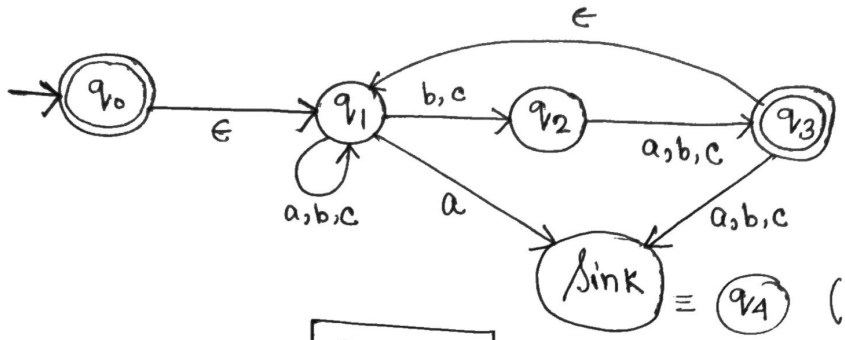
14/02/2023

PRAYAS MAZUMDER

T.O.C. Assignment → 6

∈ − NFA → DFA conversion

1.



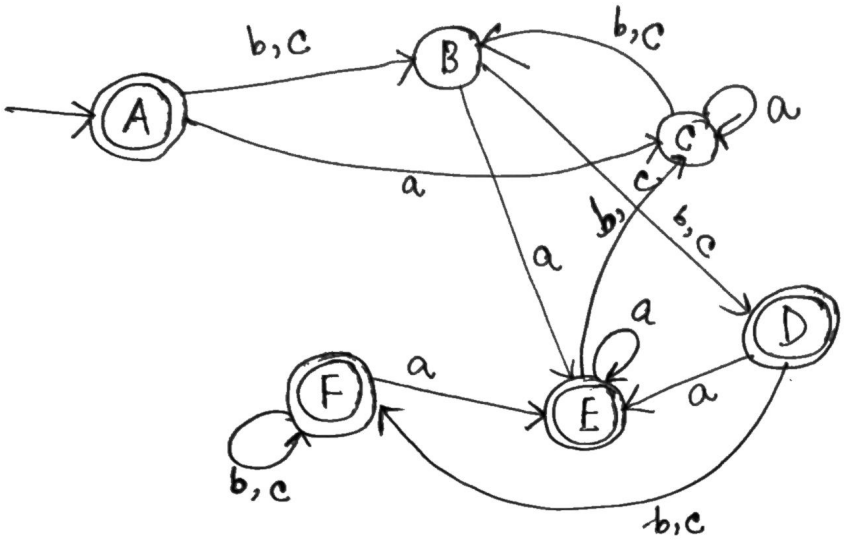
∈ − NFA 1

Language accepted by ∈-NFA1 is:

$L(N_1) = \{ x \in \{a,b,c\}^* \mid x$ is a string of minimum length 2 that has b/c in its second last bit $\}$

NFA State	DFA State
→ $\{q_0, q_1\}$	$\{q_0, q_1\} = A$
$\{q_1, q_2\}$	$\{q_1, q_2\} = B$
$\{q_1, q_4\}$	$\{q_1, q_4\} = C$
$\{q_1, q_2, q_3\}$	$\{q_1, q_2, q_3\} = D$
$\{q_1, q_3, q_4\}$	$\{q_1, q_3, q_4\} = E$
$\{q_1, q_2, q_3, q_4\}$	$\{q_1, q_2, q_3, q_4\} = F$

a	b	c
$\{q_1, q_4\}$	$\{q_0, q_2\}$	$\{q_1, q_2\}$
$\{q_1, q_3, q_4\}$	$\{q_1, q_2, q_3\}$	$\{q_1, q_2, q_3\}$
$\{q_1, q_4\}$	$\{q_1, q_2\}$	$\{q_1, q_2\}$
$\{q_1, q_3, q_4\}$	$\{q_1, q_2, q_3, q_4\}$	$\{q_1, q_2, q_3, q_4\}$
$\{q_1, q_3, q_4\}$	$\{q_1, q_2\}$	$\{q_1, \ , q_4\}$
$\{q_1, q_4, q_3\}$	$\{q_1, q_2, q_3, q_4\}$	$\{q_1, q_2, q_3, q_4\}$



