final Examination - Summer 2020

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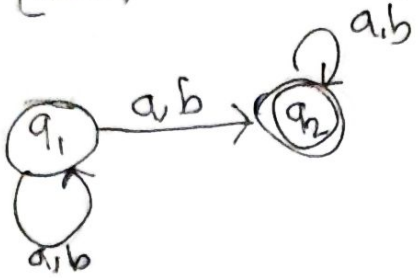
Cause code: CSE 417
Course name: Automata and Theory of Computation
section: 2

(1) a) A technique of transforming a given DFA into an equivalent DFA that has minimum states.

b) $L = \{aba, abba, bab\}$

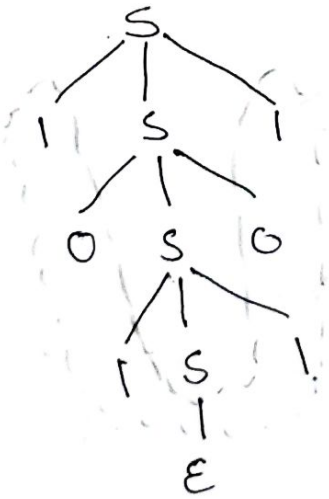


~~(2) a) Rf =~~

(3) a) In PDA it reads from the tape and perform push/pop from stack whereas in Turing machine a head is positioned on the tape that reads the current symbol.

b) L = "101101"

S -> 0S0 | 1S1 | ε

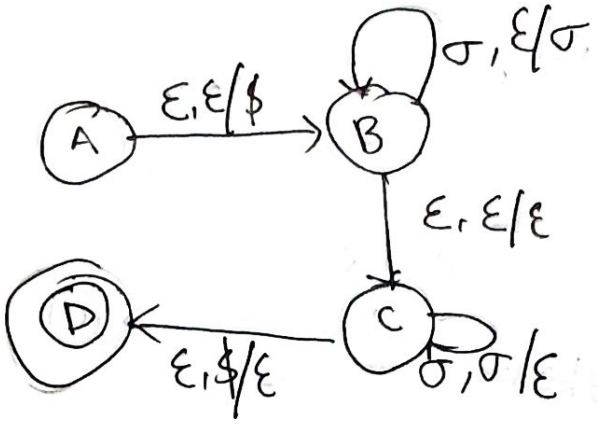


"101101" generated by parse tree.

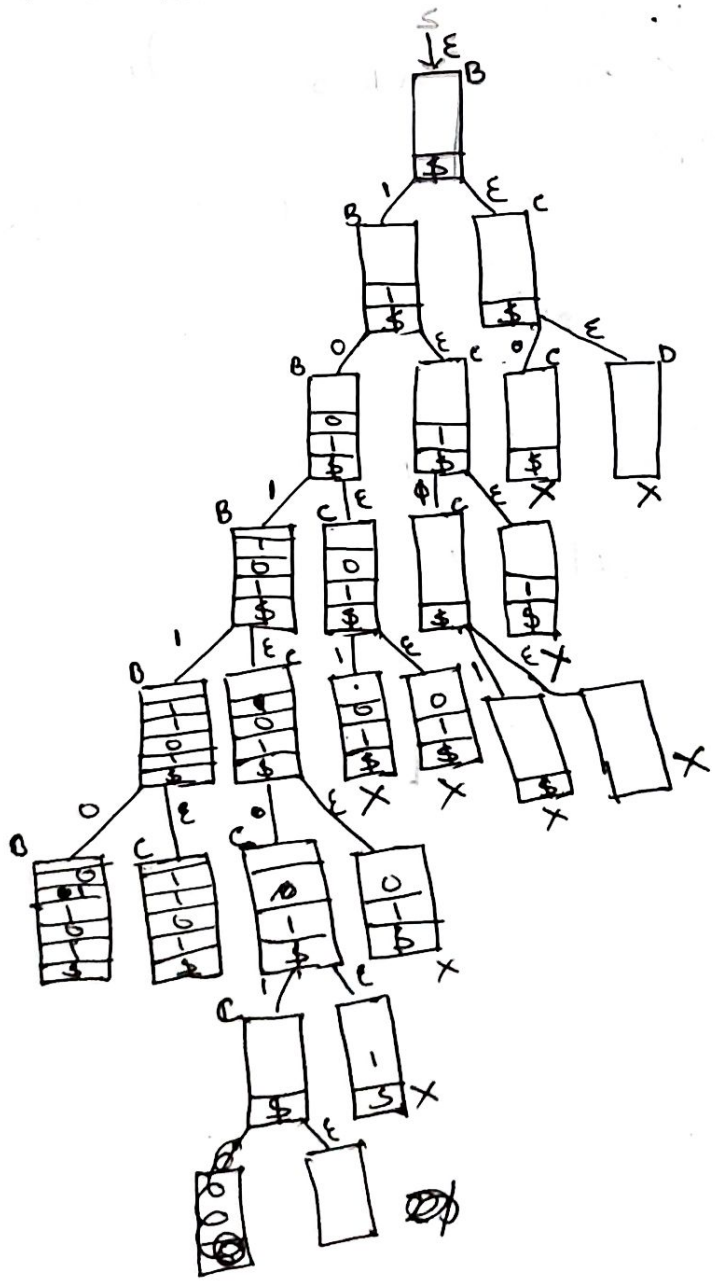
c) $S \to 0S0 \mid 1S1 \mid \varepsilon$ can also be written as

