COMPUTER ENGINEERING DEPARTMENT

ASSIGNMENT NO-01

Sub: Theory of Computer Science

COURSE: T.E. Year: 2020-2021 Semester: V

DEPT: Computer Engineering

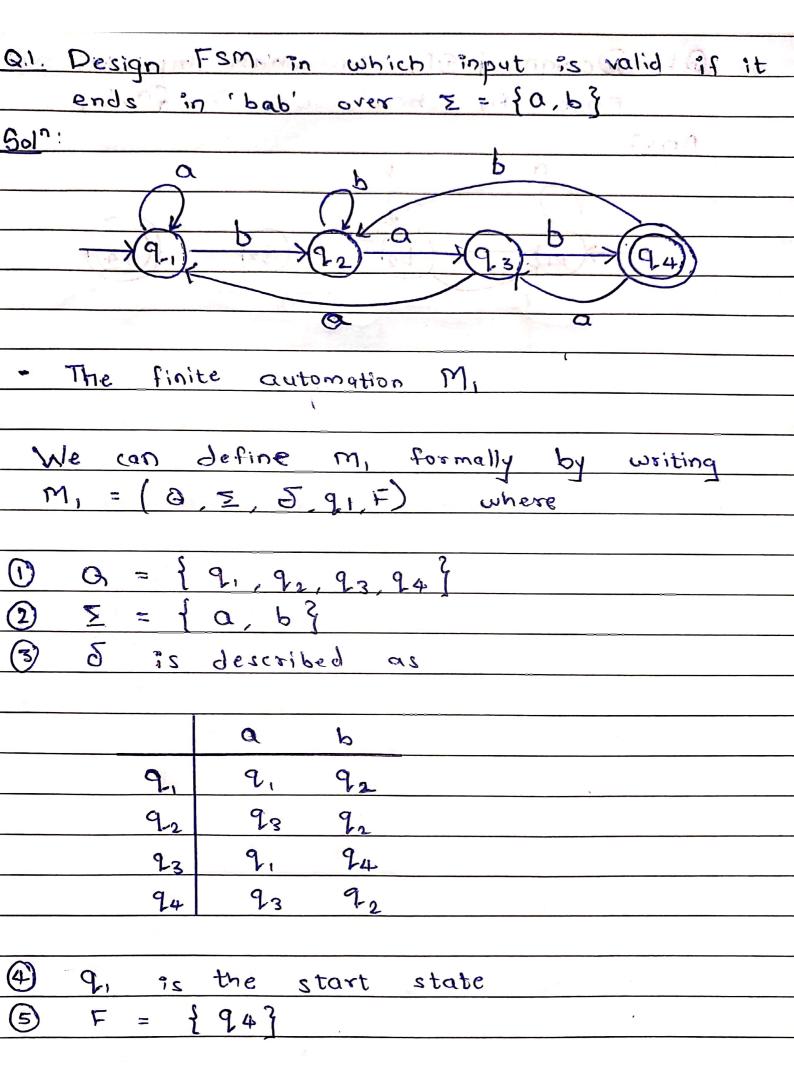
SUBJECT CODE: C5C504 DUE DATE: 05/11/2020

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Class: TE-Comps B Date of Submission: 04/11/2020

Tutorial 1

- 1. Design FSM in which input is valid if it ends in 'bab' over ∑ ={a,b}
- 2. Design FSM to implement binary adder over $\Sigma = \{0,1\}$
- 3. Design FSM to recognize a language in which every a's followed by b's over ∑ ={a,b}
- 4. Design FSM in which input is valid if it contains 1011 over ∑ ={0,1}
- Design FSM in which input is valid if it does not contains 'bbb' over ∑ ={a,b}
- 6. Design FSM in which input is valid if it starts with 3 consecutive á's over ∑ ={a,b}



Q.1 Simulation

(string: abab)

$$\rightarrow 2(43, P)$$

: 94 is Final state

Hence Accepted

Q.2. Desi	an F	t mz	nî o	plem	nent binary adder			
over $\Sigma = \{0,1\}$								
:"10 <u>2</u>					n i v			
		1 - es		View Control				
$\Sigma = \{(0,0),(0,1),(1,0)\}$								
Qo → No carry (NC) Q, → Carry (C)								
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0 +	1 +	HC =	= 1 1	10	0 + 1 + c = 0 C			
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Diagram:								
(10)/1					19/0			
(00)/0 (11)/0 ()								
\rightarrow (9) (01)								
0 (60)/1								
(01)/1								

