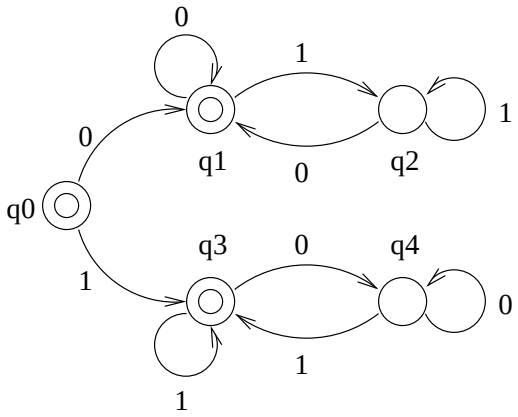
CS 154 Assignment 1

January 19, 2001

Problem 2

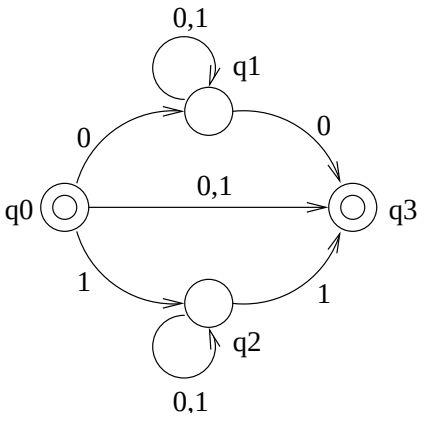
To show that D is a regular language, we construct a DFA that accepts D.



The formal definition of the above DFA is:
$Q = \{q_0, q_1, q_2, q_3, q_4\}$
$\Sigma = \{0, 1\}$
δ :

	0	1
q_0	q_1	q_3
q_1	q_1	q_2
q_2	q_1	q_2
q_3	q_4	q_3
q_4	q_4	q_3

q_0 is the start state
$F = \{q_0, q_1, q_3\}$
Since language D can be expressed with a DFA, it is a regular language (Definition 1.7 in textbook).
Alternatively, we can use the following regular expression to describe D: $(00^*(11^*00^*)^* + 11^*(00^*11^*)^* + \epsilon)$
(Yet another alternative is to construct a NFA, like the one below.


0,1
q1
0
0
0,1
q0
q3
1
1
q2
0,1
)