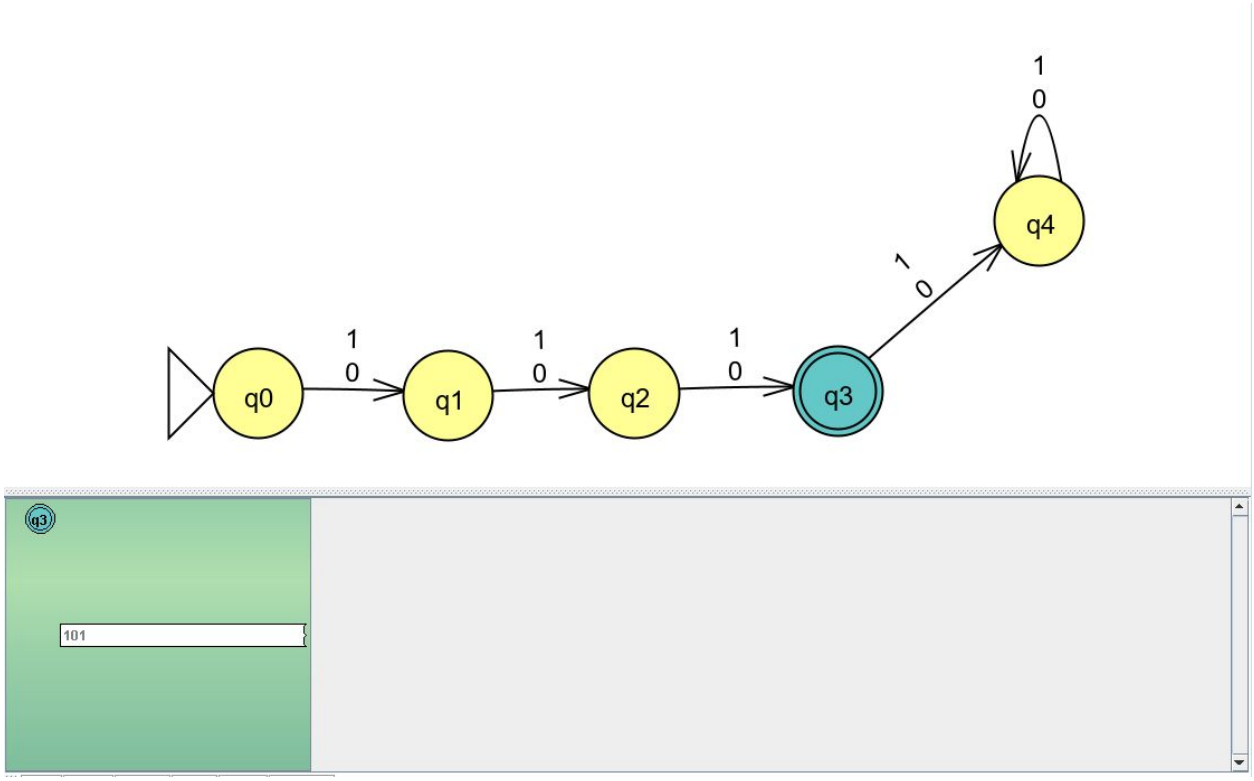
Colin Quinn
Prof. Huggins
CS 312
Assignment 1

Assignment 1 Due 2nd Friday

1.2 Give an FA that accepts only binary strings of length 3.

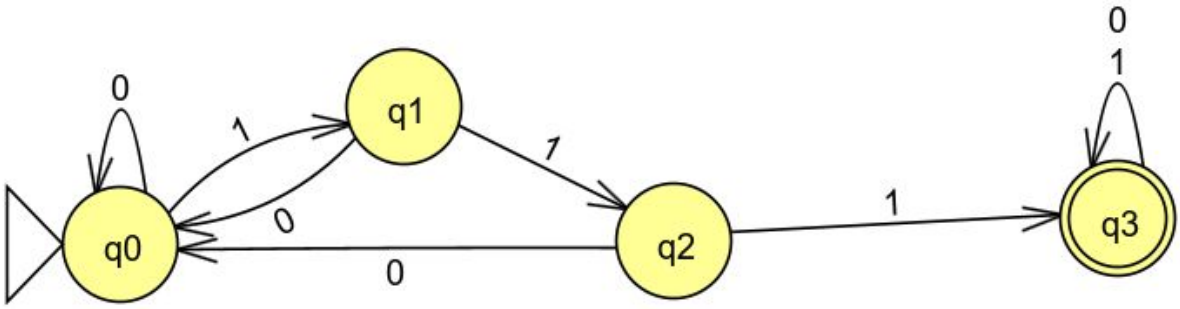


1.5 For the preceding two FA's, describe in English the strings each accepts.

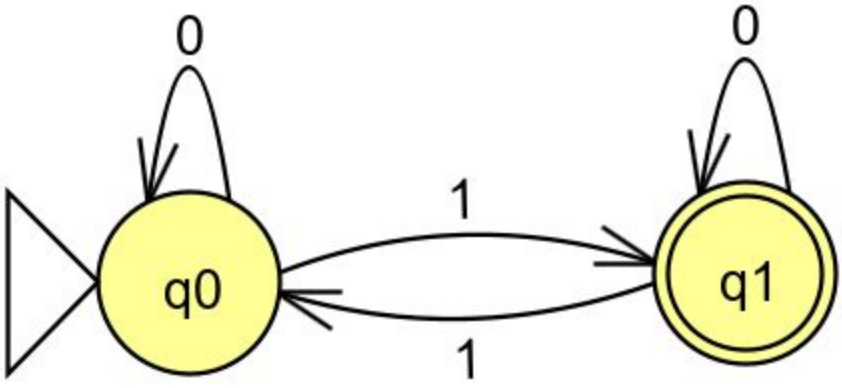
A) Accepts binary strings that start with 0
B) Accepts binary strings that end with 1

1.9 Give an FA for each of the following languages:

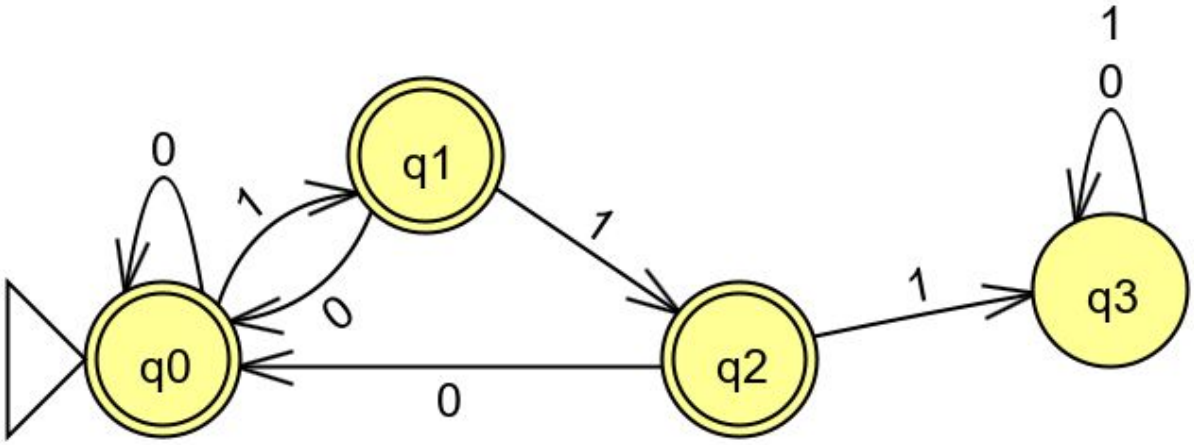
a) All binary strings with at least three 1's
b) All binary strings with an odd number of 1's
c) All binary strings without 111 as a substring
d) All binary strings where every odd position is a 1



A)



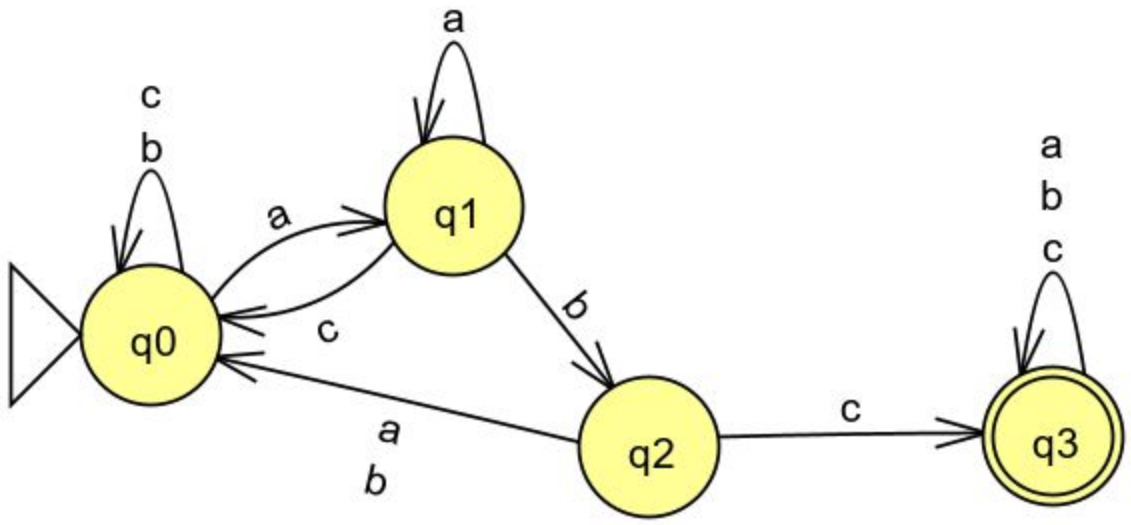
B)



C)

D)

1.14 Give an FA whose language is the set of strings a's, b's , and c's that contain abc as a substring.



2.3 Give RE's for:

a) All binary strings with exactly two 1's
b) All binary strings with a double symbol (contains 00 or 11) somewhere
c) All binary strings that contain both 00 and 11 as substrings
d) All binary strings without a double symbol anywhere

A) (0)* 1 (0)* 1 (0)*
B) (0 + 1)* (11 + 00) (0 + 1)*
C) (0 + 1)* (00 + 11) (0 + 1)* (00 + 11) (0 + 1)*
D) (010)* + (101)*

2.5 Give an RE for the language of all binary strings of length at least 2 that begin and end with the same symbol.

(1 (0 + 1)* 1) + (0 (0 + 1)* 0)

2.9 Give an RE for the language of Exercise 1.14

(a + b + c)* abc (a + b + c)*

2.15 Show that the language of RE (0*1*)* is all binary strings.

The first statement is *0** which means any amount of 0's, including none. The same remains true for the statement *1**, this implies that the string can start with any number of 0's and also any number of 1's. That then makes the overall statement of *(0*1*)** generate all binary strings as any combination of 1's and 0's can be created since the asterisk allows for the empty set to be included.