Michael Lin
CS 250 HW3

1. Truth table for A, B, C:

A	B	C	!(A + !B) x C	!((A x B) + (C x B))	Output
0	0	0	0	1	1
0	0	1	0	1	1
0	1	0	0	1	1
0	1	1	1	0	1
1	0	0	0	1	1
1	0	1	0	1	1
1	1	0	0	0	0
1	1	1	0	0	0

2. Output 1

   (!A x B x !C) + (!A x B x C) + (A x !B x !C) + (A x !B x C) + (A x B x !C)

   = [(!A x B x !C) + (!A x B x C)] + [(A x !B x !C) + (A x !B x C)] + (A x B x !C)

   = (!A x B) + (A x !B) + (A x B x !C)

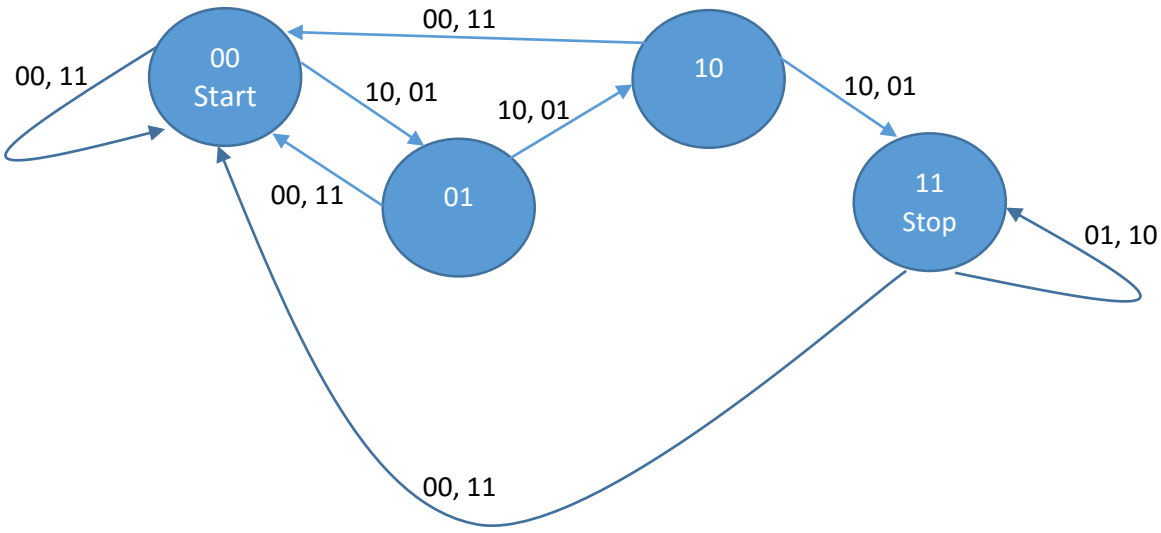
   Output 2

   (!A x !B x !C) + (!A x B x !C) + (A x !B x !C) + (A x B x C)

   = [(!A x !B x !C) + (!A x B x !C)] + (A x !B x !C) + (A x B x C)

   = (!A x !C) + (A x !B x !C) + (A x B x C)

3. Part a:



State 00: start state. **State 01:** last cycle had different input bits. **State 10:** last 2 cycles had different input bits. **State 11:** last 3 cycles had different input bits.

Output: 1 if at state 11, 0 otherwise.

Michael Lin
CS 250 HW3

Part b:
Truth table

Current state					Next state	
Q1	Q0	Output	Input 1	Input 2	D1	D0
0	0	0	0	0	0	0
0	0	0	0	1	0	1
0	0	0	1	0	0	1
0	0	0	1	1	0	0
0	1	0	0	0	0	0
0	1	0	0	1	1	0
0	1	0	1	0	1	0
0	1	0	1	1	0	0
1	0	0	0	0	0	0
1	0	0	0	1	1	1
1	0	0	1	0	1	1
1	0	0	1	1	0	0
1	1	1	0	0	0	0
1	1	1	0	1	1	1
1	1	1	1	0	1	1
1	1	1	1	1	0	0

Output = Q1 x Q0

D1 = (!Q1 x Q0 x !In1 x In2) + (!Q1 x Q0 x In1 x !In2) + (Q1 x !Q0 x !In1 x In2) + (Q1 x !Q0 x In1 x !In2) + (Q1 x Q0 x !In1 x In2) + (Q1 x Q0 x In1 x !In2)

D0 = (!Q1 x !Q0 x !In1 x In2) + (!Q1 x !Q0 x In1 x !In2) + (Q1 x !Q0 x !In1 x In2) + (Q1 x !Q0 x In1 x !In2) + (Q1 x Q0 x !In1 x In2) + (Q1 x Q0 x In1 x !In2)