ΜΗΧΑΝΙΚΩΝ Η/Υ ΚΑΙ ΠΛΗΡΟΦΟΡΙΚΗΣ

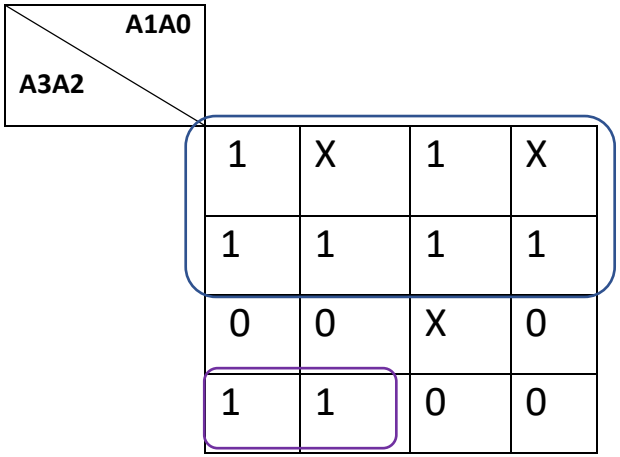
ΕΒΔΟΜΗ ΕΡΓΑΣΤΗΡΙΑΚΗ ΑΣΚΗΣΗ

Μέρος 1ο: Σχεδίαση ακολουθιακού κυκλώματος:

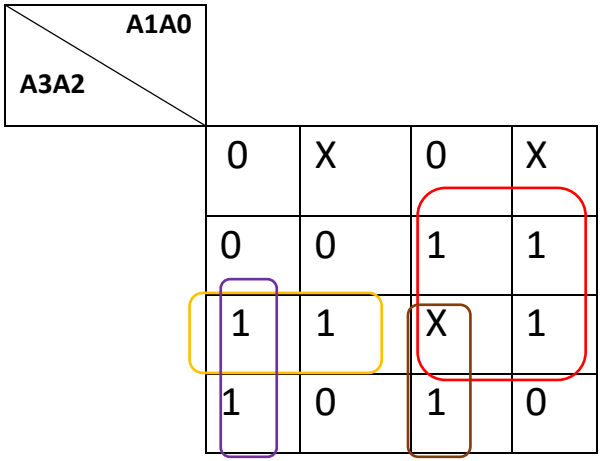
(A3A2A1A0)10 = 8, 14, 7, 13, 6, 12, 5, 11, 4, 10, 3, 9

FROM	TO
0	8
8	14
14	7
7	13
13	6
6	12
12	5
5	11
11	4
4	10
10	3
3	9
9	8 …

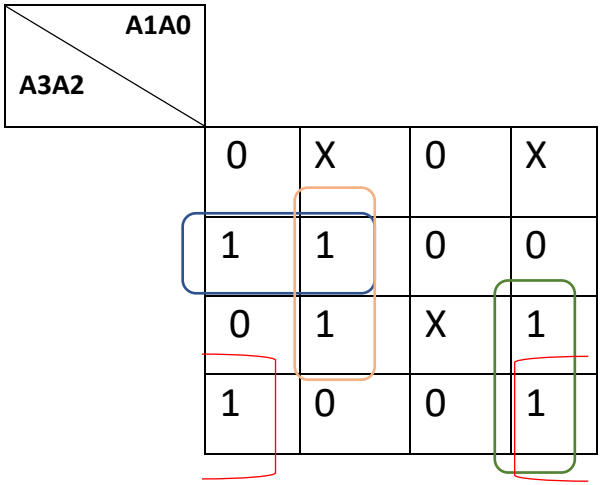
A3(OLD)	A2(OLD)	A1(OLD)	A0(OLD)	A3(NEW)	A2(NEW)	A1(NEW)	A0(NEW)
0	0	0	0	1	0	0	0
0	0	0	1	?	?	?	?
0	0	1	0	?	?	?	?
0	0	1	1	1	0	0	1
0	1	0	0	1	0	1	0
0	1	0	1	1	0	1	1
0	1	1	0	1	1	0	0
0	1	1	1	1	1	0	1
1	0	0	0	1	1	1	0
1	0	0	1	1	0	0	0
1	0	1	0	0	0	1	1
1	0	1	1	0	1	0	0
1	1	0	0	0	1	0	1
1	1	0	1	0	1	1	0
1	1	1	0	0	1	1	1
1	1	1	1	?	?	?	?

