ECE 2300L
Digital Logic Design Laboratory

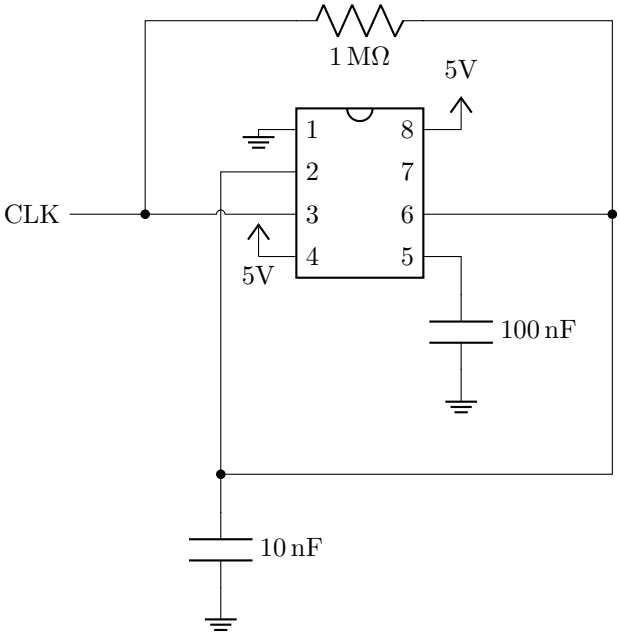
Experiment 12

Report

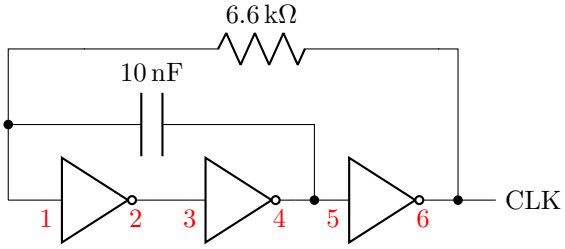
Choi Tim Antony Yung

May 12, 2020

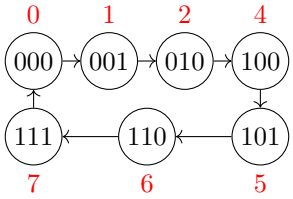
Pulse Generator Using 555 Timer



Pulse Generator Using Inverter



State Diagram



State Table

A	B	C	A^+	B^+	C^+	T_A	T_B	T_C
0	0	0	0	0	1	0	0	1
0	0	1	0	1	0	0	1	1
0	1	0	1	0	0	1	1	0
1	0	0	1	0	1	0	0	1
1	0	1	1	1	0	0	1	1
1	1	0	1	1	1	0	0	1
1	1	1	0	0	0	1	1	1

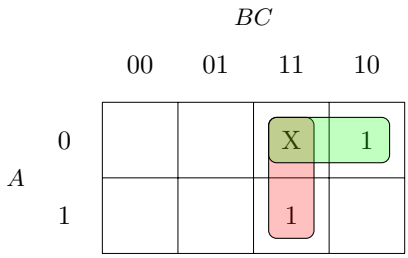
Truth Table

A	B	C	T_A
0	0	0	0
0	0	1	0
0	1	0	1
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	1

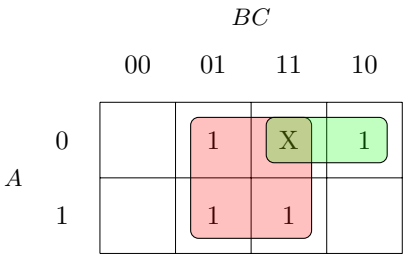
A	B	C	T_B
0	0	0	0
0	0	1	1
0	1	0	1
1	0	0	0
1	0	1	1
1	1	0	0
1	1	1	1

A	B	C	T_C
0	0	0	1
0	0	1	1
0	1	0	0
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	1

