Jason Wang

Homework 3

1. A. i.

A	B	C	Output
0	0	0	1
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	1

ii.

A	B	C	Output
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	0
1	1	1	0

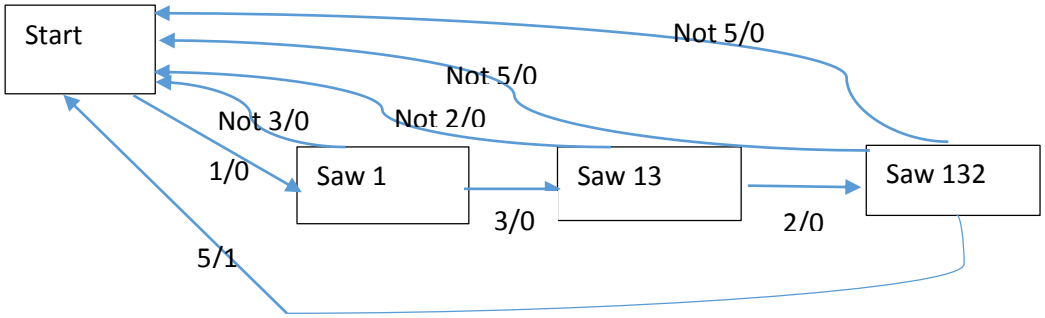
B.
(!A & !B & !C) | (!A & !B & C) | (A & B & !C) | (A & B & C)
((!A & !B) & !C) | ((!A & !B) & C) | ((A & B) & !C) | ((A & B) & C)
Which can be ((!A & !B) & (!C | C)) | ((A&B) & (!C | C))
Then **(!A & !B) | (A & B)**
Thus it is:
A XNOR B

2. A. start = 00, saw 1 = 01, saw 13 = 10, saw 132 = 11

Current State	Input	Next State	Output
Start	1	Saw 1	0 (closed)
Start	Not 1	Start	0
Saw 1	3	Saw 13	0
Saw 1	Not 3	Start	0
Saw 13	2	Saw 132	0
Saw 13	Not 2	Start	0
Saw 132	5	Start	1
Saw 132	Not 5	Start	0

Q1	Q0	In2	In1	In0	D1	D0	Output
0	0	0	0	1	0	1	0
0	0	Not 1			0	0	0
0	1	0	1	1	1	0	0
0	1	Not 3			0	0	0
1	0	0	1	0	1	1	0
1	0	Not 2			0	0	0
1	1	1	0	1	0	0	1
1	1	Not 5			0	0	0

Output = (Q1 & Q0 & In2 & !In1 & In0)
D1 = (!Q1 & Q0 & !In2 & In1 & In0) + (Q1 & !Q0 & !In2 & In1 & !In0)
D0 = (!Q1 & !Q0 & !In2 & !In1 & In0) + (Q1 & !Q0 & !In2 & In1 & !In0)



B. State: 0 = 000, 5 = 001, 10 = 010, 15 = 011, 20 = 100, 25 = 101
Input: 0 = 00, N = 01, D = 10, Q = 11

Current State	Input	Next State	Output
0	0	0	0 (closed)
0	5	5	0
0	10	10	0
0	25	25	0
5	0	5	0
5	5	10	0
5	10	15	0
5	25	0	1
10	0	10	0
10	5	15	0
10	10	20	0
10	25	0	1
15	0	15	0
15	5	20	0
15	10	25	0
15	25	0	1

