Lucas Hasting

CS 311

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Assignment #4

Encoding of the LED:

Decimal Digit	w	x	y	z
0	0	0	0	0
1	0	0	0	1
2	0	0	1	1
3	0	0	1	0
4	0	1	1	0
5	0	1	1	1
6	0	1	0	1
7	0	1	0	0
8	1	1	0	0
9	1	1	0	1

Note: X means we don’t care if it is a 1 or 0

Truth Tabel:

w	x	y	z	A	B	C	D	E	F	G	DP
0	0	0	0	1	1	1	1	1	1	0	0
0	0	0	1	0	1	1	0	0	0	0	0
0	0	1	0	1	1	1	1	0	0	1	0
0	0	1	1	1	1	0	1	1	0	1	0
0	1	0	0	1	1	1	0	0	0	0	0
0	1	0	1	1	0	1	1	1	1	1	0
0	1	1	0	0	1	1	0	0	1	1	0
0	1	1	1	1	0	1	1	0	1	1	0
1	0	0	0	X	X	X	X	X	X	X	0
1	0	0	1	X	X	X	X	X	X	X	0
1	0	1	0	X	X	X	X	X	X	X	0
1	0	1	1	X	X	X	X	X	X	X	0
1	1	0	0	1	1	1	1	1	1	1	0
1	1	0	1	1	1	1	1	0	1	1	0
1	1	1	0	X	X	X	X	X	X	X	0
1	1	1	1	X	X	X	X	X	X	X	0

Karnaugh Map – A:

wx\yz	00	01	11	10
00	1		1	1
01	1	1	1	
11	1	1	X	X
10	X	X	X	X

Groups: (0000, 0100, 1100, 1000) (0101, 1101, 0111, 1111) (0011, 0010)

A = y'z' + xz + w'x'y

Karnaugh Map – B:

wx\yz	00	01	11	10
00	1	1	1	1
01	1			1
11	1	1	X	X
10	X	X	X	X

Groups: (0000, 0001, 0011, 0010) (0000, 0100, 1100, 1000) (1100, 1101) (0010, 0110, 1110, 1010)

B = w'x' + y'z' + wxy' + yz'

Karnaugh Map – C:

wx\yz	00	01	11	10
00	1	1		1
01	1	1	1	1
11	1	1	X	X
10	X	X	X	X

Groups: (0000, 0001, 0100, 0101, 1100, 1101, 1000, 1001) (0100, 0101, 0111, 0110)

(0010, 1010, 1110, 1010)

C = y' + w'x + yz'

Karnaugh Map – D:

wx\yz	00	01	11	10
00	1		1	1
01		1	1	
11	1	1	X	X

10	X	X	X	X

Groups: (0000, 0010) (0011, 0111, 1111, 1011) (1100, 1101, 1000, 1001) (0101, 0111, 1101, 1111)

D = w'x'z' + yz + wy' + xz

Karnaugh Map – E:

wx\yz	00	01	11	10
00	1		1	
01		1		
11	1		X	X
10	X	X	X	X

Groups: (1000, 1100) (1000, 0000) (1011, 0011)

E = w'xy'z + wy'z' + x'y'z' + x'yz

Karnaugh Map – F:

wx\yz	00	01	11	10
00	1			
01		1	1	1
11	1	1	X	X
10	X	X	X	X

Groups: (1100, 1101, 1000, 1001) (0101, 1101, 0111, 1111) (0111, 0110, 1111, 1110) (0000, 1000)

F = wy' + xz + xy + x'y'z'

Karnaugh Map – G:

wx\yz	00	01	11	10
00			1	1
01		1	1	1
11	1	1	X	X
10	X	X	X	X

Groups: (0011, 0111, 1111, 1011, 0010, 0110, 1110, 1010) (0101, 0111, 1101, 1111)

(1100, 1000, 1101, 1001)

G = y + xz + wy'

Circuit: