Sunday, April 24, 2022

Assignment 7

CSCI 411

1.

a. (0+1)(00+11+01+10)*

b. ε + (01+1)(0+1)*

c. (0+1)*(01+10+11) + ε + 0 + 1

d. ((10+1)* + (01+1)*)(00 + ε)((10+1)*+(01+1)*)

2.

- Remove states that are not reachable from starting state

	0	1
->A	B	F
B	D	G
***D**	G	E
E	H	E
***F**	A	G
G	D	G
H	D	G

- Keep on separating the final and non final states ill we get all states output is lies in a common class for both 0 and 1.

	0	1
A	B	F
B, G, H	D	G
D	G	E
E	H, B	E
***F**	A	G

	A	B	C	D	E	F	G	
B	X							
C	X	X						
D	X	X						
E	X	X		X				
F	X	X	X	X	X			
G	X		X	X	X	X		
H	X		X	X	X	X		
I	X	X		X	X	X	X	X

EQ State: {B, G}, {B, H}, {C, D}, {C, E}, {C, I}, {G, H}

3.

* I - Intermediate state, F - Final state

If the pairs forming with 0 and 1 as input are symmetric(i.e. I, I and F, F), then M1 and M2 are equivalent.

	0	1
A, D	B, E (I, I)	A, D (F, F)
B, F	C, G (F, F)	A, D (F, F)
C, G	C, F (F, F)	A, G (F, F)
B, E	C, F (F, F)	A, G (F, F)

We can see that all the pairs formed in the transition table are symmetric. Hence, M1 and M2 are equivalent.

4.

* I - Intermediate state, F - Final state

If the pairs forming with 0 and 1 as input are symmetric(i.e. I, I and F, F), then M1 and M2 are equivalent.

	0	1
A, C	A, D (F, F)	B, E (I, I)
B, E	A, C (F, F)	B, E (I, I)
A, D	A, D (F, F)	B, E (I, I)

We can see that all the pairs formed in the transition table are symmetric. Hence, M1 and M2 are equivalent.

5.

a. let L be regular length and P be pumping length.

w belongs to L, where |w| <= P

w = xy

conditions: |y| < 0, (y is composed only of zeros)

|xy| >= p, (x and y lies within p)

Vi < xyi belongs to L (if i=0, xy0 = x = 0(p - k)

these contradicts L. Hence, L is not a regular language.

b.

c. let L be regular length and P be pumping length.

let w^2((w^r)^2) belongs to L, where |w| > 1 and |ww| <= P and w belongs to L

now let P >= 4

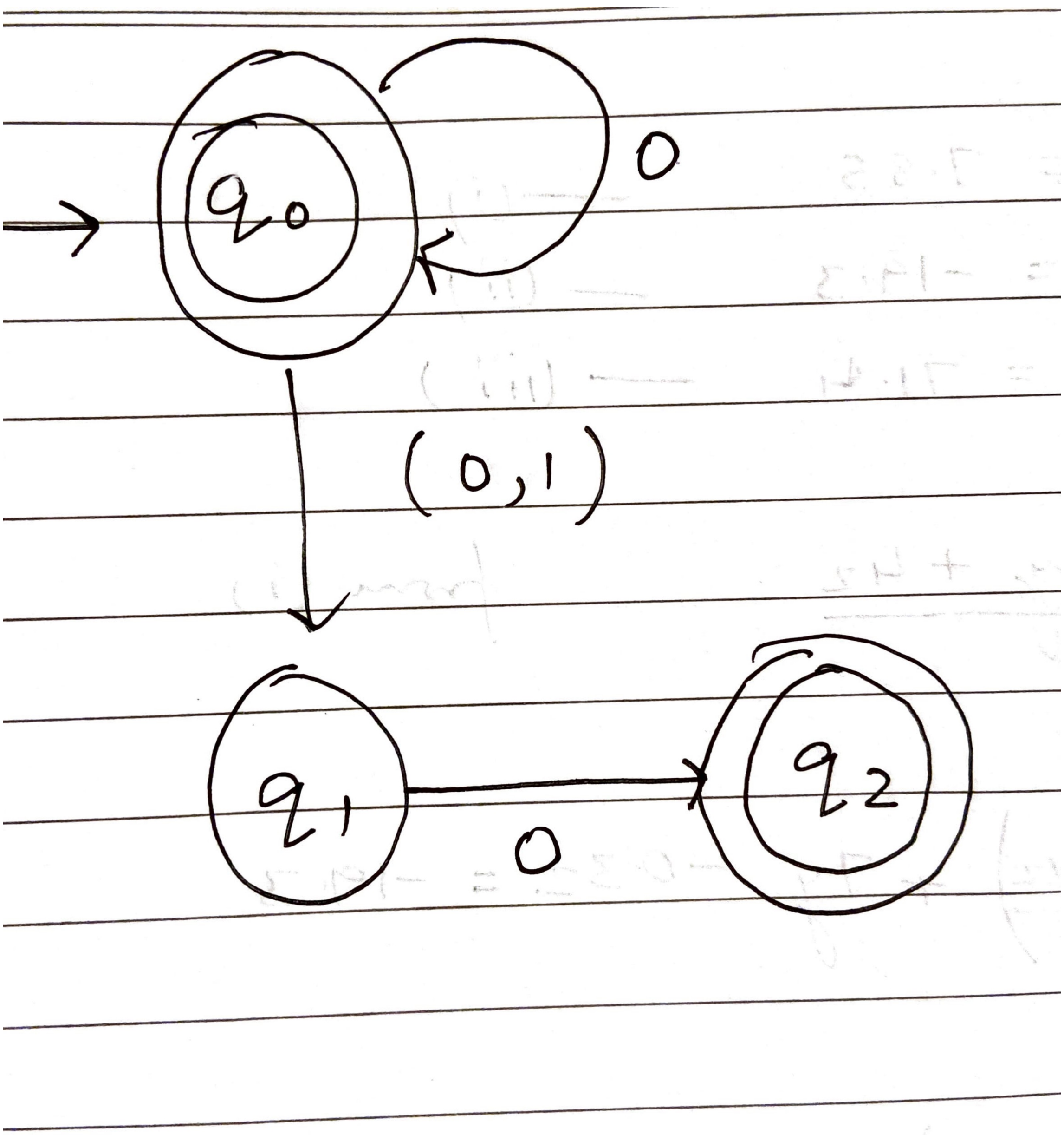
and xyz where x = y = z, and z = (w^r)^2 which is does not

{wwR|w ∈ {0, 1}∗}.

Hence, {wwR|w ∈ {0, 1}∗} is not a regular language.

6.

a. Initial state of finite automata will be final because empty string is included.



Binary number will end with a 0 for even numbers.

b. This is not a regular language because there is comparison.

c.

This is not a regular language because there is comparison.

For a regular language L, there exists an integer value ’n’, such that for all ‘w’ belongs to L with |w| >= n.

w = xyz, |xy| <= n, |y| > 0 or |y| >= 1 and for all i >= 0: xy^(i)z belongs to L

Let L be regular length and P be pumping length.

Let n be the states of DFA for which and example string s = 0^(n)10^(n)1

Now, s = uvw, if u and v were empty and then we could pump the string, but according to the pumping lemma Condition, v must be all 0’s.

Thus, uvvw is not in language L because contains 1 which indicates that s does not work.

Hence, L is not regular.

d. This is a regular language.

NFA: