |
| * e | φ | φ |

DFA

| | 0 | 1 |
|---|------|-----------|
| a | abde | de |
| b | atde | atde b de |
| c | bde | c. |
| d | ce | ce φ abde |
| e | ce | ce abde |