$\Sigma = \{0, 1\}$
where $\sigma \in \Sigma$

$S \to 0S0$
$S \to 1S1$
$S \to \varepsilon$



check: ε 1 ε 0 ε 1 ε 1 ε 0 ε 1 ε



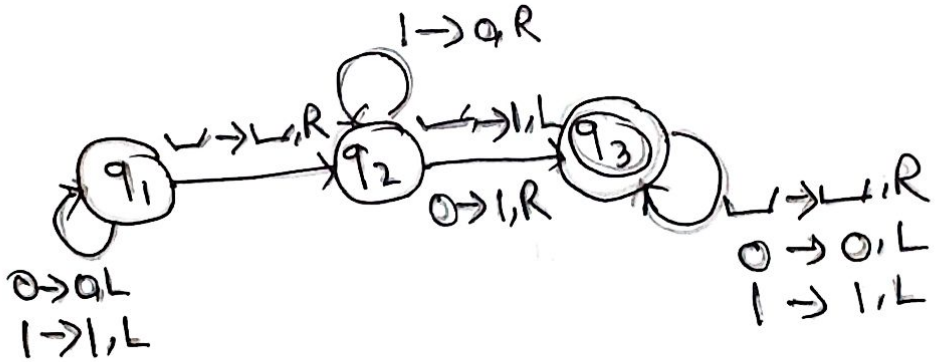
Stack empty
Final state reached

(4) a) Suppose the decimal value is 13 (1101)
Incrementing by 1 the decimal value will be 14 (1110)

Procedure → Start from the right most digit
if the digit is 0, Flip it to 1 and halt
if the digit is 1, Flip it to 0 and move to the digit on the left.

b)

State \ Input	␣	0	1
q_1	$q_2, ␣, R$	$q_1, 0, L$	$q_1, 1, L$
q_2	$q_3, 1, L$	$q_3, 1, R$	$q_2, 0, R$
q_3	(Halt, ␣, R)	$q_3, 0, L$	$q_3, 1, L$



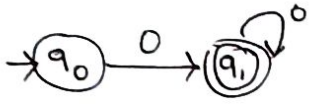
(2) a) RE : $|(0+1)^*| \bmod 2 = 0$

b) RE : $|(0+1)^*| \bmod 2 = 1$

c) RE = $R_1 | R_2$

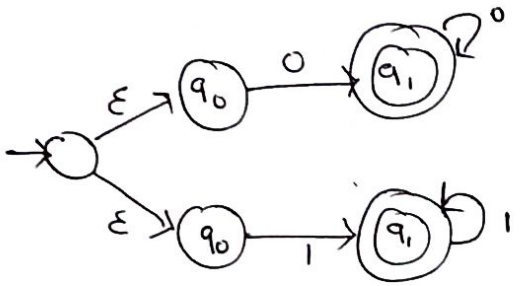
$R_1 = |(0+1)^*| \bmod 2 = 0$

$R_2 = |(0+1)^*| \bmod 2 = 1$

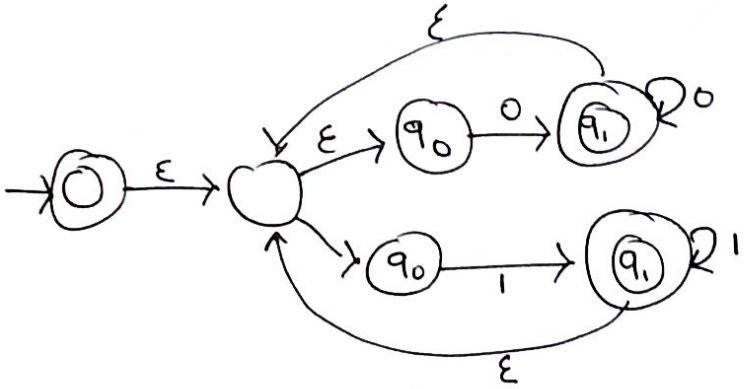
for 0 : 

for 1 

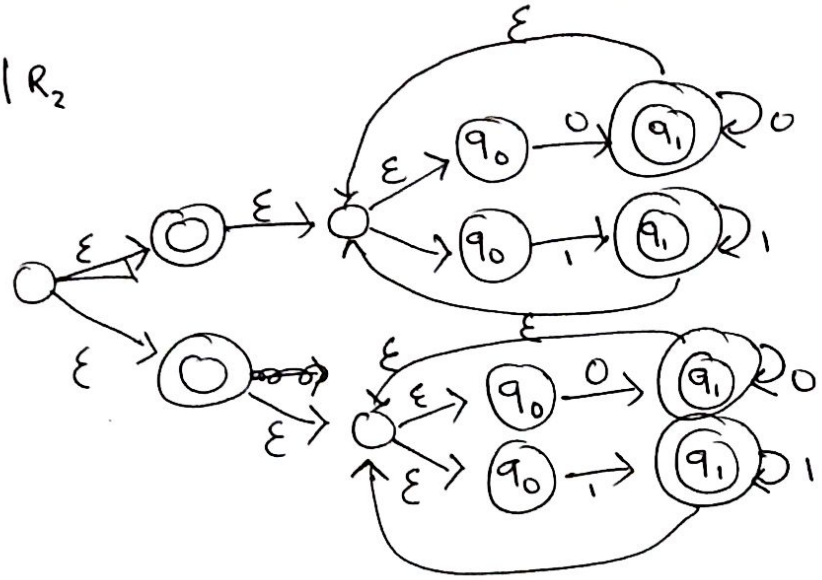
$(0+1)$



$(0+1)^*$



$R_1 | R_2$



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