Q.3. Design FSM to recognize a language in which every a's followed by b's over $\Sigma = \{a,b\}$ Sol7: Design FSM to recognize a language in which every a's followed by b's over $\Sigma = \{a,b\}$ Sol7: Design FSM to recognize a language in which every a's followed by b's over $\Sigma = \{a,b\}$ Design FSM to recognize a language in which every a's followed by b's over $\Sigma = \{a,b\}$ The finite automation M , We can define M , formally by writing M , = $\{a \in \mathbb{Z}, a, b\}$ where Design FSM to recognize a language in $\Sigma = \{a,b\}$ Design FSM to recognize a language in $\Sigma = \{a,b\}$ The finite automation M , We can define M , formally by writing M , and a language in $\Sigma = \{a,b\}$ The finite automation M , Design FSM to recognize a language in $\Sigma = \{a,b\}$ The finite automation M , The		
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- The finite automation M , We can define M , formally by writing M , = (Q, Z, J, Q, F) where $Q = \{Q_1, Q_2, Q_3, Q_4\}$ $Q = \{Q_1, Q$		() h
The finite automation M , We can define M_1 formally by writing $M_1 = \{Q, \Xi, \overline{S}, q, \overline{f}\}$ where $Q = \{q_1, q_2, q_3, q_4\}$ $Q = \{q_1, q_2, q_3, q_4\}$ $Q = \{q_1, q_2, q_3, q_4\}$ $Q = \{q_1, q_2, q_4, q_4\}$		
The finite automation M , We can define M , formally by writing $M_1 = \{Q \geq J, q, f\}$ where $Q = \{q_1, q_2, q_3, q_4\}$ $Q \geq \{q_1, q_2, q_4\}$ $Q \geq \{q_2, q_4\}$ $Q \geq \{q_3, q_4\}$ $Q \geq \{q_4, q_4\}$ $Q \geq \{q_4, q_4\}$ $Q \leq \{q_4, q_4\}$	3 10 510 11 5 710 11 12	
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We can define M_1 formally by writing $M_1 = \{0, \geq 5, q, f\}$ where $\mathbb{O} Q = \{q_1, q_2, q_3, q_4\}$ $\mathbb{O} Z = \{q_1, q_2, q_3, q_4\}$	7 7 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2	4-
We can define M_1 formally by writing $M_1 = \{0, \geq 5, q, f\}$ where $\mathbb{O} Q = \{q_1, q_2, q_3, q_4\}$ $\mathbb{O} Z = \{q_1, q_2, q_3, q_4\}$	- The finite automatic m	
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$M_1 = (Q \leq 5 q, f)$ where $Q = \{q_1, q_2, q_3, q_4\}$ $Q \leq \{q_1, q_2, q_4\}$ $Q \leq \{q$	10/2 00- 1000 m 10 0 0 10 0 0	
① Q = $\{q_1, q_2, q_3, q_4\}$ ② $\Sigma = \{q_1, q_2, q_3, q_4\}$ ③ Σ is described as Q ₁ Q ₂ Q ₁ Q ₂ Q ₃ Q ₄ Q ₃ Q ₄		4
① Q = $\{9_1, 9_2, 9_3, 9_4\}$ ② $\Xi = \{0, 5_3\}$ ③ $\Xi : S = \{0, 5_3\}$ Q ₁ Q ₂ Q ₃ Q ₄ Q ₂ Q ₄ Q ₃ Q ₄ Q ₄ Q ₂ Q ₄ Q ₄ Q ₄ Q ₄ Q ₅ Q ₄ Q ₇ Q ₇ Q ₇ Q ₇ Q ₈		re
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9, 92 9, 92 94 93 93 93 94 92 94 4 92 94		` , *
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4 9, is the start state		7-(31)
	94 92 94	NO 3
(5) F = {9,94}	C and C o	
	(5) F = {9,943	

03

Simulation (string: abab)

→ 2 (q,, abab)

 $\rightarrow 3 (92, bab)$

-> & (94, ab)

 $\rightarrow \delta (9_2, b)$

-> 5 (94)

: 94 is final state

Hence Accepted

Simulation

(string: b)