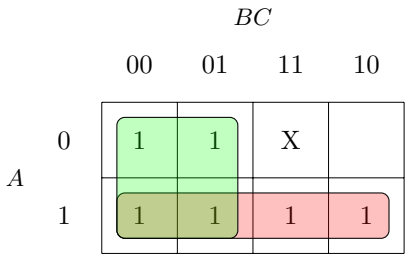
Karnaugh Maps



$T_A = BC + \overline{A}B$

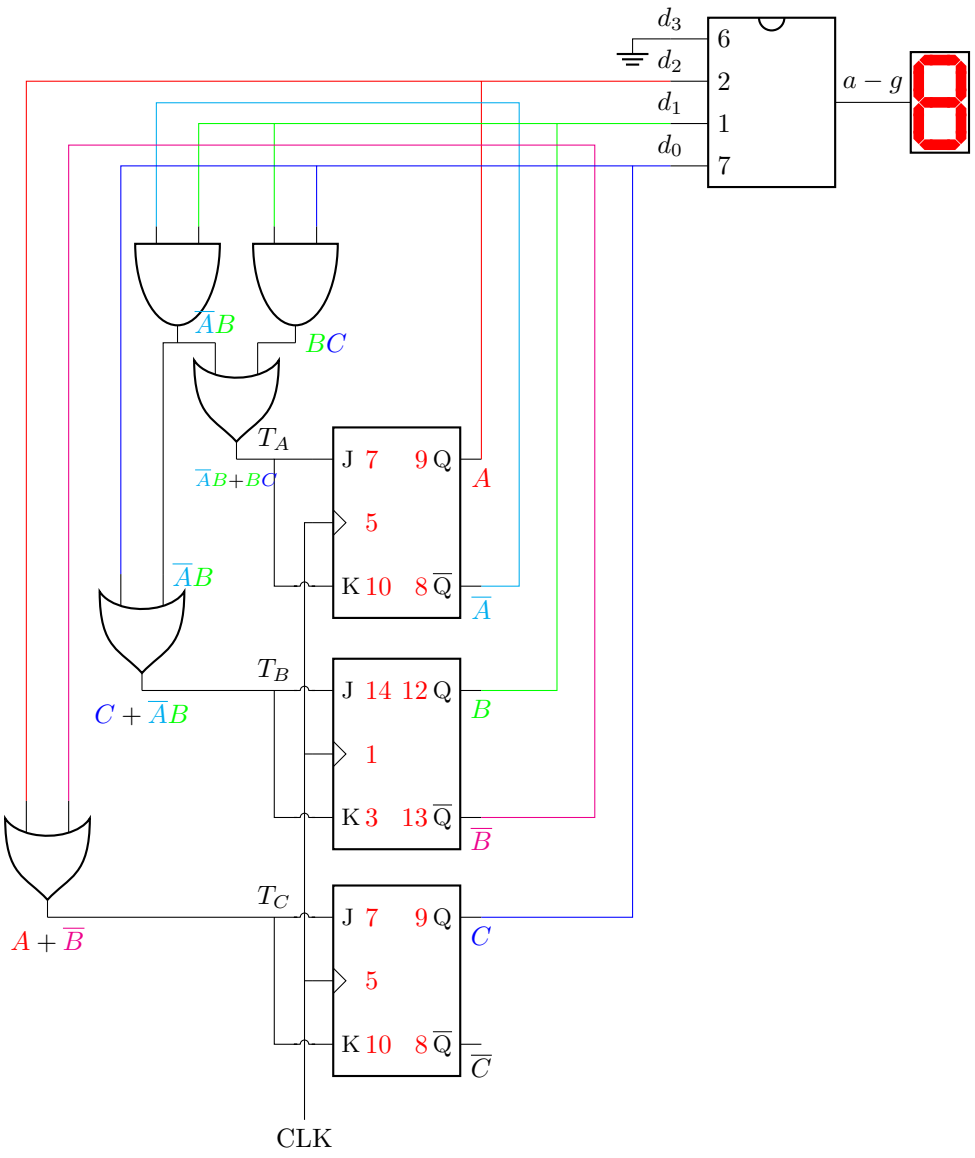


$T_B = C + \overline{A}B$



$T_C = A + \overline{B}$

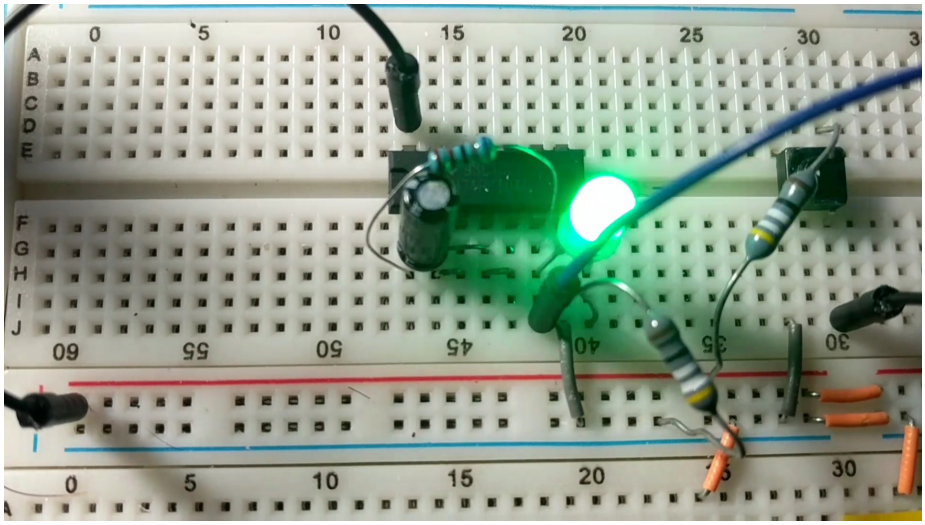
Schematic

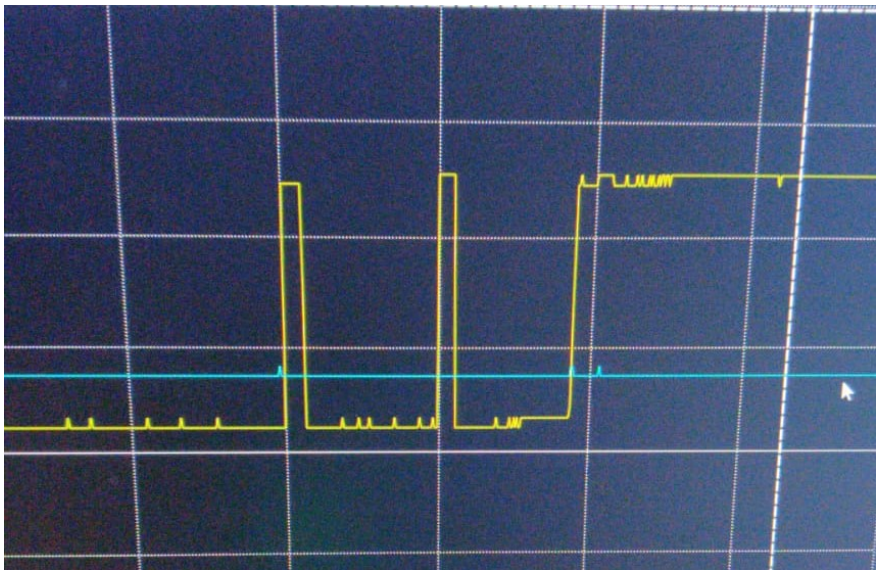

d_3
d_2
d_1
d_0
6
2
1
7
$a-g$
$\overline{A}B$
BC
T_A
$\overline{A}B+BC$
J 7 9 Q
5
K 10 8 $\overline{Q}$
A
$\overline{A}$
$\overline{A}B$
$C+\overline{A}B$
T_B
J 14 12 Q
1
K 3 13 $\overline{Q}$
B
$\overline{B}$
$A+\overline{B}$
T_C
J 7 9 Q
5
K 10 8 $\overline{Q}$
C
$\overline{C}$
CLK

Demo

Video demonstrations can be found here at https://photos.app.goo.gl/eSdNj98HEJmizMVE7

