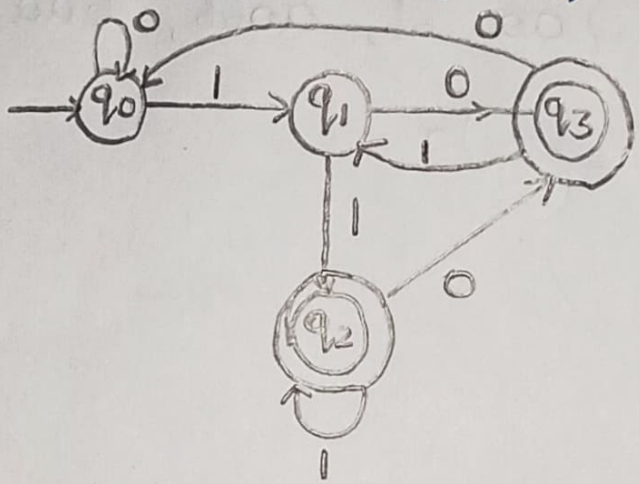
TCS-402

Assignment-1

Name- Anurag Pandey
Section- A
Roll No- 11
Student ID - 20011436

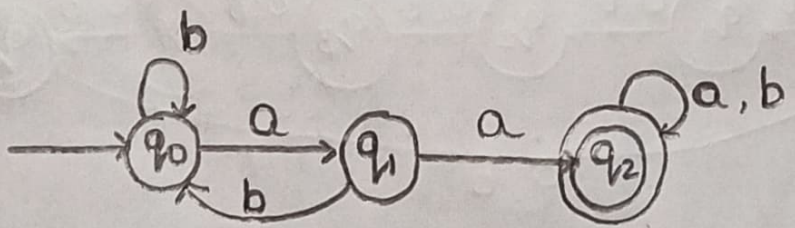
Q1:- Construct DFA over $\Sigma = \{0, 1\}$ which accepts all strings which have "1" in second last position.

Ans- $\Sigma = \{0, 1\}$, $L = \{10, 11, 111, 0011, 11111..\}$



Q2:- Construct DFA that accepts all the strings of "a's" & "b's" where string contains 2 'a's' consequently.

Ans- $\Sigma = \{a, b\}$, $L = \{aa, baa, aaa, baab...\}$



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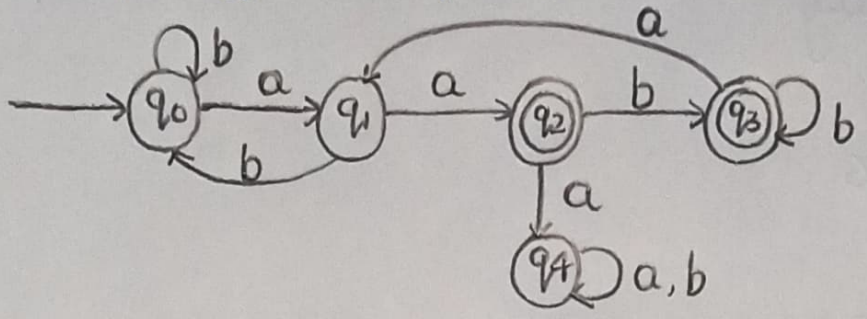
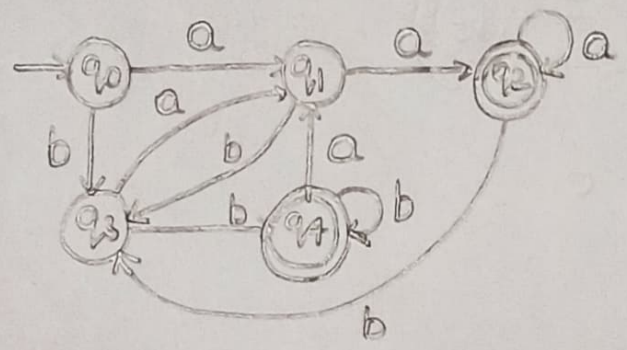
Q3:- All string of a's & b's where each string contains exactly 2 a's consequently.