10:00

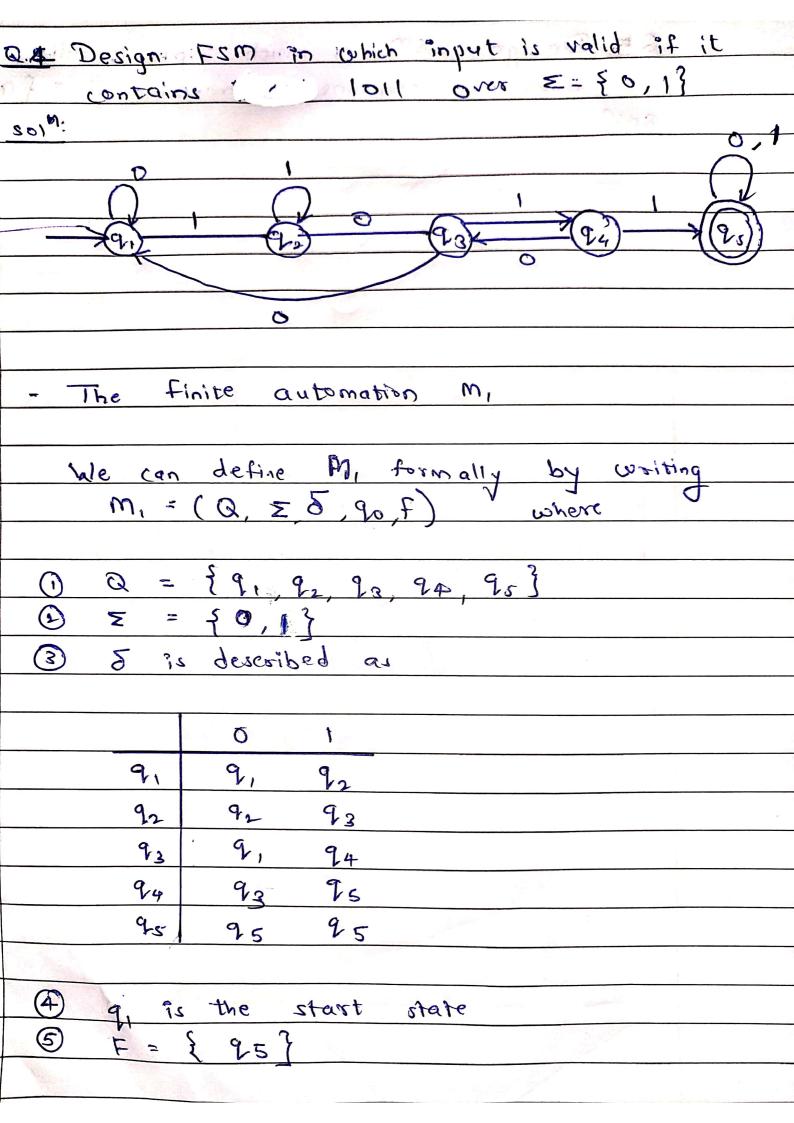
Training and Training

-> 5 (9,,b)

→ Z (91)

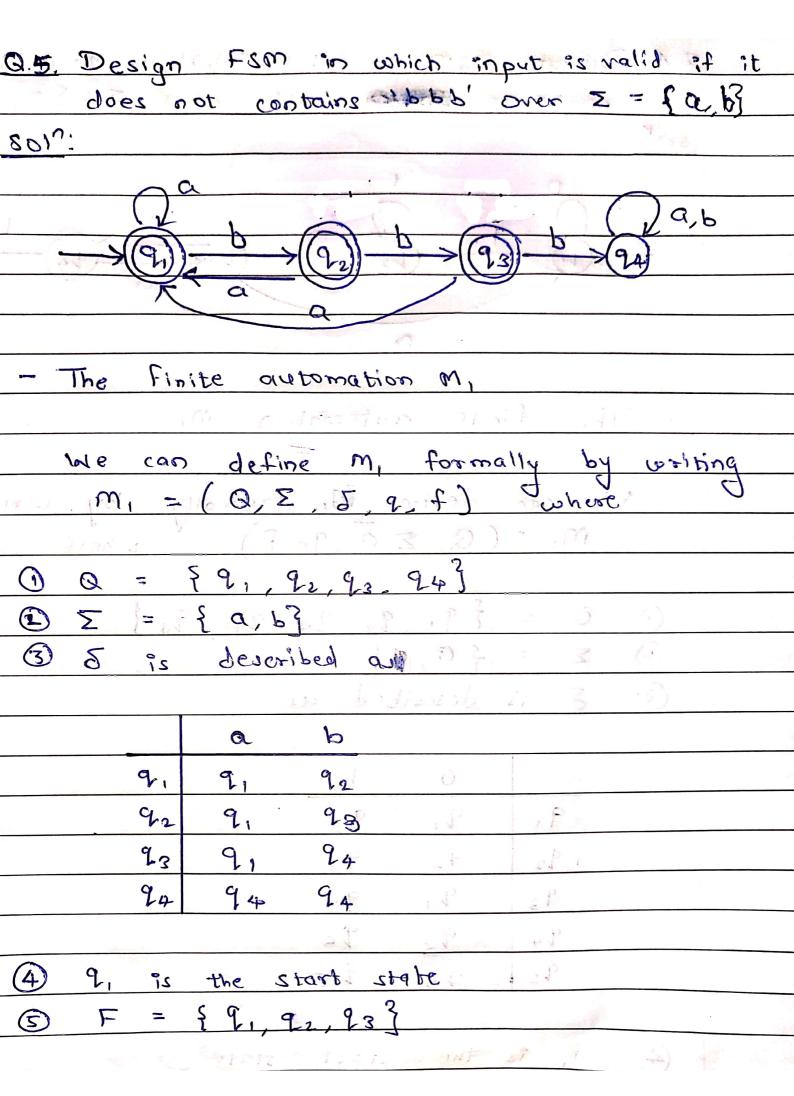
"." It is final state

Hence Accepted



04

Simulation (string: 1010110) → 5 (2,,1010110) $\rightarrow 5 (92,010110)$ -> 2 (d3 10110) -> 5 (q4,0110) -> 2 (d3 , 110) → 5 (94,10) -> 5 (25, 0) → S(95) .. 95 is Final state Hence Accepted



