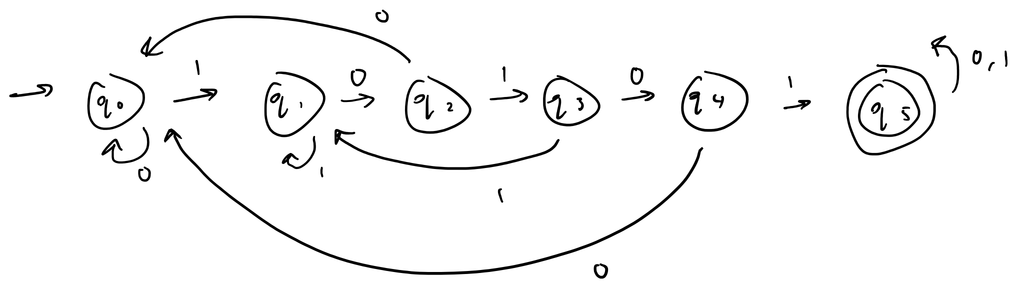
Homework 2

Tuesday, September 3, 2024 11:54 AM

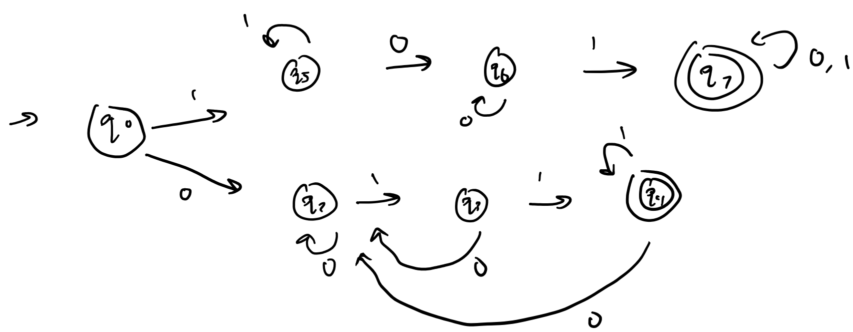
1.



Ex. 111010011 ✓ reject

1101100110101 ✓ accept

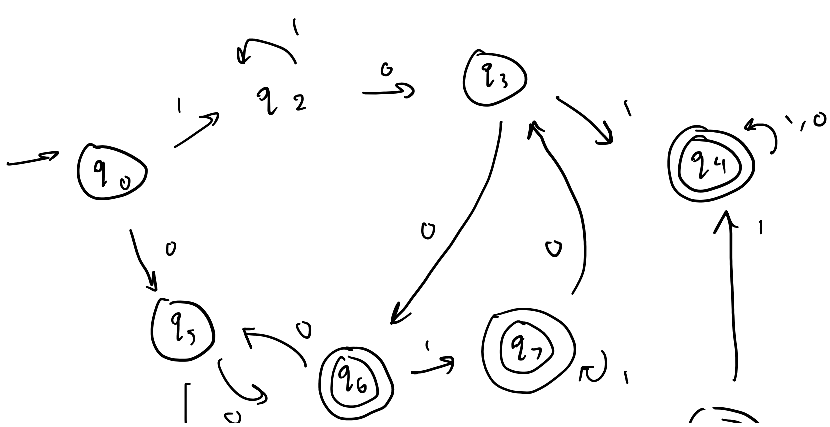
2.

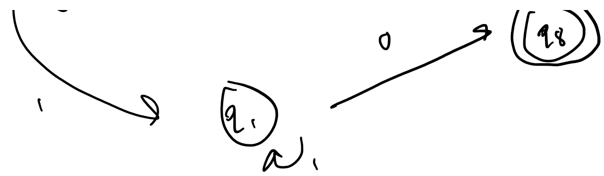


Ex. 00110111 ✓

100100110 ✓

3.



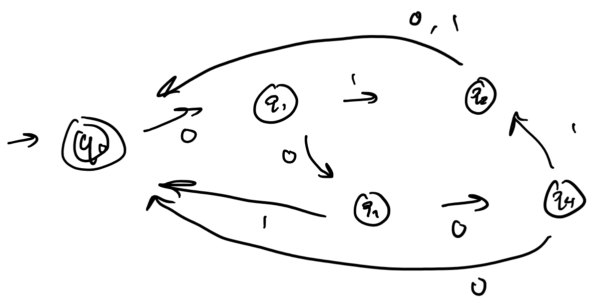


Ex. 10011011 Accept ✓

100100 1110 Reject ✓

01101 Accept ✓

4.



