

EE348 Homework 1

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Question 1

Part a

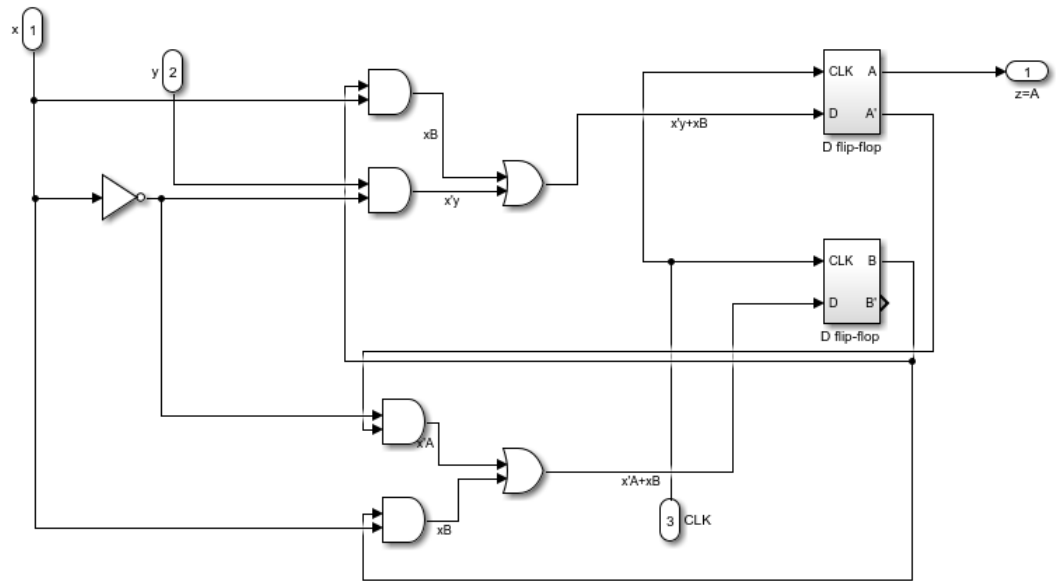


Figure 1: Logic diagram of the circuit

Part b

Present State		Input		Next State		Output
A	B	x	y	A	B	z
0	0	0	0	0	0	0
0	0	0	1	1	0	0
0	0	1	0	0	0	0
0	0	1	1	0	0	0
0	1	0	0	0	0	0
0	1	0	1	1	0	0
0	1	1	0	1	1	0
0	1	1	1	1	1	0
1	0	0	0	0	1	1
1	0	0	1	1	1	1
1	0	1	0	0	0	1
1	0	1	1	0	0	1
1	1	0	0	0	1	1
1	1	0	1	1	1	1
1	1	1	0	1	1	1
1	1	1	1	1	1	1

Figure 2: State Table

Part c

Question 2

Part a

Present State		Input	Next State		output
A	B	x	A	B	z
0	0	0	0	0	0
0	0	1	0	1	0
0	1	0	0	0	1
0	1	1	1	1	0
1	0	1	1	0	0
1	0	0	0	0	1
1	1	1	1	0	0
1	1	0	0	0	1

Figure 3: State table of the logic circuit

Part b

States	Output
00	0
00	0
01	1
00	0
01	0
11	1
00	0
01	0
11	0
10	1
00	0
01	0
11	0
10	0
10	1
00	

Figure 4: States and output of the logic circuit

Question 3

$$A(n+1) = (A + B) \oplus A = A'B$$

$$B(n+1) = (A' + B) \oplus B = A'B'$$

Present State	Next State
00	01
01	10
10	00
11	00

Figure 5: State table of the logic circuit

When we look at the state diagram i saw that circuit is 0 to 2 counter.

Question 4

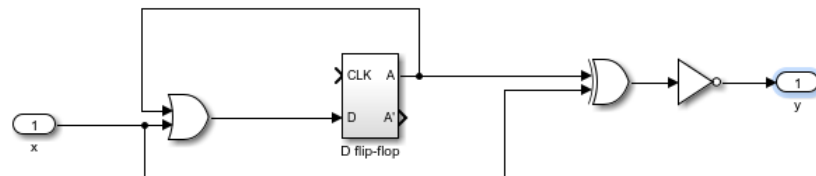


Figure 6: Design of 2's complementer

Calculations are in appendix.

Question 5

Present State			Input	Next State			Output
A	B	C	x	A	B	C	y
0	0	0	0	0	1	1	0
0	0	0	1	1	0	0	1
0	0	1	0	0	0	0	0
0	0	1	1	1	0	0	1
0	1	0	0	0	1	0	0
0	1	0	1	0	0	0	1
0	1	1	0	0	0	1	0
0	1	1	1	0	1	0	1
1	0	0	0	0	1	0	0
1	0	0	1	0	1	1	0
1	0	1	0	x	x	x	x
1	0	1	1	x	x	x	x
1	1	0	0	x	x	x	x
1	1	0	1	x	x	x	x
1	1	1	0	x	x	x	x
1	1	1	1	x	x	x	x

Figure 7: State table of the state diagram

$$T_{mech} = \frac{N_{ph} I_2^2 R_2 N_{poles}}{s 4\pi}$$