20	0	20	0
20	5	25	0
20	10	0	1
20	25	0	1
25	0	25	0
25	Not 0	0	1

Q2	Q1	Q0	In1	In0	D2	D1	D0	Output
0	0	0	0	0	0	0	0	0
0	0	0	0	1	0	0	1	0
0	0	0	1	0	0	1	0	0
0	0	0	1	1	1	0	1	0
0	0	1	0	0	0	0	1	0
0	0	1	0	1	0	1	0	0
0	0	1	1	0	0	1	1	0
0	0	1	1	1	0	0	0	1
0	1	0	0	0	0	1	0	0
0	1	0	0	1	0	1	1	0
0	1	0	1	0	1	0	0	0
0	1	0	1	1	0	0	0	1
0	1	1	0	0	0	1	1	0
0	1	1	0	1	1	0	0	0
0	1	1	1	0	1	0	1	0
0	1	1	1	1	0	0	0	1
1	0	0	0	0	1	0	0	0
1	0	0	0	1	1	0	1	0
1	0	0	1	0	0	0	0	1
1	0	0	1	1	0	0	0	1
1	0	1	0	0	1	0	1	0
1	0	1	Not 0		0	0	0	1

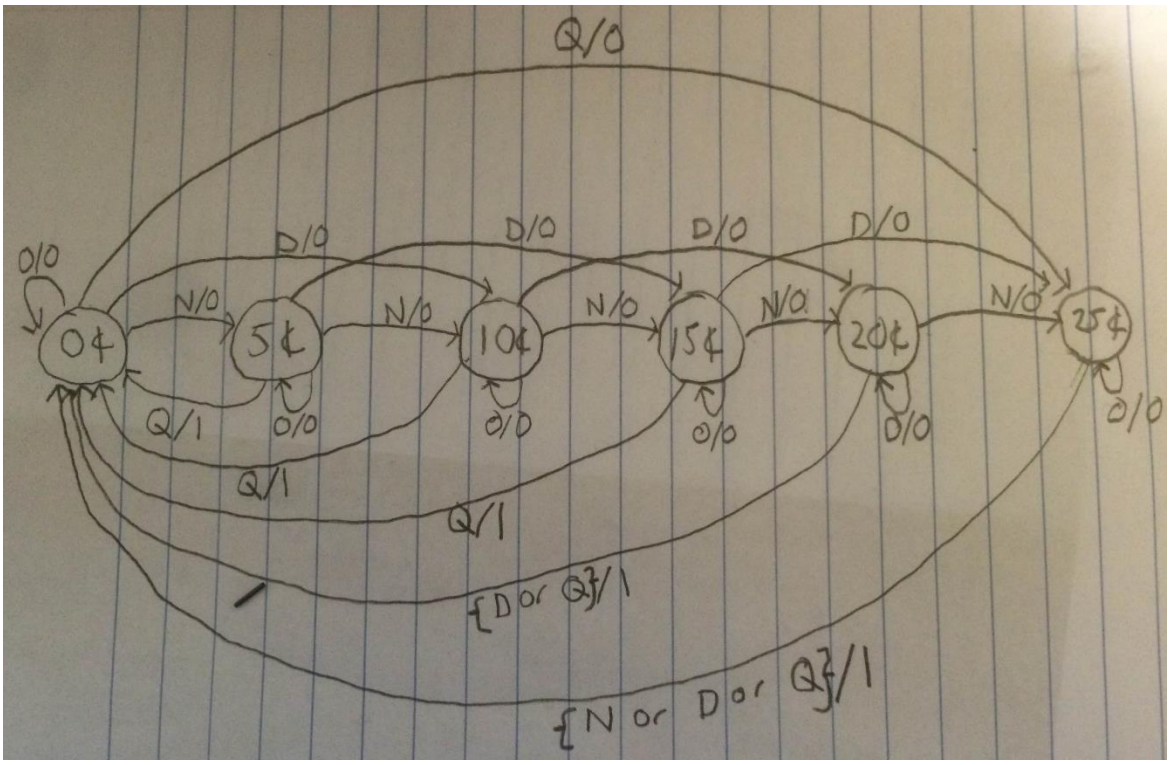
Output = (!Q2 & !Q1 & Q0 & In1 & In0) + (!Q2 & Q1 & !Q0 & In1 & In0) + (!Q2 & Q1 & Q0 & In1 & In0) + (Q2 & !Q1 & !Q0 & In1 & !In0) + (Q2 & !Q1 & !Q0 & In1 & In0) + (Q2 & !Q1 & Q0 & !In1 & In0) + (Q2 & !Q1 & Q0 & In1 & !In0) + (Q2 & !Q1 & Q0 & In1 & In0)