Ex. 01 ✓ reject

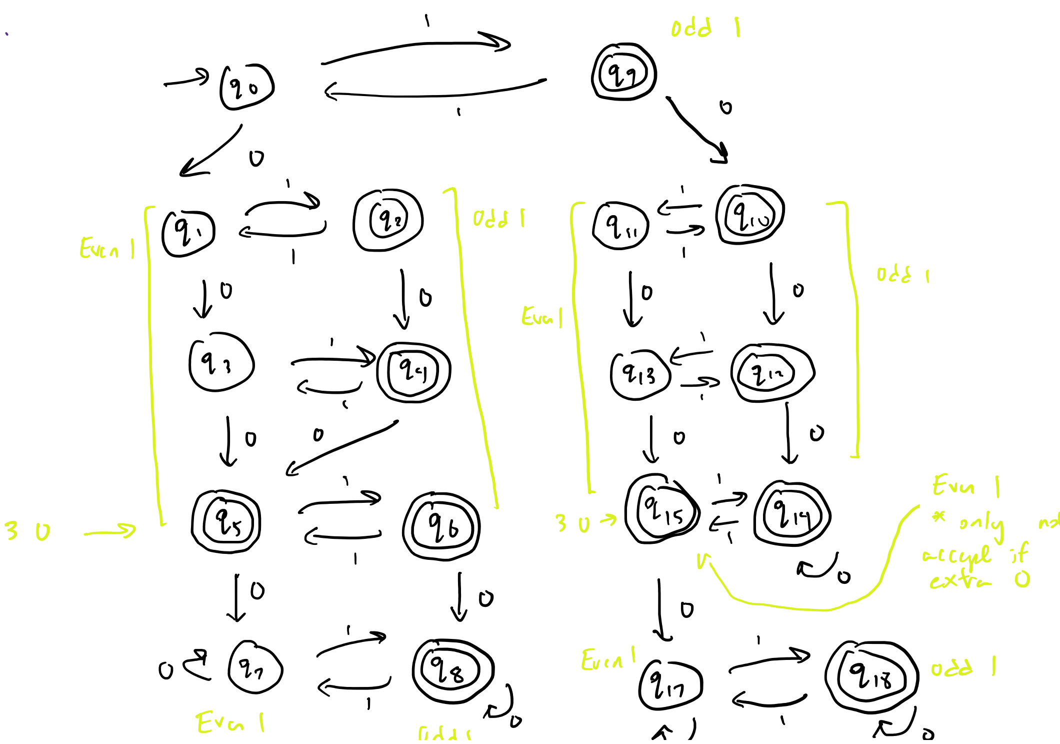
0001 ✓ reject

00001 ✓ accept

010 ✓ accept

00010 ✓ accept

5.

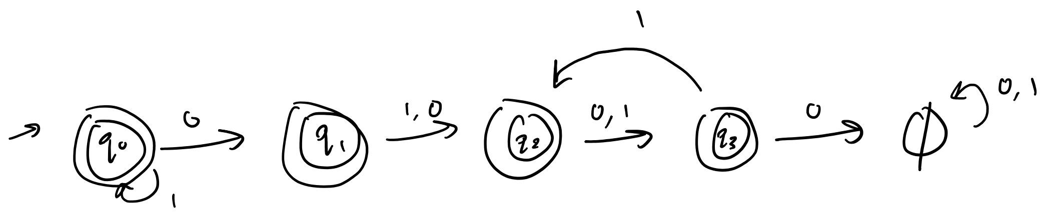


Ex. 111011011 √ reject

00010101 √ accept (odd 1)

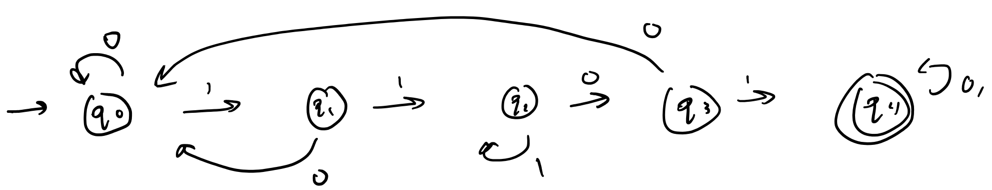
1001111010 √ accept (odd 1)

1010101 √ accept (3 0)

6. 

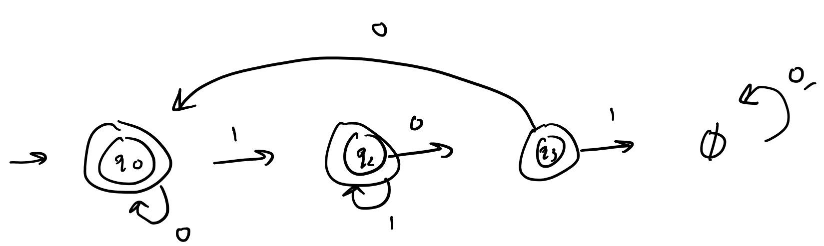
Ex. 010111010 √ no

010110 √ accept

7. 

Ex. 00110111 ✓

Ex. 0101011101 √

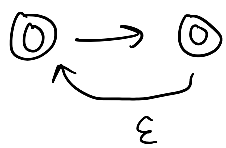
8. 

Ex. 110011001 √ accept

11001010 ✓   no

9. N_1

N as proposed, making the start state an accepted state



1. The empty string, $\emptyset$, would be accepted by N but not by N_1.
2. A string that passes by the accept state in N_1 but does not end on it and therefore does not get accepted can end up getting accepted on N through ε transition.

10. L is regular, meaning there is a finite automata $F = (Q, \Sigma, \delta, q_0, F)$, that accepts L.

L_{op} has the same alphabet, $\Sigma = \{0,1\}$ as L.

On the same set Q of states, we can create a finite automaton $F' = (Q, \Sigma, \delta', q_0, F')$

s.t. $\delta: Q \times \{0,1\} = Q \Rightarrow \delta': Q \times \{1,0\} = Q$ (opposite transition)

$F \subseteq Q \Rightarrow F' \subseteq Q$ s.t. $F' \subseteq F^c$, meaning no element $f \in F'$ is in F.

Thus, L_p is regular.