The above DFA M_1 has:

$M_1 = \{Q_1, \delta_1, \Sigma, A, F_1\}$

$Q_1 = \{A, B, C, D, E, F\}$, $\Sigma = \{a, b, c\}$,

initial State : A, $F_1 = \{A, D, E, F\}$

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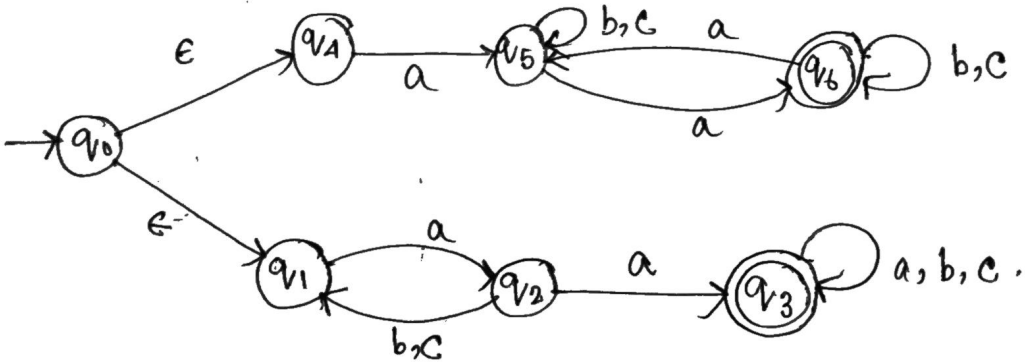
(2)

