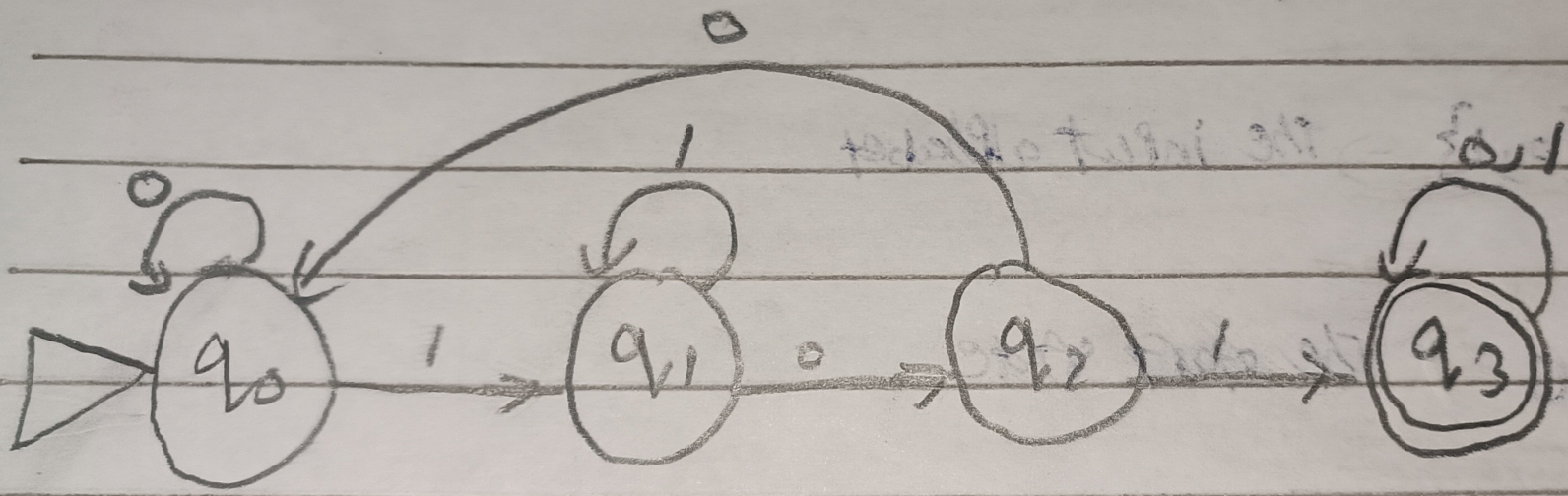
2. State Diagram



Date No

Construct a DFA for substring "101"

⇒ The DFA accepts any binary string that contains the substring "101" at least once.

1- Formal Definition:

The DFA is define as $M = (Q, \Sigma, \delta, q_0, F)$ where

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

q_0 الحالة البداية

q_1: 1

q_2: 10

q_3: 101 accept

* $\Sigma = \{0, 1\}$ ⇒ The input alphabet

* $q_0 = q_0$ ⇒ The start state

* $F = \{q_3\}$ ⇒ The set of accept states

* δ (Transition function):

Current state	input 0	input 1
q_0	q_0	q_1
q_1	q_2	q_1
q_2	q_0	q_3
q_3	q_3	q_3

$\delta(q_0, 0) = q_0$
$\delta(q_0, 1) = q_1$
$\delta(q_1, 0) = q_2$
$\delta(q_1, 1) = q_1$
$\delta(q_2, 0) = q_0$
$\delta(q_2, 1) = q_3$
$\delta(q_3, 0) = q_3$
$\delta(q_3, 1) = q_3$