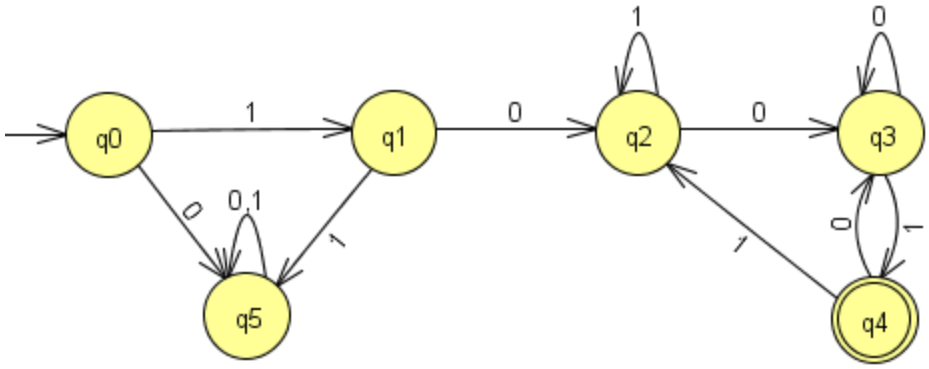
Student Id: 07.04.2016
Name Surname:
Signature:

BLG311E – FORMAL LANGUAGES AND AUTOMATA

2016 SPRING

QUIZ 3

The state transition diagram of a Deterministic Finite Automaton (DFA) is given below.



a) Heuristically derive the regular expression for the language recognized by this DFA.

b) Produce a Type-3 grammar for the language recognized by this DFA.

Duration: 20 mins

Solution:

a) Due to the death state q_5, only the strings starting with 10 are accepted by this DFA.
Due to the loops among q_2, q_3 and q_4, only the strings ending with 01 are accepted by this DFA.
Thus the regular expression is $L = 10(0 \vee 1)^*01$

b) $< q_0 > ::= 1 < q_1 >$
$< q_1 > ::= 0 < q_2 >$
$< q_2 > ::= 0 < q_3 > \mid 1 < q_2 >$
$< q_3 > ::= 0 < q_3 > \mid 1 < q_4 > \mid 1$
$< q_4 > ::= 0 < q_3 > \mid 1 < q_2 >$

$< q_2 >$ and $< q_4 >$ are the same. So production rule for $< q_4 >$ can be eliminated:
$< q_0 > ::= 1 < q_1 >$
$< q_1 > ::= 0 < q_2 >$
$< q_2 > ::= 0 < q_3 > \mid 1 < q_2 >$
$< q_3 > ::= 0 < q_3 > \mid 1 < q_2 > \mid 1$