ASSIGNMENT - 1

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Branch :- CSE (Lateral Entry)   Group :- 616 - A

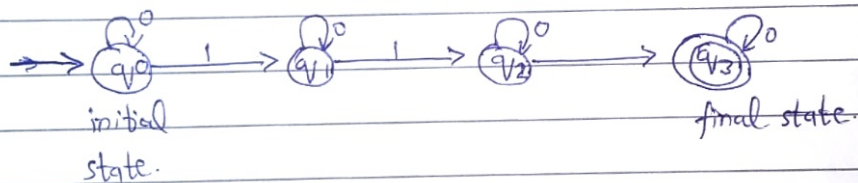Semester :- 6th   Subject Code :- 20CST-353

Subject Name :- Theory of Computation   Date :- 02/03/2023

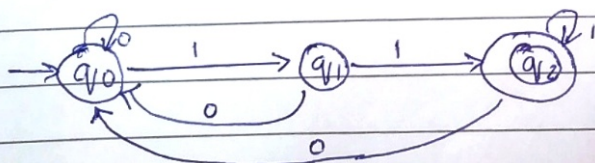**Q1.** Construct DFA to accept the following languages over alphabet {0,1}.

(a) The language of all strings containing at least three 1's.

Ans. $\alpha = \{$ 111, 11110, 0111, 001110, 00111110 ---- $\}$
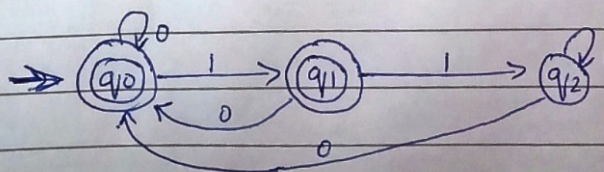

initial state.   final state.

(b) The language of all strings that do not end with 11.

Ans: initial state   final state

end with 11

Complement → don't end with 11

Q2. Consider the following NDFA/NFA whose transition table is given and design DFA.

$Q = \{q_0, q_1, q_2, q_3\}$, $\Sigma = \{a,b\}$, Here q_0 is the initial state and q_3 is the final state.

Explain the procedure step by step.

State	a	b
q_0	$q_1 q_3$	$q_1 q_3$
q_1	q_1	q_3
q_2	q_3	q_2
(q_3)	-	→

Ans.- Step-1 :- let's Q be a new state of DFA. Q' is null in starting. Let T' be a new transition table of DFA.

- Step-2 :- Add start state of NFA to $Q' = \{q_0\}$.
Add transition state of NFA to Q'
Add transition state of start state
$$q' = \{q_0, q_1\} \quad \{q_0\}$$
$$\quad\quad a \quad\quad\quad b$$

- Step-3 :-
New state present in Q' is

State	a	b
→ q_0	q_1, q_3	q_2, q_3
q_1, q_3	q_0	q_2, q_1, q_3

— Step 4 :-

New state is q_0, q_1, q_3 add transition for set of q_0, q_1, q_2 to T_3

State	a	b
→ q_0	q_0	q_2, q_3
q_1, q_2	q_0	q_0, q_1, q_3
q_0, q_1, q_3	q_0	q_0, q_1, q_3, q_2

— Step 5 :-

New state will be q_0, q_1, q_2, q_3 add all transition to table T'

state	a	b
→ q_0	q_0	q_2, q_3
q_2, q_3	q_0	q_0, q_1, q_3
q_0, q_1, q_3	q_0	q_0, q_1, q_3, q_2
q_0, q_1, q_2, q_3	q_0	q_0, q_1, q_3, q_2

— Step 6 :-

Since no new state are left to be added in transition table T', so, we stop.

So, DFA may be drawn as.

Initial State.

final state