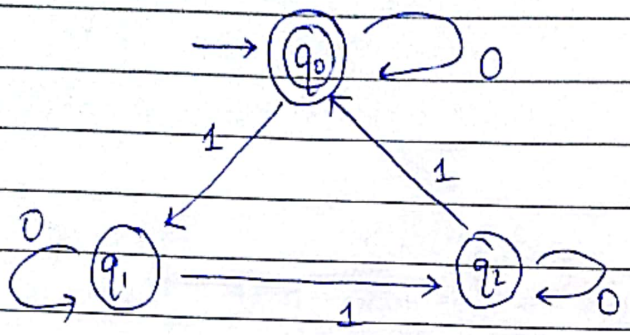
AIMAN SIDDIQUA - 2K18/MC/008 Date .....

MC-304

THEORY OF COMPUTATION.

(1) M:



(a) 01110 $\delta(q_0, 01110) = \delta(q_0, 1110) = \delta(q_1, 110)$
$= \delta(q_2, 10) = \delta(q_0, 0) = q_0$

Hence 01110 is accepted as q_0 is a final state

(b) 10001

$\delta(q_0, 10001) = \delta(q_1, 0001) = \delta(q_1, 001) = \delta(q_1, 01)$
$= \delta(q_1, 1) = q_2$

Hence q_2 is not accepted as q_2 is not a final state.

(c) 01010

$\delta(q_0, 01010) = \delta(q_0, 1010) = \delta(q_1, 010) = \delta(q_1, 10)$
$= \delta(q_2, 0) = q_2$

Not accepted

(d) 1111

$\delta(q_0, 1111) = \delta(q_1, 111) = \delta(q_2, 11) = \delta(q_3, 1)$
$= \delta(q_1, 1) = \delta(q_2, \Lambda) = q_2$

Not accepted.

Spiral

(i) (a) 01110 and 01100

01110 is accepted as seen above

$\delta(q_0, 01100) = \delta(q_0, 1100) = \delta(q_1, 100) = \delta(q_2, 00)$
$= \delta(q_2, 0) = \delta(q_2, \wedge) = q_2$

As q_2 is a final state 01100 is also accepted.

(b) 10001 and 10000

As seen in previous part 10001 has final state q_2 so it is accepted.

$\delta(q_0, 10000) = \delta(q_1, 0000) = \delta(q_1, 000) = \delta(q_1, 00)$
$= \delta(q_1, 0) = q_1$

As q_1 is not final it is not accepted.

(c) 0110 and 0111101

$\delta(q_0, 0110) = \delta(q_0, 110) = \delta(q_1, 10) = \delta(q_2, 0) = q_2$

It is accepted

$\delta(q_0, 0111101) = \delta(q_0, 111101) = \delta(q_1, 11101) = \delta(q_2, 1101)$
$= \delta(q_0, 101) = \delta(q_1, 01) = \delta(q_1, 1) = q_2$

It is accepted

So 0110 and 0111101 are accepted.

(d) 0^{3n} $n \geq 1$ but not 1^{3n} $n \geq 1$

0^{2n} = 00000-- Accepted as always q_0

1^{2n} = 1111--- Depends on number

Hence false.

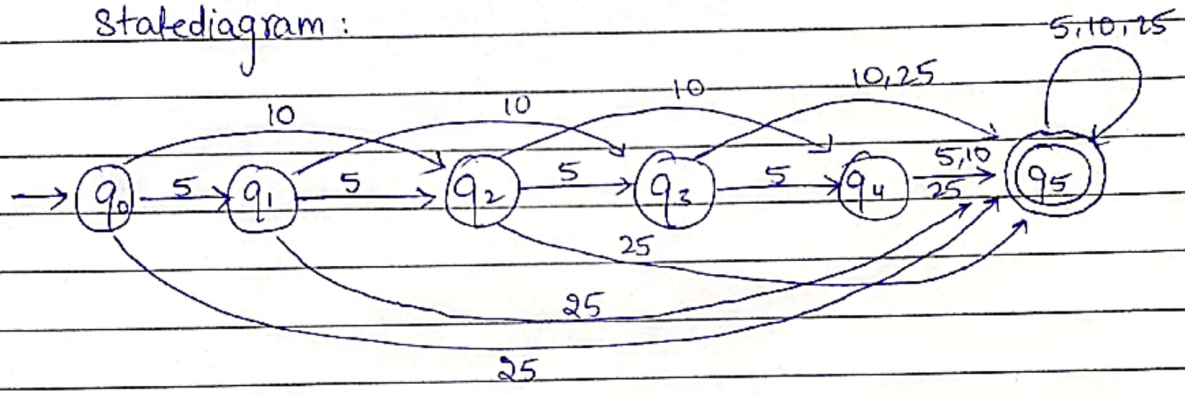
(2.) Let us make the following states

q_0 = No money collected
q_1 = 5 cents collected
q_2 = 10 cents collected q_3 = 15 cents collected
q_4 = 20 cents collected
q_5 = 25 cents collected.

$Q = \{q_0, q_1, q_2, q_3, q_4\}$

$\Sigma = \{5, 10, 25\}$ $q_0 = \{q_0\}$ $F = \{q_5\}$

Statediagram:



Since no change is given all extra money also takes us to q_5.

Present State	Next State $a=5$	$a=10$	$a=25$
q_0	q_1	q_2	q_5
q_1	q_2	q_3	q_5
q_2	q_3	q_4	q_5
q_3	q_4	q_5	q_5
q_4	q_5	q_5	q_5
q_5	q_5	q_5	q_5