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Panel C

TOC CCA 3 Assignment

ns 1) $1^0 = 1$ $\quad 2^2 = 10$

$2^1 = 10$ $\quad 2^3 = 1000$

$\log_2(1) = \log(2^0) = 0 \times \log(2) = 0$

$\log_2(10) = \log(2^1) = 1 \times \log(2) = 1$

$\log_2(100) = \log(2^2) = 2 \times \log(2) = 2$

$\log_2(1000) = \log(2^3) = 3 \times \log(2) = 3$

Steps:

1. Tuple in Turing Machine $\{Q, \Sigma, T, \delta, q_0, q_f, b\}$

b	b	b	b	b	b	b	b	b

Consider string '1000' on tape

current state: q_0
Input: 1
Output: b
resultant state:
q_1 : move R

2.

b	b	b	0	0	0	b	b	b

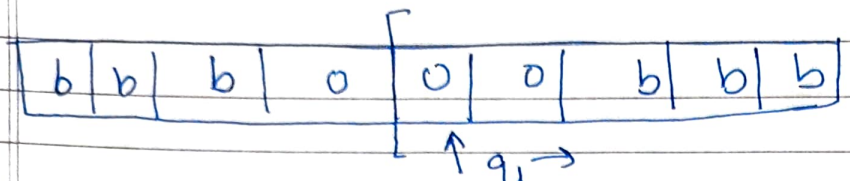
q_1

$Q : \{q_2\}$ $q_0 \in Q$

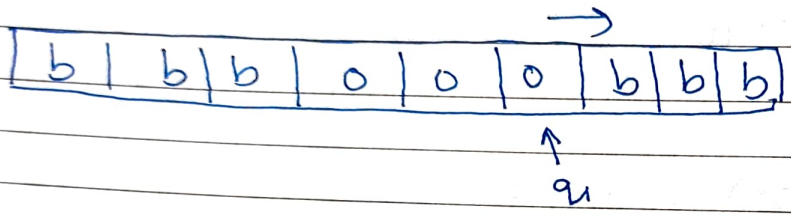
$\Sigma : 1$

$T = \{0, 1\}$ $b \rightarrow$ blank

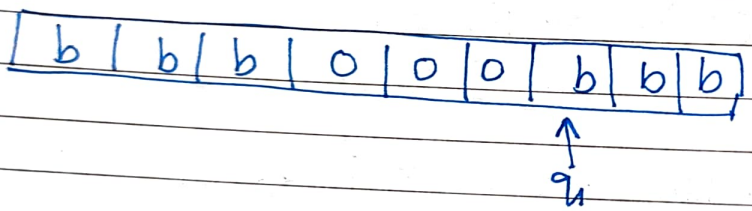
current state: q_1
Input: $0 (\in \Sigma)$
Output: $0 (\in T)$
Resultant state:
q_1 move R

3. 

current state: q_1
Input : $0(\varepsilon)$
$0/p = 0(r)$
Resultant state:
q_1 move R

4. 

current state: q_1
$1/p = 0(\varepsilon)$
$0/p = 0(r)$
Resultant state:
q_1 move R

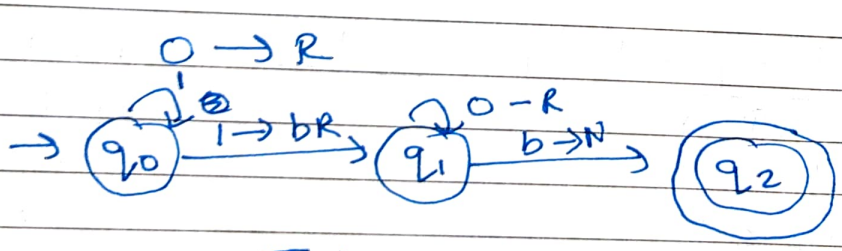
5. 

current state: q_1
$1/p = b(\varepsilon)$
$0/p = b(r)$
Resultant state:
q_2 move none

If, we find extra 1, then report error.

Table:

	0	1	b
q_0	R	q_1, R	Error
q_1	R	Error	Error
q_2	—	—	—



Turing Machine.

Ans 2. $L = \{x, \varepsilon, (a,b)\}^*, n_a(x) > n_b(x)$ where $n_a(x) > n_b(x)$ means no. of a's > b's

$M = (Q, \Sigma, \delta, q_0, z_0, f)$

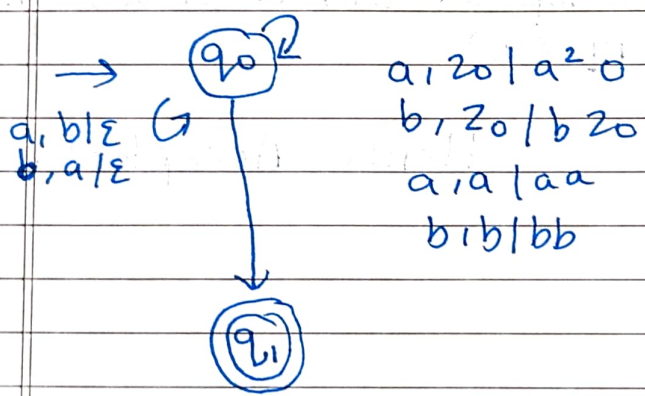
$Q = q_0, q_1, q_f$

$\Sigma = a, b$

$q_0 = q_0$

$\Gamma_0 = R$

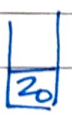
$f = q_f$



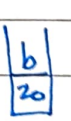
Ex: baaba

PDA

Basically we need more no. of a's than b's.

1) 

empty stack
string baaba

2) 

push b in stack
String: aaba

3) 

since next i/p is a, pop 'b'
coz $a \neq b$
string: aba

4) 

push a
String: ba

5) | | pop a
| Z_0 | becuz i/p b
string : a

6) | a | string : ε
| Z_0 | push a
since top of stack is a so we move to q_1 which is final state.
$(q_1, \varepsilon, a Z_0)$
Accepted.

And 'a' being on : top of stack proves the point of $n_a(x) > n_b(x)$

Hence Accepted.