DESIGN METHOD:

Truth Table

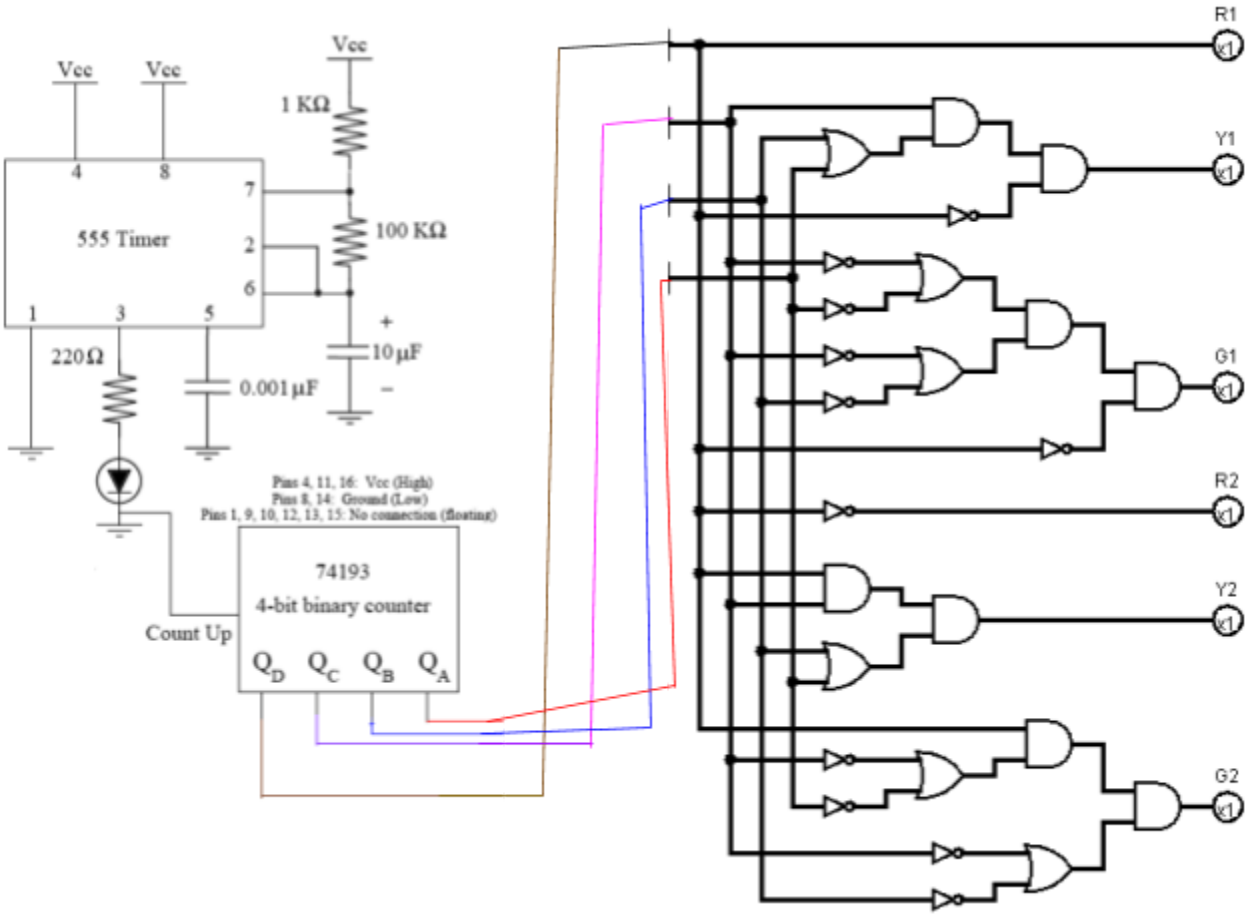
	Binary Counter Outputs				North and South Traffic Signal			East and West Traffic Signal		
Count	Q_D	Q_C	Q_B	Q_A	R_1	Y_1	G_1	R_2	Y_2	G_2
0	0	0	0	0	0	0	1	1	0	0
1	0	0	0	1	0	0	1	1	0	0
2	0	0	1	0	0	0	1	1	0	0
3	0	0	1	1	0	0	1	1	0	0
4	0	1	0	0	0	0	1	1	0	0
5	0	1	0	1	0	1	0	1	0	0
6	0	1	1	0	0	1	0	1	0	0
7	0	1	1	1	0	1	0	1	0	0
8	1	0	0	0	1	0	0	0	0	1
9	1	0	0	1	1	0	0	0	0	1
10	1	0	1	0	1	0	0	0	0	1
11	1	0	1	1	1	0	0	0	0	1
12	1	1	0	0	1	0	0	0	0	1

13	1	1	0	1	1	0	0	0	1	0
14	1	1	1	0	1	0	0	0	1	0
15	1	1	1	1	1	0	0	0	1	0

PARTS LIST:

- 555 Timer
- .001uF capacitor
- 10uF capacitor
- Four K resistor,
- One 100K resistor
- 7 220 resistors
- 7 LEDs
- One 74193 binary bit counter
- One 74LS04 IC chip
- Two 74LS08 IC chip
- Two 74LS32 IC chip

CIRCUIT DIAGRAM:



SOP (Sum of product) expressions of output variables derived from K-maps:

$R_1 = Q_D$

$Y_1 = Q_D'Q_CQ_A+Q_D'Q_CQ_B$

$G_1= Q_D'Q_C'+Q_D'Q_C'Q_A'$

$R_2 = Q_D'$

$Y_2 = Q_DQ_CQ_A+Q_DQ_CQ_B$

$G_2= Q_DQ_C'+Q_DQ_B'Q_A$

For $R_1 = Q_D$

DC/BA	**00**	**01**	**11**	**10**
00	**0**	**0**	**0**	**0**
01	**0**	**0**	**0**	**0**
11	**1**	**1**	**1**	**1**
10	**1**	**1**	**1**	**1**

For $Y_1 = Q_D'Q_CQ_A+Q_D'Q_CQ_B$

DC/BA	**00**	**01**	**11**	**10**
00	0	0	0	0
01	0	1	**1 (Overlap R&G)**	1

11	0	0	0	0
10	0	0	0	0

Bolded 1 in the box has an overlapping of green and red

For $G_1 = Q_D'Q_C' + Q_D'Q_C'Q_A'$

DC/BA	**00**	**01**	**11**	**10**
00	**1 (Overlap R&G)**	1	1	1
01	1	0	**0**	0
11	0	0	0	0
10	0	0	0	0

Bolded 1 in the box has an overlapping of green and red

For $R_2 = Q_D'$

DC/BA	**00**	**01**	**11**	**10**
00	**1**	**1**	**1**	**1**
01	**1**	**1**	**1**	**1**
11	**0**	**0**	**0**	**0**
10	**0**	**0**	**0**	**0**

For $Y_2 = Q_DQ_CQ_A + Q_DQ_CQ_B$

DC/BA	00	01	11	10
00	0	0	0	0
01	0	0	0	0
11	0	1	**1 (Overlap R&G)**	1
10	0	0	0	0

Bolded 1 in the box has an overlapping of green and red

For $G_2 = Q_D Q_C' + Q_D Q_B' Q_A'$

DC/BA	00	01	11	10
00	**0**	0	0	0
01	0	0	**0**	0
11	1	0	0	0
10	1 **(Overlap R&G)**	1	1	1

Bolded 1 in the box has an overlapping of green and red