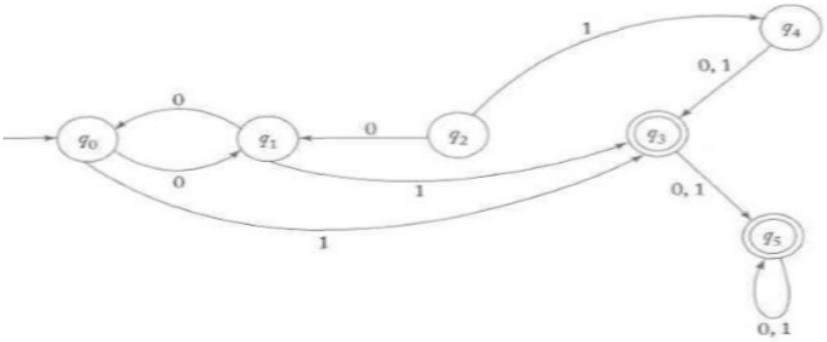
BLG311E: Formal Languages and Automata

Homework #2

Due Date: 30.10.2014, First Lecture Hour

1) Prove or disprove the following conjecture. If $M = (Q, \Sigma, \delta, q_0, F)$ is a minimal DFA for a regular language L, then $\overline{M} = (Q, \Sigma, \delta, q_0, Q\text{-}F)$ is a minimal DFA for $\overline{L}$.

2) Minimize the states in the DFA depicted in the following diagram. Then, write the regular expression for the language accepted by the minimal DFA.



3) Give FAs accepting the following languages over the alphabet {0,1} or prove that they are not regular:

a) The set of all strings beginning with a 1 that, when interpreted as a binary integer, is a multiple of 3. For example, strings 1001, 11000, and 101101 are in this language but 101 and 01001 are not.

b) The set of all strings that, when interpreted ***in reverse*** as a binary integer, is divisible by 3. For example, strings 00011, and 0110 are in this language but 101 and 0101 are not.