Ans- $\Sigma = \{a, b\}$, $L = \{aa, aab, baa, aabb..\}$



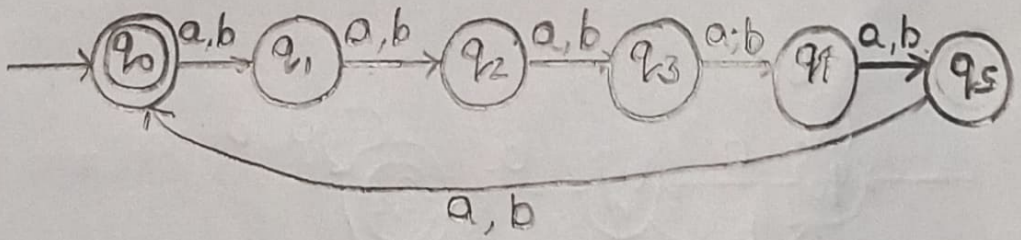
Q4:- All string of a's & b's where every string ends with "aa" or "bb".

Ans- $\Sigma = \{a, b\}$, $L = \{aa, bb, aabb, baa, abb\}$



Q5:- All strings where length of string is divisible by 2 & 3.

Ans- $\Sigma = \{a, b\}$, $L = \{\varepsilon, aaaaaa, bbbbbb, ababab..\}$



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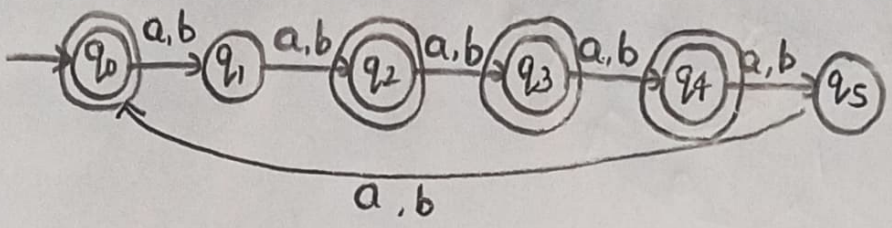
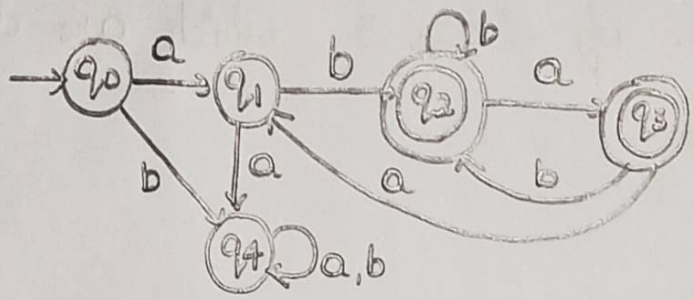
Q6: Construct DFA that accepts all strings of length divisible by 2 or 3.

Ans - $\Sigma = \{a, b\}$, $L = \{aa, bb, aaa, bbb, abab..\}$



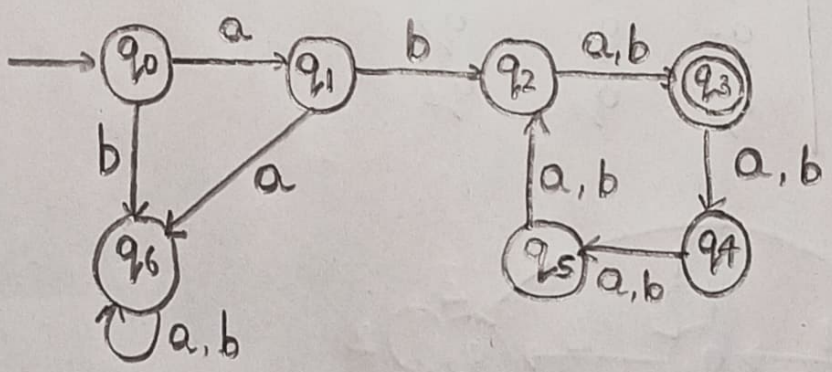
Q7: Draw DFA for $L = (ab \cup aba)^*$, $\Sigma = \{a, b\}$.

Ans: $\Sigma = \{a, b\}$, $L = \{ab, aba, ababa, abaab..\}$



Q8: $\Sigma = \{a, b\}$, Accepts string starting with 'ab' & length $|w| = 3 \bmod 4$.