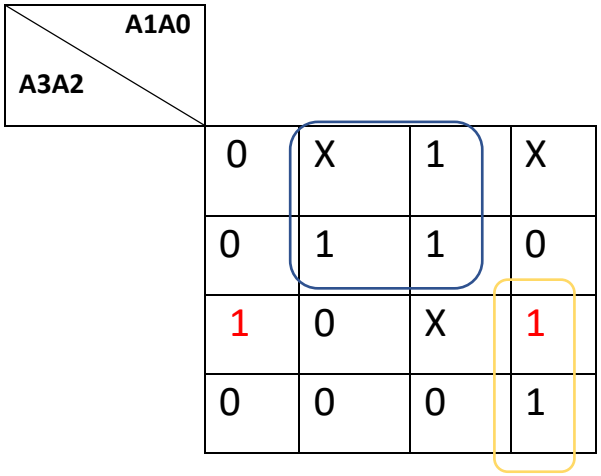


A3(NEW) =A3'+A3A2'A1'



A2(NEW)=A2A1+A3A2+A3A1'AO'+A3A1A0

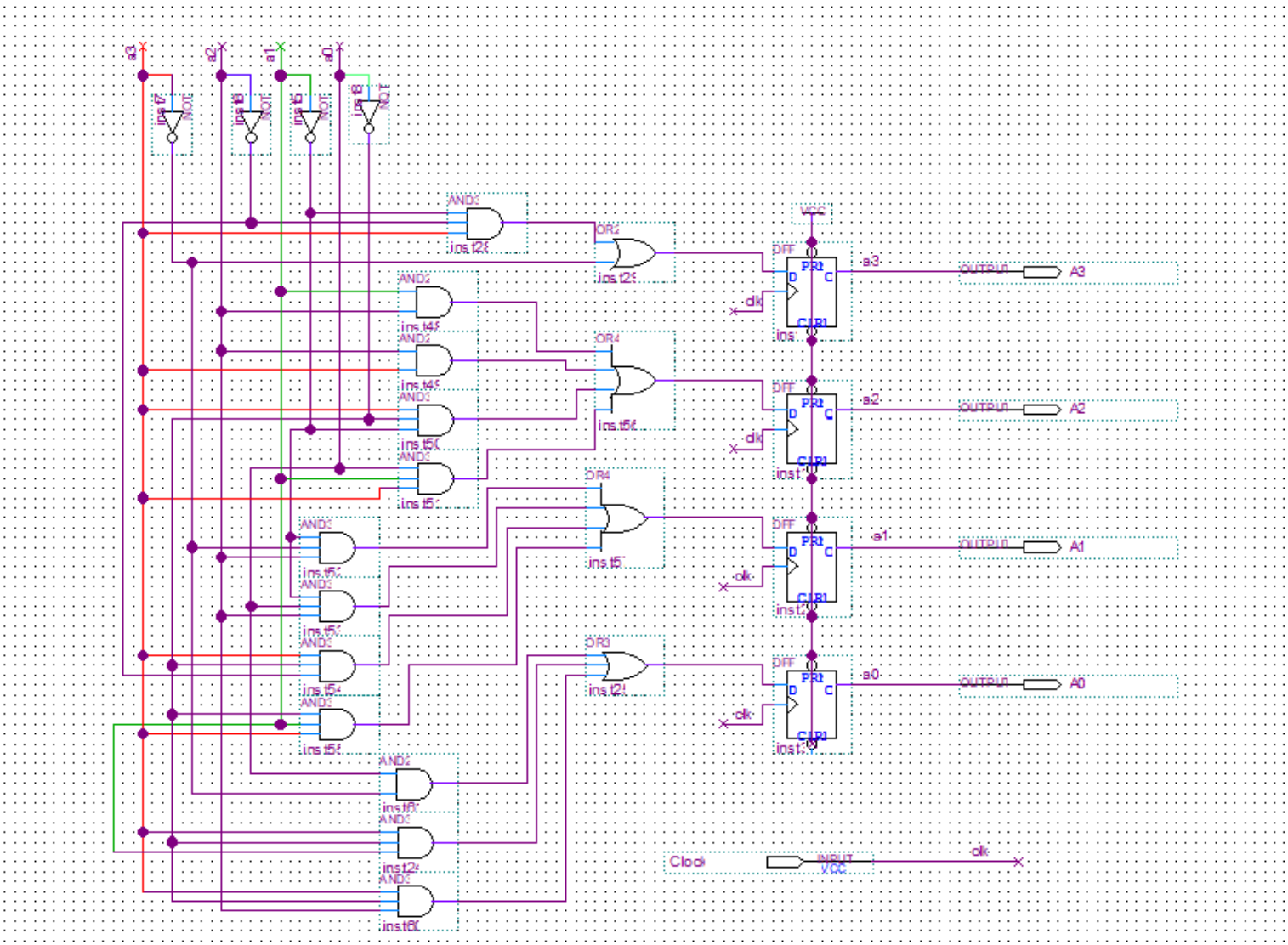




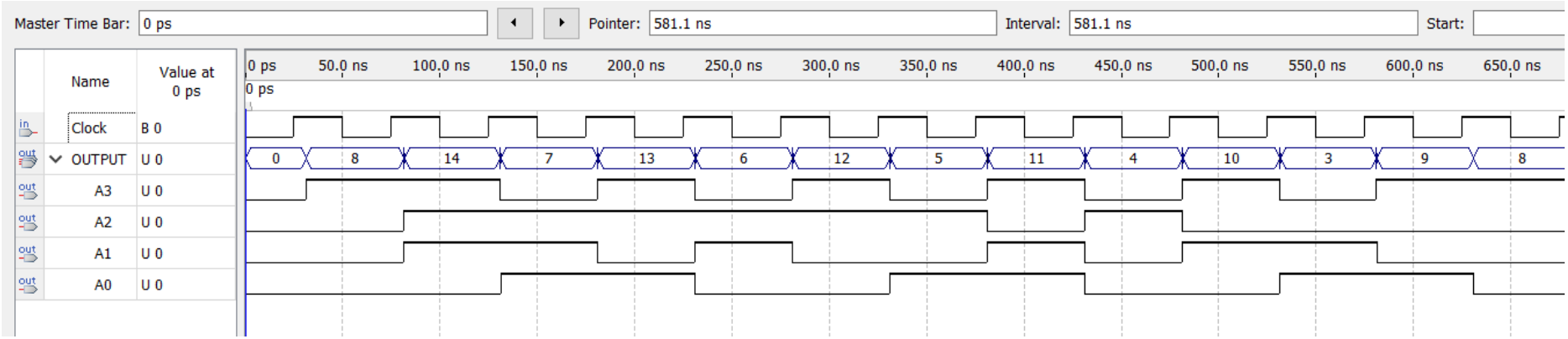
A1(NEW)=A3'A2A1'+A2A1'A0+A3A2'A0'+A3A1A0'

A0(NEW)=A3'A0+A3A1A0'+A3A2A0'

<u>Το κύκλωμα:</u>


a3
a2
a1
a0
NOT
AND2
OR2
OR4
OR3
VCC
DFF
PRE
D
C
CLR
Q
a3
a2
a1
a0
clk
OUTPUT
A3
A2
A1
A0
Clock
INPUT
VCC

Το Waveform:



~ Το κύκλωμα που σχεδίασα είναι αυτόματης διόρθωσης γιατί ξαναγυρνάει σε αυτό που θέλουμε.

Μέρος 2ο: Σχεδίαση σύγχρονου μετρητή:

E=0 ANEBAINEI

FROM	TO
0	1
1	2
2	3
3	0

E=1 KATEBAINEI

FROM	TO
0	3
3	2
2	1
1	0

A1(CURRENT)	A0(CURRENT)	E	A1(NEXT)	A0(NEXT)	J1	K1	J0	K0
0	0	0	0	1	0	X	1	X
0	0	1	1	1	1	X	1	X
0	1	0	1	0	1	X	X	1
0	1	1	0	0	0	X	X	1
1	0	0	1	1	X	0	1	X
1	0	1	0	1	X	1	1	X
1	1	0	0	0	X	1	X	1
1	1	1	1	0	X	0	X	1

ΠΙΑΝΑΚΕΣ KARNAUGH:

A1 \ A0(CURRENT)E	0	1	0	1
	X	X	X	X

J1=E ‘A0+EA0’

E \ A1A0(CURRENT)	X	X	X	X
	0	1	0	1

K1= E ‘A0+EA0’

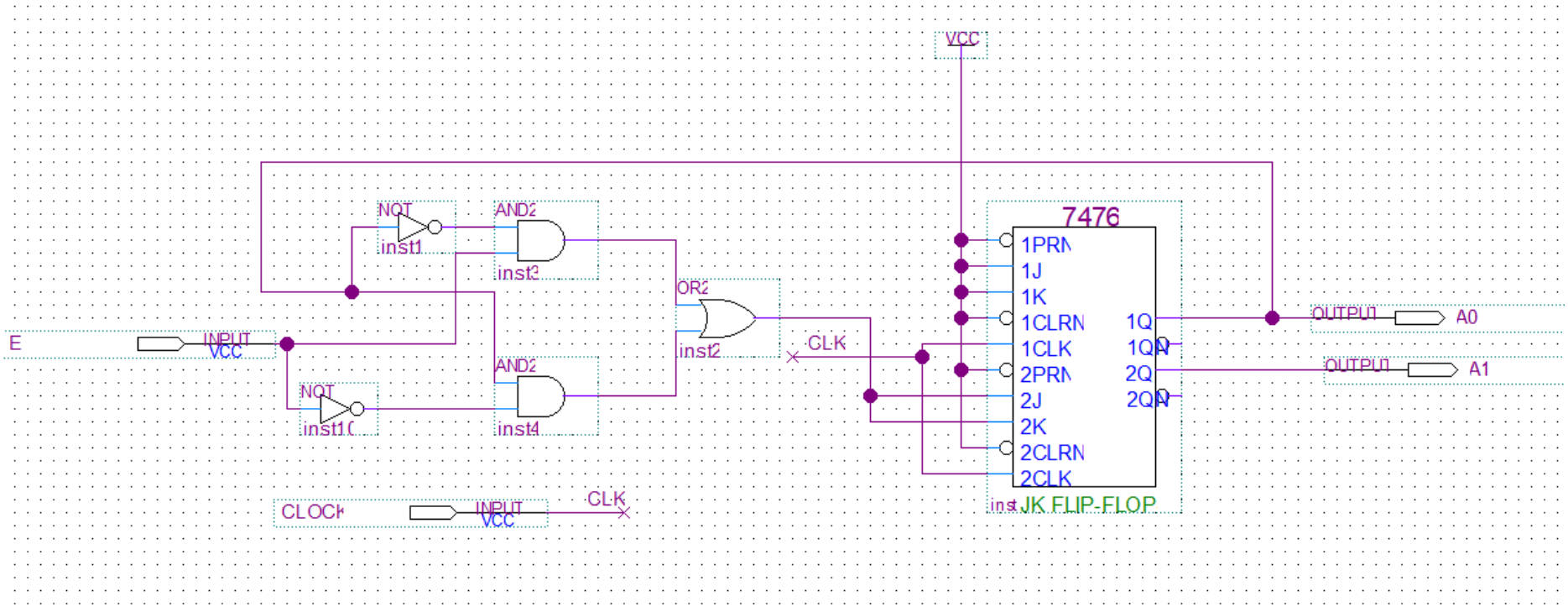
E \ A1A0(CURRENT)				
	1	1	X	X
	1	1	X	X

J0=1

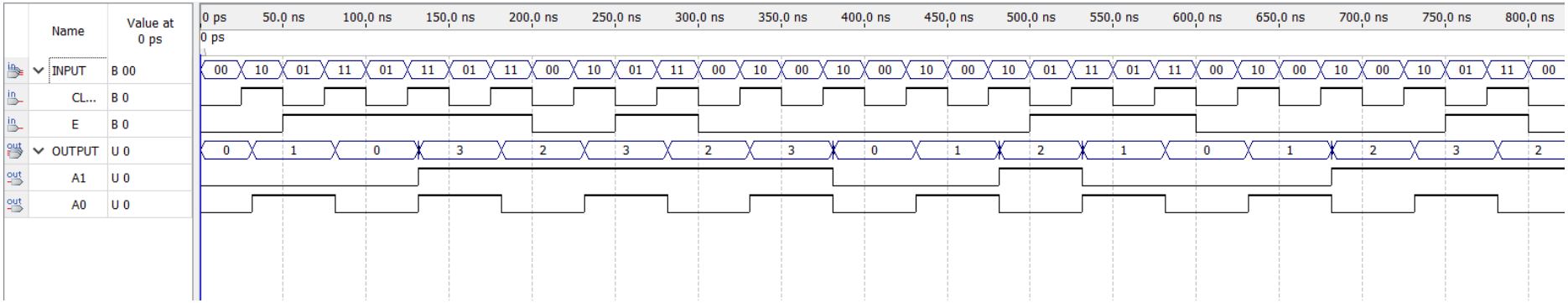
E \ A1A0(CURRENT)				
	X	X	1	1
	X	X	1	1

K0= 1

Το κύκλωμα :