D2 = (!Q2 & !Q1 & !Q0 & In1 & In0) + (!Q2 & Q1 & !Q0 & In1 & !In0) + (!Q2 & Q1 & Q0 & !In1 & In0) + (!Q2 & Q1 & Q0 & In1 & !In0) + (Q2 & !Q1 & !Q0 & !In1 & !In0) + (Q2 & !Q1 & !Q0 & !In1 & In0) + (Q2 & !Q1 & Q0 & !In1 & !In0)

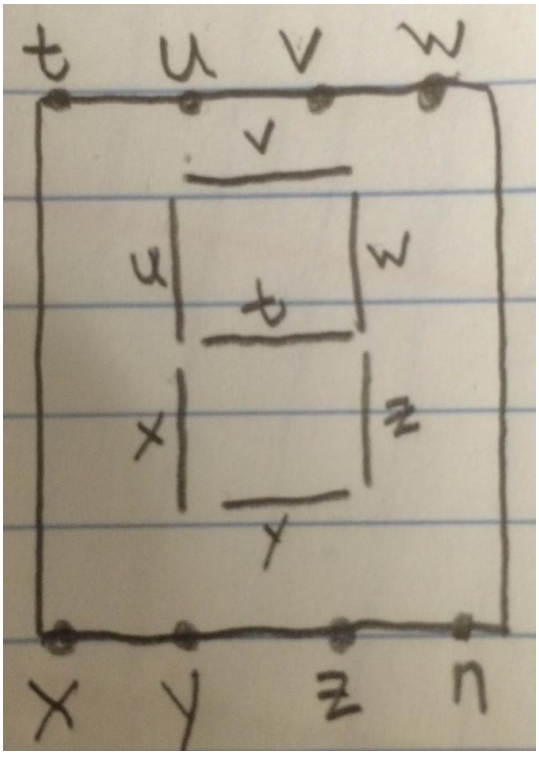
D1 = (!Q2 & !Q1 & !Q0 & In1 & !In0) + (!Q2 & !Q1 & Q0 & !In1 & In0) + (!Q2 & !Q1 & Q0 & In1 & !In0) + (!Q2 & Q1 & !Q0 & !In1 & !In0) + (!Q2 & Q1 & !Q0 & !In1 & In0) + (!Q2 & Q1 & Q0 & !In1 & !In0)

D0 = (!Q2 & !Q1 & !Q0 & !In1 & In0) + (!Q2 & !Q1 & !Q0 & In1 & In0) + (!Q2 & !Q1 & Q0 & !In1 & !In0) + (!Q2 & !Q1 & Q0 & In1 & !In0) + (!Q2 & Q1 & !Q0 & !In1 & In0) + (!Q2 &

Q1 & Q0 & !In1 & !In0) + (!Q2 & Q1 & Q0 & In1 & !In0) + (Q2 & !Q1 & !Q0 & !In1 & In0) + (Q2 & !Q1 & Q0 & !In1 & !In0)



3e.



In3	In2	In1	In0	t	u	v	w	x	y	z	
0	0	0	0	0	1	1	1	1	1	1	0
0	0	0	1	0	0	0	1	0	0	1	1
0	0	1	0	1	0	1	1	1	1	0	2
0	0	1	1	1	0	1	1	0	1	1	3
0	1	0	0	1	1	0	1	0	0	1	4
0	1	0	1	1	1	1	0	0	1	1	5
0	1	1	0	1	1	1	0	1	1	1	6
0	1	1	1	0	0	1	1	0	0	1	7
1	0	0	0	1	1	1	1	1	1	1	8
1	0	0	1	1	1	1	1	0	0	1	9
1	0	1	0	1	1	1	1	1	0	1	A
1	0	1	1	1	1	0	0	1	1	1	B
1	1	0	0	1	0	0	0	1	1	0	C
1	1	0	1	1	0	0	1	1	1	1	D
1	1	1	0	1	1	1	0	1	1	0	E
1	1	1	1	1	1	1	0	1	0	0	F