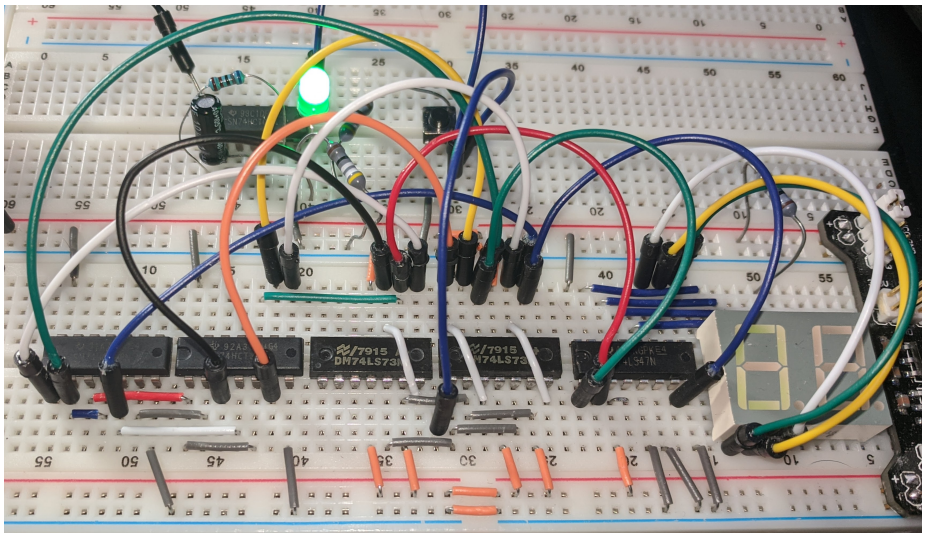
Pulse Generator

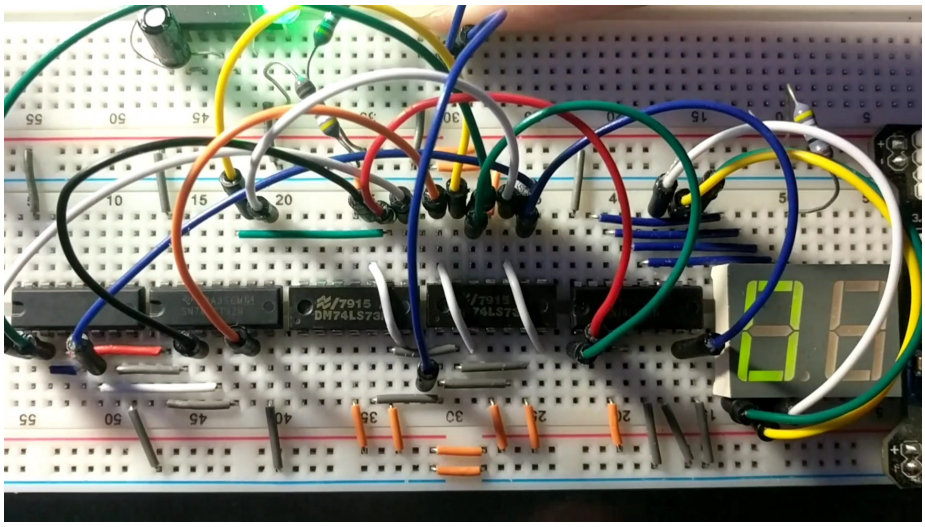


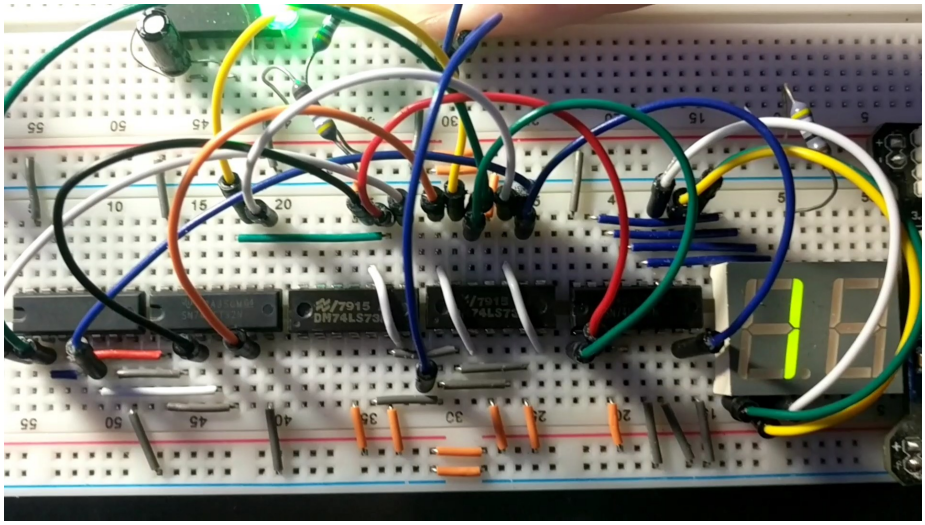


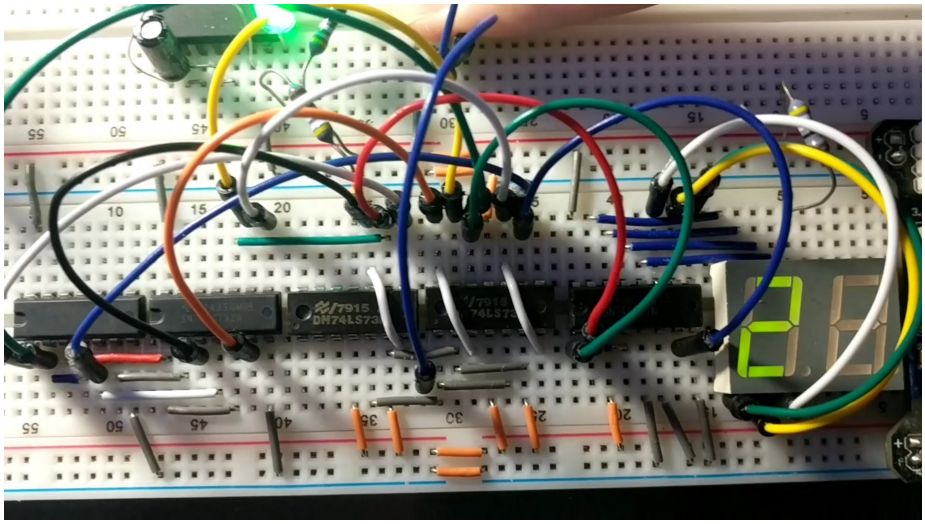
As seen from the oscilloscope capture above, the pulse generator have multiple rising edges at the start of the pulse, therefore it is not suitable to be used as clock. For the counter, a push button was used instead.