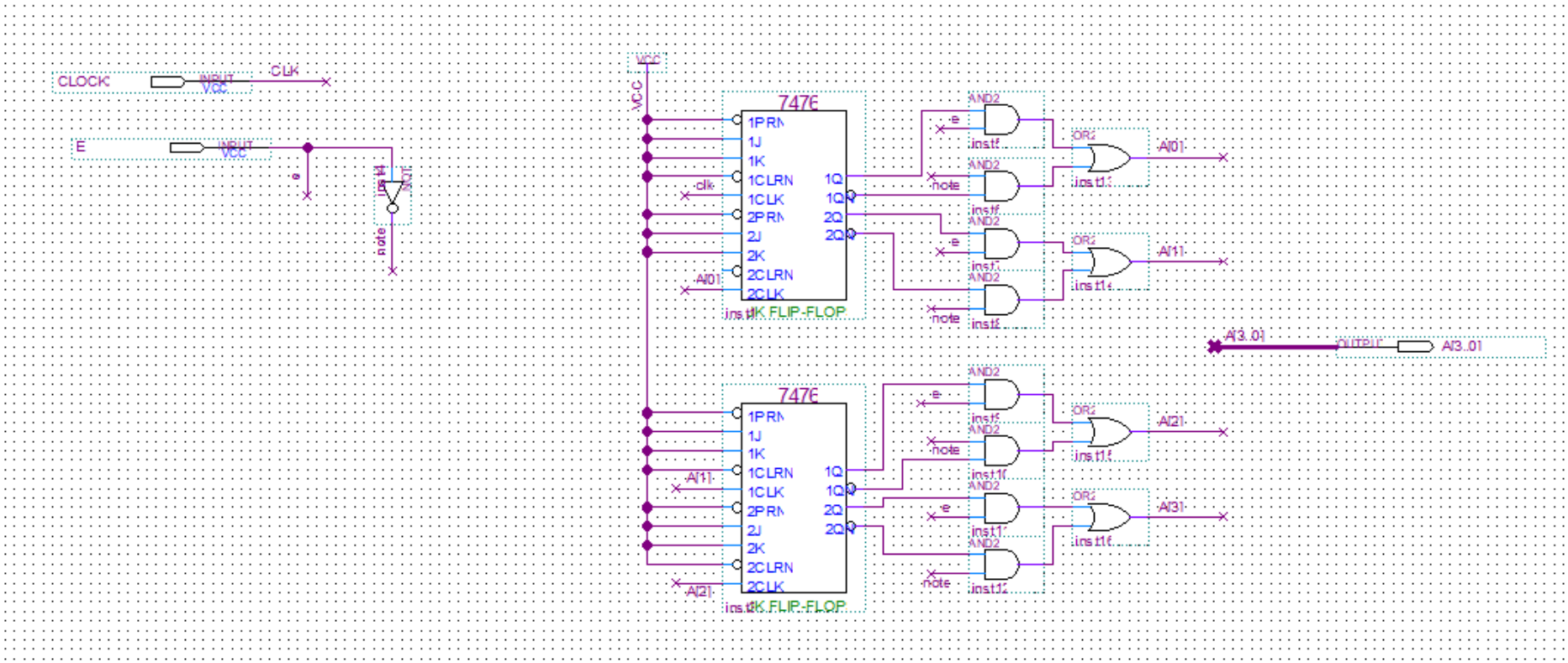

VCC
NOT
inst1
AND2
inst3
OR2
inst2
7476
1PRN
1J
1K
1CLRN
1CLK
2PRN
2J
2K
2CLRN
2CLK
1Q
1QN
2Q
2QN
OUTPUT
A0
OUTPUT
A1
E
INPUT
VCC
NOT
inst10
AND2
inst4
CLK
CLOCK
INPUT
VCC
CLK
inst
JK FLIP-FLOP

To Waveform:

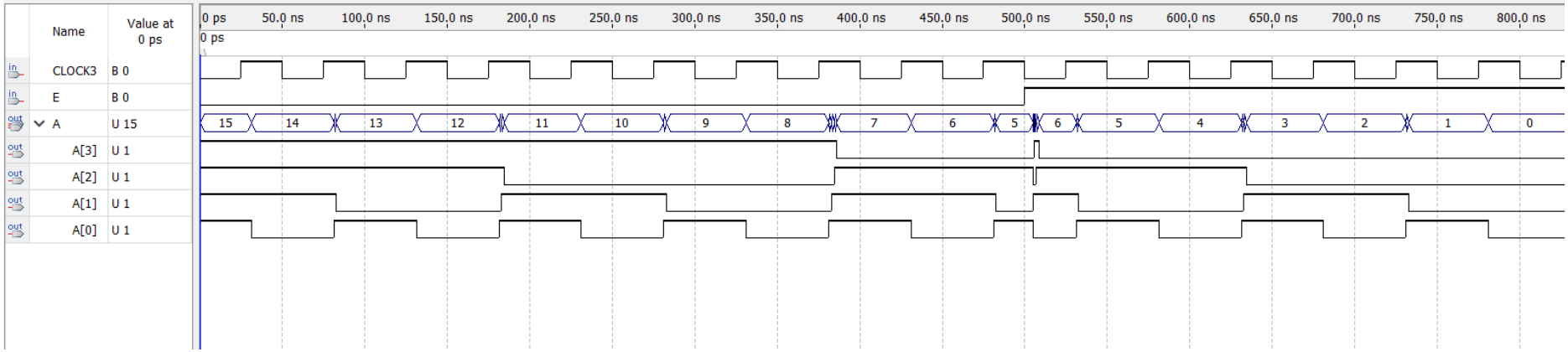

Name
Value at 0 ps
0 ps
50.0 ns
100.0 ns
150.0 ns
200.0 ns
250.0 ns
300.0 ns
350.0 ns
400.0 ns
450.0 ns
500.0 ns
550.0 ns
600.0 ns
650.0 ns
700.0 ns
750.0 ns
800.0 ns
INPUT
B 00
CL...
B 0
E
B 0
OUTPUT
U 0
A1
U 0
A0
U 0

Μέρος 3ο: Σχεδίαση μετρητή ριπής:

Το κύκλωμα :



To Waveform:


Name
Value at 0 ps
0 ps
50.0 ns
100.0 ns
150.0 ns
200.0 ns
250.0 ns
300.0 ns
350.0 ns
400.0 ns
450.0 ns
500.0 ns
550.0 ns
600.0 ns
650.0 ns
700.0 ns
750.0 ns
800.0 ns
CLOCK3
B 0
E
B 0
A
U 15
15 14 13 12 11 10 9 8 7 6 5 6 5 4 3 2 1 0
A[3]
U 1
A[2]
U 1
A[1]
U 1
A[0]
U 1