t = (!In3 & !In2 & In1 & !In0) + (!In3 & !In2 & In1 & In0) + (!In3 & In2 & !In1 & !In0) + (!In3 & In2 & !In1 & In0) + (!In3 & In2 & In1 & !In0) + (In3 & !In2 & !In1 & !In0) + (In3 & !In2 & !In1 & In0) + (In3 & !In2 & In1 & !In0) + (In3 & !In2 & In1 & In0) + (In3 & In2 & !In1 & !In0) + (In3 & In2 & !In1 & In0) + (In3 & In2 & In1 & !In0) + (In3 & In2 & In1 & In0)

u = (!In3 & !In2 & !In1 & !In0) + (!In3 & In2 & !In1 & !In0) + (!In3 & In2 & !In1 & In0) + (!In3 & In2 & In1 & !In0) + (In3 & !In2 & !In1 & !In0) + (In3 & !In2 & !In1 & In0) + (In3 & !In2 & In1 & !In0) + (In3 & !In2 & In1 & In0) + (In3 & In2 & In1 & !In0) + (In3 & In2 & In1 & In0)

v = (!In3 & !In2 & !In1 & !In0) + (!In3 & !In2 & In1 & !In0) + (!In3 & !In2 & In1 & In0) + (!In3 & In2 & !In1 & In0) + (!In3 & In2 & In1 & !In0) + (!In3 & In2 & In1 & In0) + (In3 & !In2 & !In1 & !In0) + (In3 & !In2 & !In1 & In0) + (In3 & !In2 & In1 & !In0) + (In3 & In2 & In1 & !In0) + (In3 & In2 & In1 & In0)

w = (!In3 & !In2 & !In1 & !In0) + (!In3 & !In2 & !In1 & In0) + (!In3 & !In2 & In1 & !In0) + (!In3 & !In2 & In1 & In0) + (!In3 & In2 & !In1 & !In0) + (!In3 & In2 & In1 & In0) + (In3 & !In2 & !In1 & !In0) + (In3 & !In2 & !In1 & In0) + (In3 & !In2 & In1 & !In0) + (In3 & In2 & !In1 & In0)

x = (!In3 & !In2 & !In1 & !In0) + (!In3 & !In2 & In1 & !In0) +(!In3 & In2 & In1 & !In0) + (In3 & !In2 & !In1 & !In0) + (In3 & !In2 & In1 & !In0) + (In3 & !In2 & In1 & In0) + (In3 & In2 & !In1 & !In0) + (In3 & In2 & !In1 & In0) + (In3 & In2 & In1 & !In0) + (In3 & In2 & In1 & In0)

y = (!In3 & !In2 & !In1 & !In0) + (!In3 & !In2 & In1 & !In0) + (!In3 & !In2 & In1 & In0) + (!In3 & In2 & !In1 & In0) + (!In3 & In2 & In1 & !In0) + (In3 & !In2 & !In1 & !In0) + (In3 & !In2 & In1 & In0) + (In3 & In2 & !In1 & !In0) + (In3 & In2 & !In1 & In0) + (In3 & In2 & In1 & !In0)

z = (!In3 & !In2 & !In1 & !In0) + (!In3 & !In2 & !In1 & In0) + (!In3 & !In2 & In1 & In0) + (!In3 & In2 & !In1 & !In0) + (!In3 & In2 & !In1 & In0) + (!In3 & In2 & In1 & !In0) + (!In3 & In2 & In1 & In0) + (In3 & !In2 & !In1 & !In0) + (In3 & !In2 & !In1 & In0) + (In3 & !In2 & In1 & !In0) + (In3 & !In2 & In1 & In0) + (In3 & In2 & !In1 & In0)