BLG 311E – FORMAL LANGUAGES AND AUTOMATA
SPRING 2017
HOMEWORK 4

Let $L = \{w \mid w \in \{0,1\}^* \text{ and w does not contain } 011 \text{ as a substring}\}$.

a) Draw the deterministic finite automaton (DFA) for L as a state transition diagram.

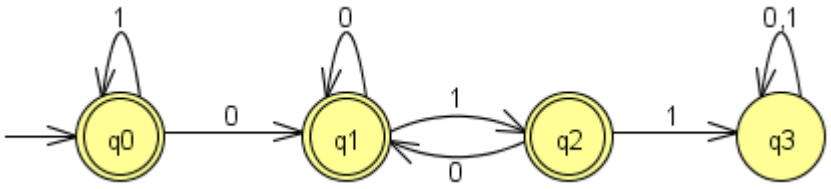
b) Give a Type-3 grammar for this language.

c) Write the regular expression for this language.

IMPORTANT: You must do this homework **by hand** and **submit it using the box in the department secretariat**.

SOLUTION:

a)



q_3: death state for strings containing 011

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

$< q_1 >::= 0 < q_1 > \mid 0 \mid 1 < q_2 > \mid 1$

$< q_2 >::= 0 < q_1 > \mid 0$

c) $L = \underbrace{1^*}_{q_0} \vee \underbrace{1^*0(0 \vee 10)^*}_{q_1} \vee \underbrace{1^*0(0 \vee 10)^*1}_{q_2} = 1^*\big(\Lambda \vee 0(0 \vee 10)^*(\Lambda \vee 1)\big)$