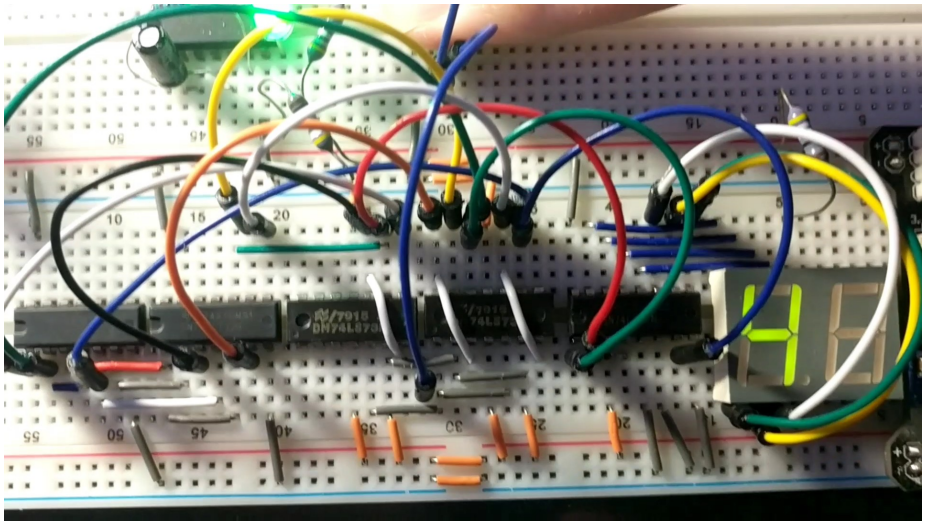
Counter

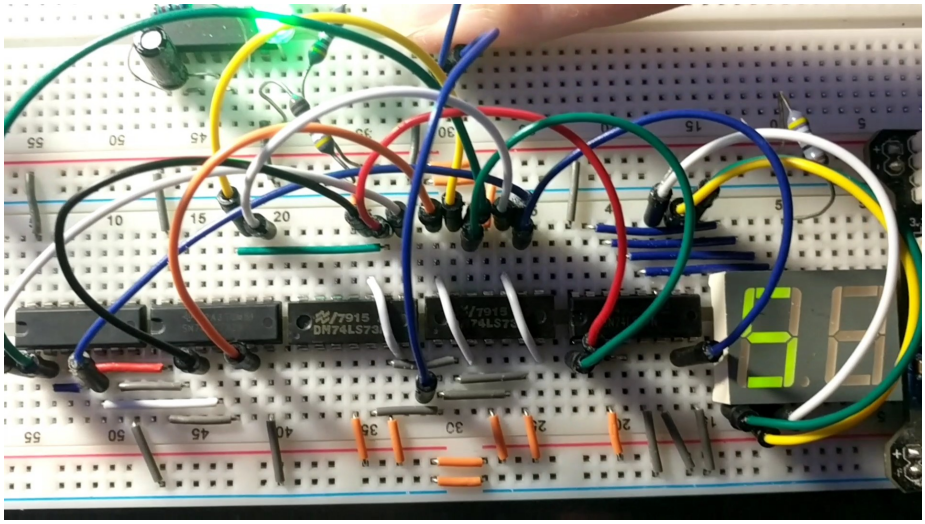


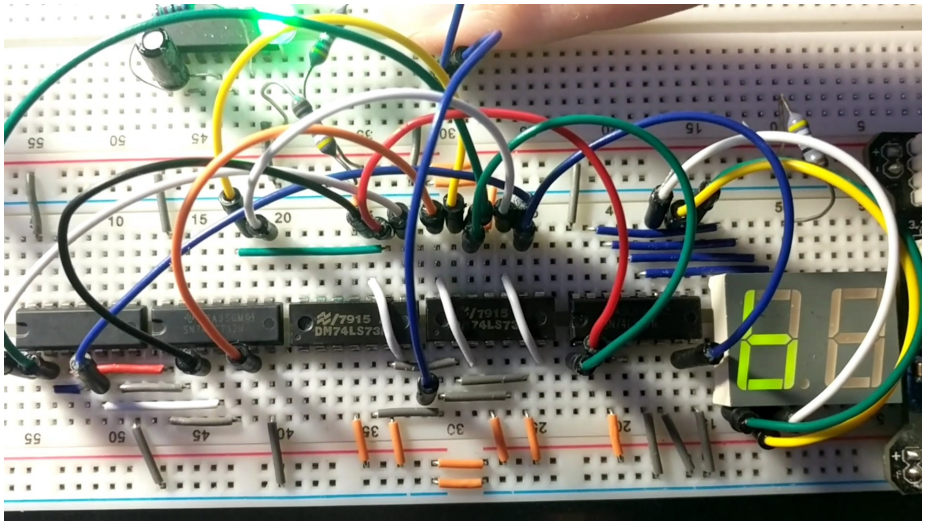


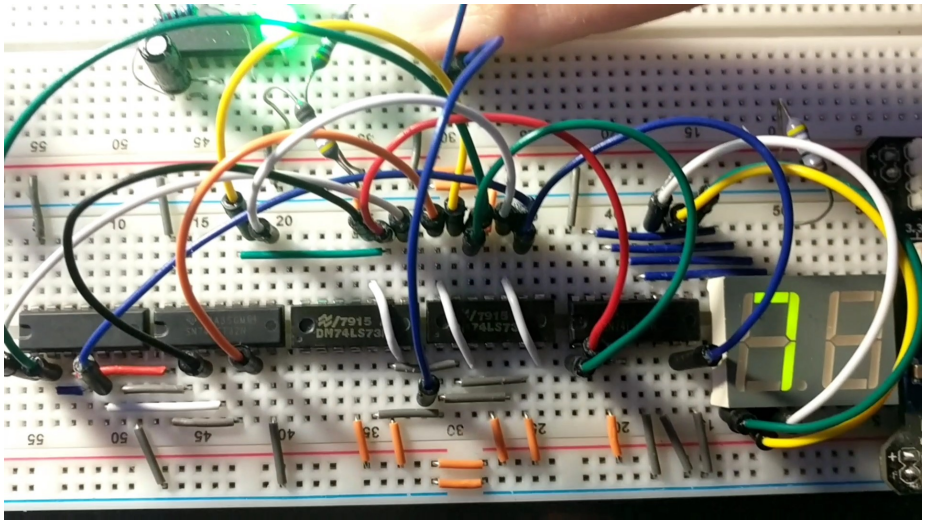









DM74LS73


DM74LS73