Ans - $L = \{aba, abb, abaaaaaa, ababaaa..\}$



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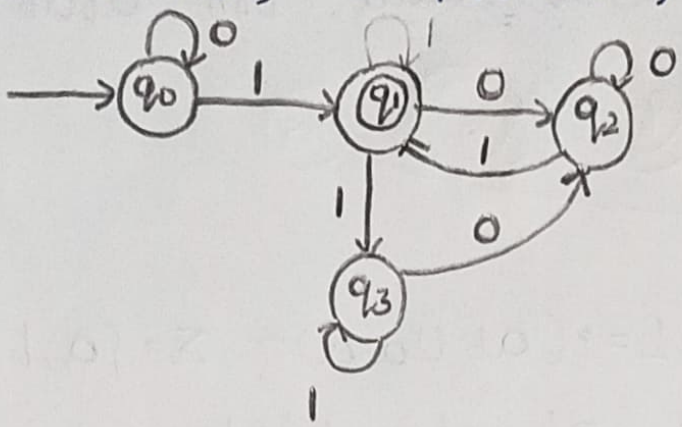
Q9 :- Accepts all strings of binary no. which is congruent to 1 mod 4. ④

Ans- $\Sigma = \{0,1\}$, $L = \{1, 101, 1101, 1001 \ldots\}$



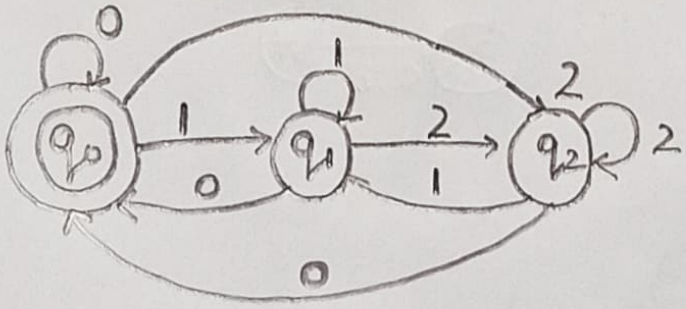
Q10 :- Accepts all no. of base 3, which are divisible by 3.

Ans- $\omega = \{0,1,2\}^*$

$|\omega| \bmod 3 = 0$

transition table :-

States	Symbol		
	0	1	2
q_0	q_0	q_1	q_2
q_1	q_0	q_1	q_2
q_2	q_0	q_1	q_2



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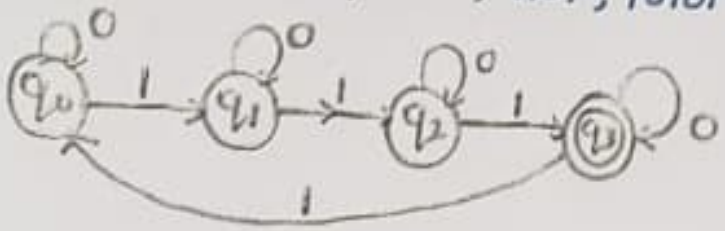
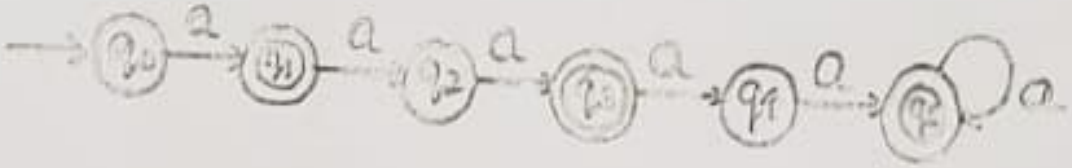
Q11 :- All string ω over $\{0,1\}$ such that, the number of 1's in ω is 3 mod 4.

Ans - $L = \{ 111, 1110, 1011, 1101, 10101 \ldots \}$



Q12 :- $L = \{ a^n \mid n>0, n \neq 2, n \neq 4 \}$, $\Sigma = \{a\}^*$

Ans - $\Sigma = \{a\}^*$, $L = \{a, aaa, aaaaaa \ldots\}$



Answer