Q5

Simulation (string: abbb)

(a) 17 04

→ 5 (q, ,abbb)

≥> S (9, bbb)

 $\rightarrow 5(92,66)$

-> 2 (d3, p)

→ S (94)

=: 94 is not final state

Hence not Accepted

Simulation (Strong: abab)

-> 5 (2, abab)

-> & (Q1, b9b)

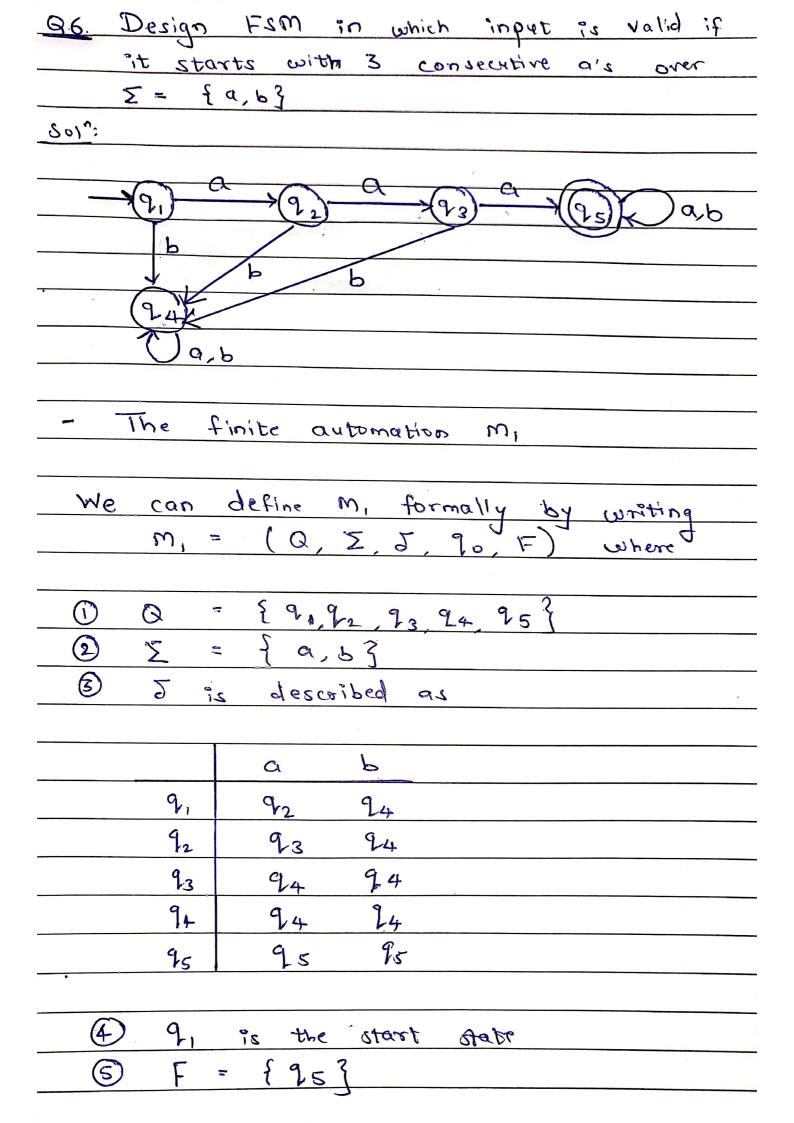
J (92,95)

-> 2 (d. p. p)

 \rightarrow 5 (q_2)

== 92 is final state

Hence Accepted



```
Q.6
   Simulation (string: aaba)
   -> 5 (q, aaba) (1111)
   -> 5 (92, aba)
   → S ( 93, ba)
   → S ( 9.4,a)
    -> 5 ( 94)
  or qu is not final state
       Hence not Accepted
   Simulation (String: adaba)
   \rightarrow \delta (q_1, aaaba)
   \rightarrow \delta(22, aaba)
                  and prop & a
   → 8 (93, aba)
   → 5 (95, ba)
```

-= 95 is final state

Hence Accepted

 $\rightarrow \delta (95, a)$

-> S(95)