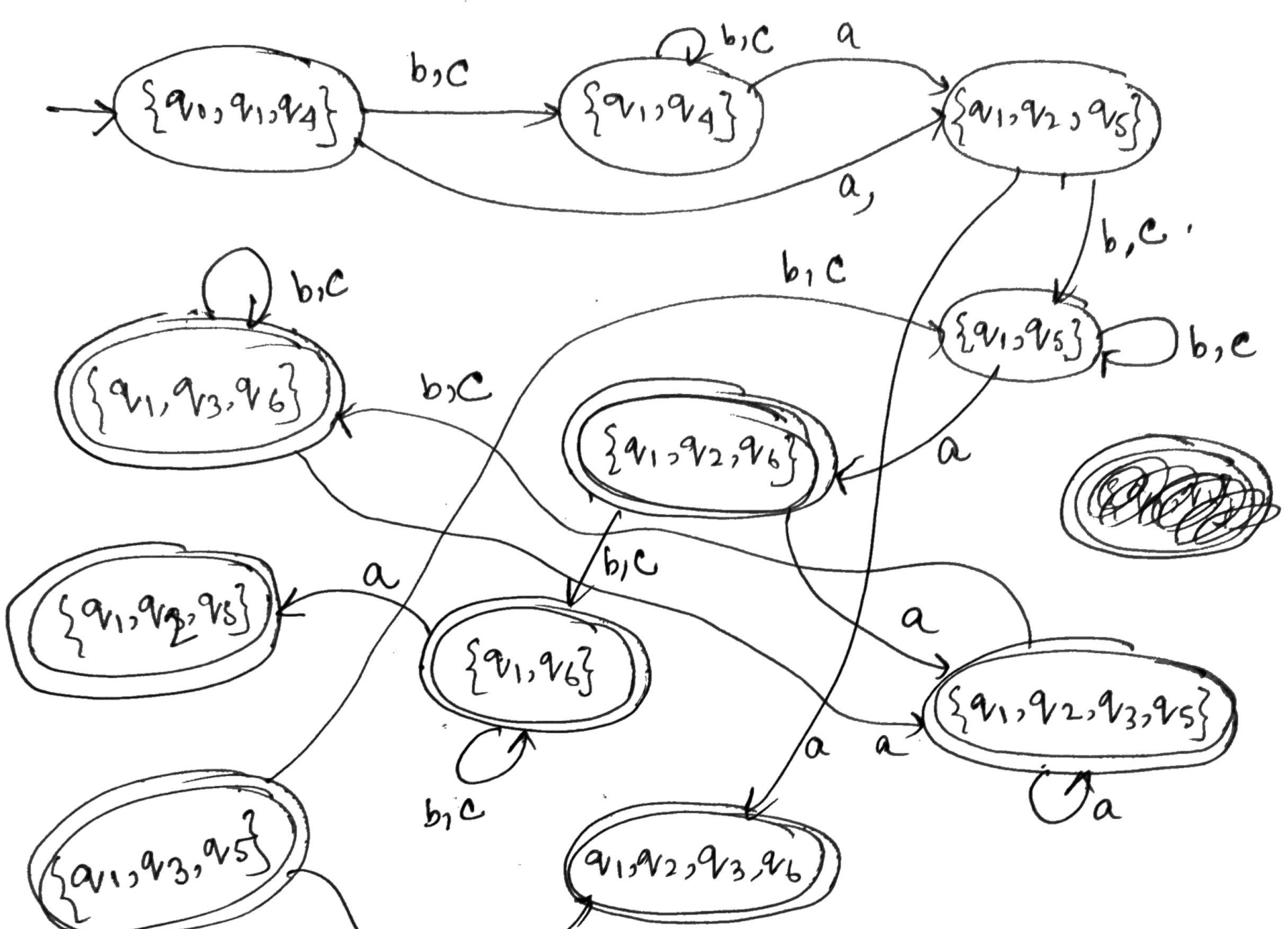


NFA N2

Language accepted by the NFA =

$L(N_2) = \{ x \in \{a,b,c\}^* \mid$ x has minimum length 2 and contains 'aa' as a substring or, contains an substring containing even number of 'a's $\}$.

NFA State	DFA State	Input a	Input b	Input c
→ $\{q_0, q_1, q_4\}$	$\{q_0, q_1, q_4\}$	$\{q_2, q_1, q_5\}$	$\{q_1, q_4\}$	$\{q_1, q_4\}$
$\{q_1, q_4\}$	$\{q_1, q_2, q_5\}$	$\{q_1, q_2, q_5\}$	$\{q_1, q_4\}$	$\{q_1, q_4\}$
$\{q_1, q_2, q_5\}$	$\{q_1, q_2, q_3, q_6\}$	$\{q_1, q_2, q_3, q_6\}$	$\{q_1, q_5\}$	$\{q_1, q_5\}$
$\{q_1, q_5\}$	$\{q_1, q_2, q_6\}$	$\{q_1, q_2, q_6\}$	$\{q_1, q_5\}$	$\{q_1, q_5\}$
$\{q_1, q_2, q_6\}$	$\{q_1, q_2, q_3, q_5\}$	$\{q_1, q_2, q_3, q_5\}$	$\{q_1, q_6\}$	$\{q_1, q_6\}$
$\{q_1, q_6\}$	$\{q_1, q_2, q_5\}$	$\{q_1, q_2, q_5\}$	$\{q_1, q_4\}$	$\{q_1, q_6\}$
$\{q_1, q_2, q_3, q_5\}$	$\{q_1, q_2, q_3, q_5\}$	$\{q_1, q_2, q_3, q_5\}$	$\{q_1, q_3, q_5\}$	$\{q_1, q_3, q_5\}$
$\{q_1, q_2, q_3, q_6\}$	$\{q_1, q_2, q_3, q_5\}$	$\{q_1, q_2, q_3, q_5\}$	$\{q_1, q_3, q_6\}$	$\{q_1, q_3, q_6\}$
$\{q_1, q_3, q_5\}$	$\{q_1, q_2, q_3, q_6\}$	$\{q_1, q_2, q_3, q_6\}$	$\{q_1, q_5\}$	$\{q_1, q_5\}$
$\{q_1, q_3, q_6\}$	$\{q_1, q_2, q_3, q_5\}$	$\{q_1, q_2, q_3, q_5\}$	$\{q_1, q_3, q_6\}$	$\{q_1, q_3, q_6\}$


{q0, q1, q4}
b, c
{q1, q4}
b, c
a
{q1, q2, q5}
a,
b, c
{q1, q5}
b, c
b, c
{q1, q3, q6}
b, c
{q1, q2, q6}
a
{q1, q2, q3}
a
{q1, q6}
b, c
a
{q1, q2, q3, q5}
a
a
b, c
a
{q1, q3, q5}
{q1, q2, q3, q6}
a,

DFA M2