

Name: Harshal Shirish Sable  
Roll No: BT18CSE075

RANKA

DATE / /

PAGE

Q1) DFA of all strings either beginning or ending with "111"

For the NFA ;

① Beginning with "111"

$q_0 \xrightarrow{1} q_1 \xrightarrow{1} q_2 \xrightarrow{1} q_3^*$

② Ending with "111"

$r_0 \xrightarrow{0} r_0$

$r_0 \xrightarrow{1} r_0$

$r_0 \xrightarrow{1} r_1 \xrightarrow{1} r_2 \xrightarrow{1} r_3^*$

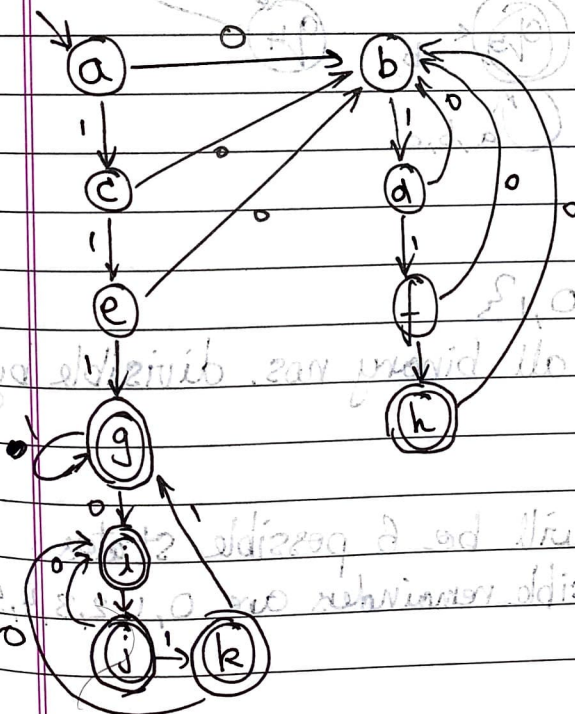
Also  $q_0' \xrightarrow{\epsilon} q_0$   
and  $q_0' \xrightarrow{\epsilon} r_0$

Epsilon table

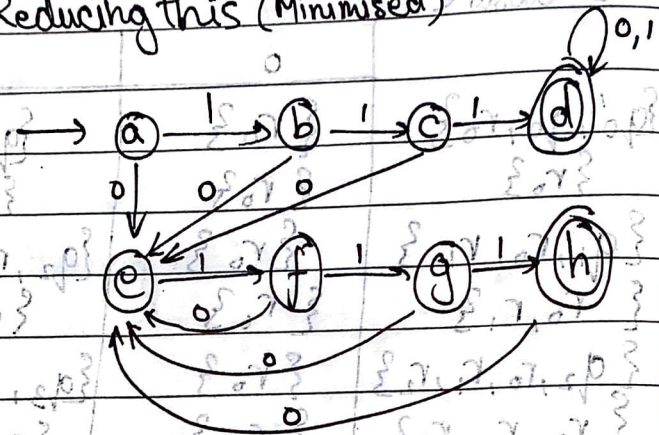
	0	1	$\epsilon$
$q_0'$	$\phi$	$\phi$	$q_0, r_0$
$q_0$	$\phi$	$q_1$	
$q_1$	$\phi$	$q_2$	
$q_2$	$\phi$	$q_3$	
$* q_3$	$\phi$	$q_3$	
$r_0$	$r_0$	$r_0, r_1$	
$r_1$	$\phi$	$r_2$	
$r_2$	$\phi$	$r_3$	
$* r_3$	$\phi$	$\phi$	

E-closure

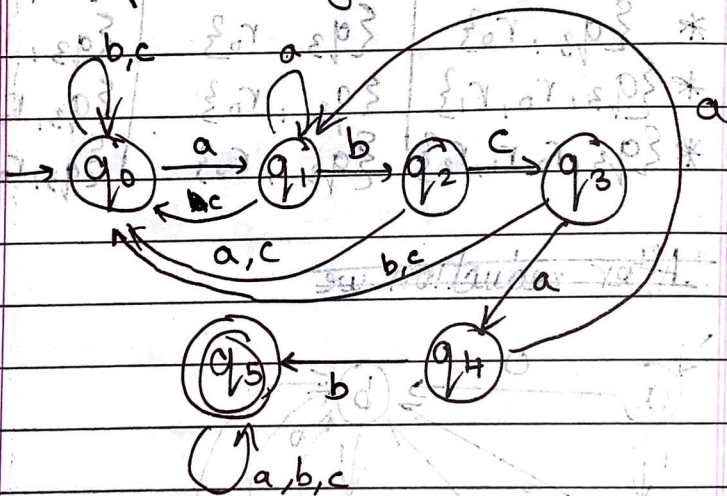
	0	1
a $\{q_0, q_0, r_0\}$	$\{r_0\}$	$\{q_1, r_0, r_1\}$
b $\{r_0\}$	$\{r_0\}$	$\{r_0, r_1\}$
c $\{q_1, r_0, r_1\}$	$\{r_0\}$	$\{q_2, r_0, r_1, r_2\}$
d $\{r_0, r_1\}$	$\{r_0\}$	$\{r_0, r_1, r_2\}$
e $\{q_2, r_0, r_1, r_2\}$	$\{r_0\}$	$\{q_3, r_0, r_1, r_2, r_3\}$
f $\{r_0, r_1, r_2\}$	$\{r_0\}$	$\{r_0, r_1, r_2, r_3\}$
g $\{q_3, r_0, r_1, r_2, r_3\}$	$\{q_3, r_0\}$	$\{q_3, r_0, r_1, r_2, r_3\}$
h $\{r_0, r_1, r_2, r_3\}$	$\{r_0\}$	$\{r_0, r_1, r_2, r_3\}$
i $\{q_3, r_0\}$	$\{q_3, r_0\}$	$\{q_3, r_0, r_1\}$
j $\{q_3, r_0, r_1\}$	$\{q_3, r_0\}$	$\{q_3, r_0, r_1, r_2\}$
k $\{q_3, r_0, r_1, r_2\}$	$\{q_3, r_0\}$	$\{q_3, r_0, r_1, r_2, r_3\}$

After reduction we

Reducing this (Minimised)



Q2) Accept substring "abcab";  $\Sigma = \{a, b, c\}$



Q3)  $\Sigma = \{0, 1\}$

Accept all binary nos. divisible by 6.

There will be 6 possible states as possible remainders are 0, 1, 2, 3, 4, 5



	0	1
* $q_0$	$q_0$	$q_1$
$q_1$	$q_2$	$q_3$
$q_2$	$q_4$	$q_5$
$q_3$	$q_0$	$q_1$
$q_4$	$q_2$	$q_3$
$q_5$	$q_4$	$q_5$

