LAB 2

PRELAB

a) 3 bit Synchronous modulo 6 counter ($Q_2Q_1Q_0$)

i) Excitation Table (Provided on page 2 of lab2.pdf)

ii) From K-maps.

$J_0 = Q_2Q_1$ $\quad K_0 = \overline{Q_1}$

$J_1 = \overline{Q_2}$ $\quad K_1 = Q_0$

$J_2 = Q_1$ $\quad K_2 = \overline{Q_0}$

b) BCD Counter ($Q_3^A Q_2^B Q_1^C Q_0^D$)

i) Excitation table

	PRESENT STATE				NEXT STATE				FLIP-FLOP INPUTS							
	Q_3	Q_2	Q_1	Q_0	Q_3	Q_2	Q_1	Q_0	J_3	K_3	J_2	K_2	J_1	K_1	J_0	K_0
0	0	0	0	0	0	0	0	1	0	X	0	X	0	X	1	X
1	0	0	0	1	0	0	1	0	0	X	0	X	1	X	X	1
2	0	0	1	0	0	0	1	1	0	X	0	X	X	0	1	X
3	0	0	1	1	0	1	0	0	0	X	1	X	X	1	X	1
4	0	1	0	0	0	1	0	1	0	X	X	0	0	X	1	X
5	0	1	0	1	0	1	1	0	0	X	X	0	1	X	X	1
6	0	1	1	0	0	1	1	1	0	X	X	0	X	0	1	X
7	0	1	1	1	1	0	0	0	1	X	X	1	X	1	X	1
8	1	0	0	0	1	0	0	1	0	X	0	X	0	X	1	X
9	1	0	0	1	0	0	0	0	0	X	0	X	0	X	X	1

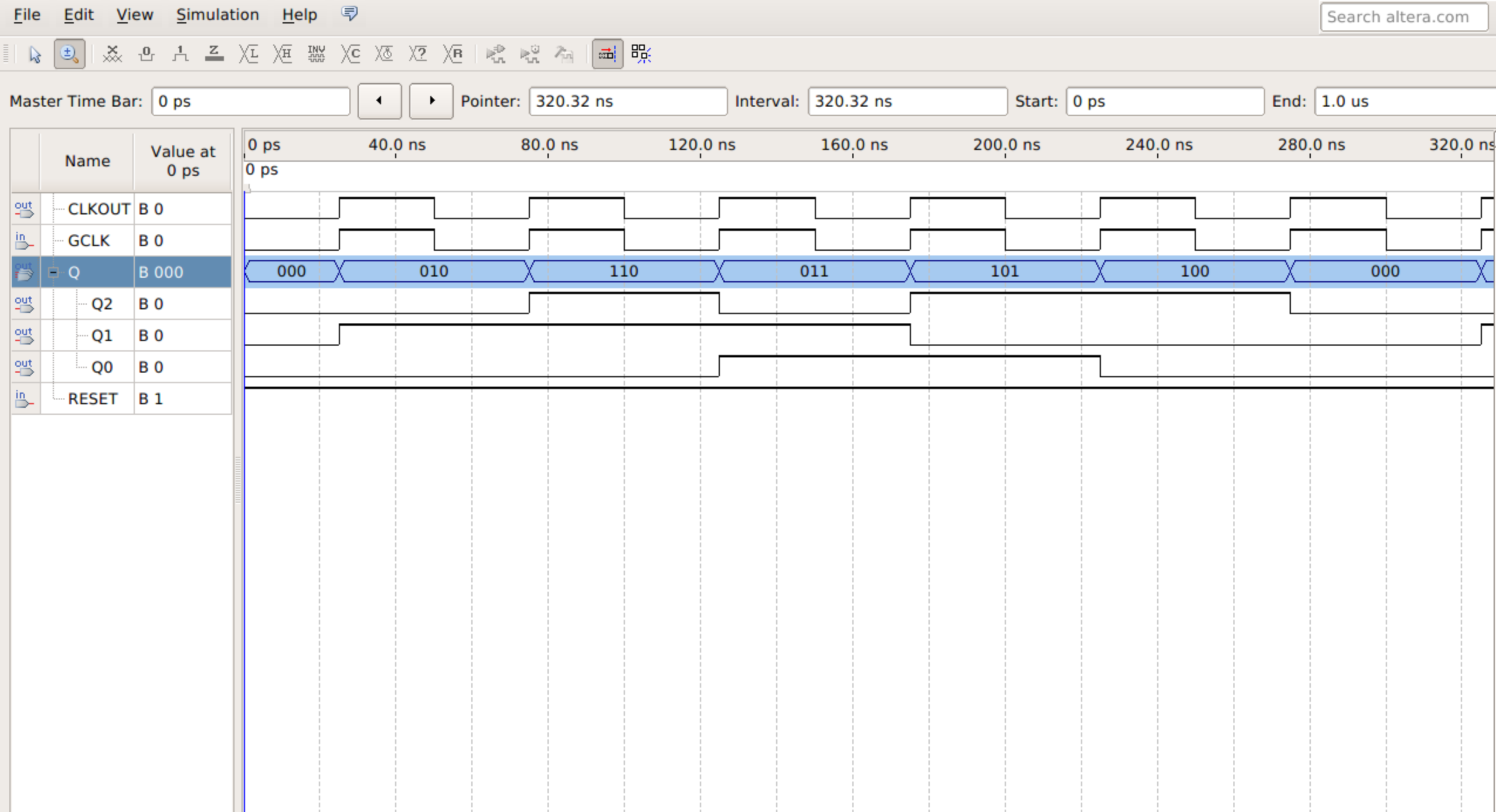
ii) From K-maps.

$J_3 = Q_2 Q_1 Q_0$ $\quad K_3 = Q_0$

$J_2 = Q_1 Q_0$ $\quad K_2 = Q_1 Q_0$

$J_1 = \overline{Q_3} Q_0$ $\quad K_1 = Q_0$

$J_0 = 1$ $\quad K_1 = 1$


File
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Simulation
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Search altera.com
Master Time Bar: 0 ps
Pointer: 320.32 ns
Interval: 320.32 ns
Start: 0 ps
End: 1.0 us
Name
Value at 0 ps
CLKOUT
B 0
GCLK
B 0
Q
B 000
Q2
B 0
Q1
B 0
Q0
B 0
RESET
B 1
0 ps
40.0 ns
80.0 ns
120.0 ns
160.0 ns
200.0 ns
240.0 ns
280.0 ns
320.0 ns
000
010
110
011
101
100
000

File Edit View Simulation Help

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Master Time Bar: 0 ps | Pointer: 3.98 ns | Interval: 3.98 ns | Start: 0 ps | End: 1.0 us

	Name	Value at 0 ps
out	CLKOUT	B 0
in	GCLK	B 0
out	Q	B 0000
out	Q3	B 0
out	Q2	B 0
out	Q1	B 0
out	Q0	B 0
in	RESET	B 1