Austin Smothers

Professor Bustamante

CSC 137

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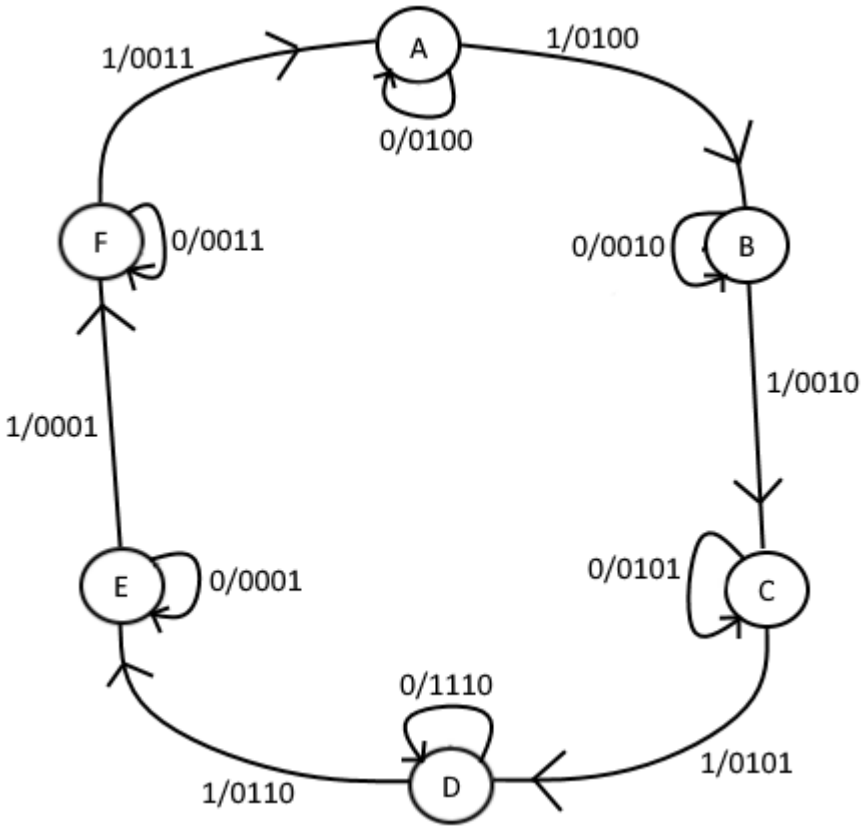
Project 2

State Diagram:



State Assignment:

{ A = 101	D = 110 }
{ B = 011	E = 100 }
{ C = 010	F = 001 }

State Table:

q_3	q_2	q_1	R	O_3	O_2	O_1	B	q_3^+	q_2^+	q_1^+
0	0	0	0	0	0	0	0	0	0	0
0	0	0	1	0	0	0	0	1	0	1
1	0	1	0	1	0	0	0	1	0	1
1	0	1	1	1	0	0	0	0	1	1
0	1	1	0	0	1	0	0	0	1	1
0	1	1	1	0	1	0	0	0	1	0
0	1	0	0	1	0	1	0	0	1	0
0	1	0	1	1	0	1	0	1	1	0
1	1	0	0	1	1	0	1	1	1	0
1	1	0	1	1	1	0	0	1	0	0
1	0	0	0	0	0	1	0	1	0	0
1	0	0	1	0	0	1	0	0	0	1
0	0	1	0	0	1	1	0	0	0	1
0	0	1	1	0	1	1	0	1	0	1

K-Map Minimization:

O_3:

q_3q_2 \ q_1R	00	01	11	10
00	0	0	0	0
01	1	1	0	0
11	1	1	d	d
10	0	0	1	1

$O_3 = (q_2\overline{q_1}) + (q_3q_1)$

O_2:

q_3q_2 \ q_1R	00	01	11	10
00	0	0	1	1
01	0	0	1	1
11	1	1	d	d
10	0	0	0	0

$O_2 = (\overline{q_3}q_1) + (q_3q_2)$

O_1:

q_3q_2 \ q_1R	00	01	11	10
00	0	0	1	1
01	1	1	0	0
11	0	0	d	d
10	1	1	0	0

$O_1 = (\overline{q_3q_1}q_2) + (\overline{q_3q_2}q_1) + (\overline{q_2q_1}q_3)$

B (output_logic):

q_3q_2 \ q_1R	00	01	11	10
00	0	0	0	0
01	0	0	0	0
11	1	0	d	d
10	0	0	0	0

$B = (q_3q_2\overline{R})$

q_3^+:

q_3q_2 \ q_1R	00	01	11	10
00	0	1	1	0
01	0	1	0	0
11	1	1	d	d
10	1	0	0	1

$s_3 = (q_2\overline{q_1}R) + (\overline{q_3q_2}R) + (q_3q_2) + (q_3\overline{R})$

q_2^+:

q_3q_2 \ q_1R	00	01	11	10
00	0	0	0	0
01	1	1	1	1
11	1	0	d	d
10	0	0	1	0

$s_2 = (\overline{q_3}q_2) + (q_2\overline{R}) + (q_3q_1R)$

q_1^+:

q_3q_2 \ q_1R	00	01	11	10
00	0	1	1	1
01	0	0	0	1
11	0	0	d	d
10	0	1	1	1

$s_1 = (\overline{q_2}R) + (q_1\overline{R})$

Circuit Diagram: