4-bit Binary to Gray Code Conversion:

Decimal No.	Binary Code				Gray Code			
	b_3	b_2	b_1	b_0	g_3	g_2	g_1	g_0
0	0	0	0	0	0	0	0	0
1	0	0	0	1	0	0	0	1
2	0	0	1	0	0	0	1	1
3	0	0	1	1	0	0	1	0
4	0	1	0	0	0	1	1	0
5	0	1	0	1	0	1	1	1
6	0	1	1	0	0	1	0	1
7	0	1	1	1	0	1	0	0
8	1	0	0	0	1	1	0	0
9	1	0	0	1	1	1	0	1
10	1	0	1	0	1	1	1	1
11	1	0	1	1	1	1	1	0
12	1	1	0	0	1	0	1	0
13	1	1	0	1	1	0	1	1
14	1	1	1	0	1	0	0	1
15	1	1	1	1	1	0	0	0

4-bit Binary to Gray Code Conversion (Cont.)

g_3

$$g_3 = b_3$$

g_2

$$g_2 = \sum m(4, 5, 6, \ldots, 11)$$

$b_3b_2 \backslash b_1b_0$	00	01	11	10
00				
01	1	1	1	1
11				
10	1	1	1	1

$$g_2 = \overline{b_3}\, b_2 + b_3 \overline{b_2}$$
$$= b_3 \oplus b_2$$

g_1

$$g_1 = \sum m(2, 3, 4, 5, 10, 11, 12, 13)$$

$b_3b_2 \backslash b_1b_0$	00	01	11	10
00			1	1
01	1	1		
11	1	1		
10			1	1

$$g_1 = b_2 \overline{b_1} + \overline{b_2}\, b_1$$
$$= b_2 \oplus b_1$$

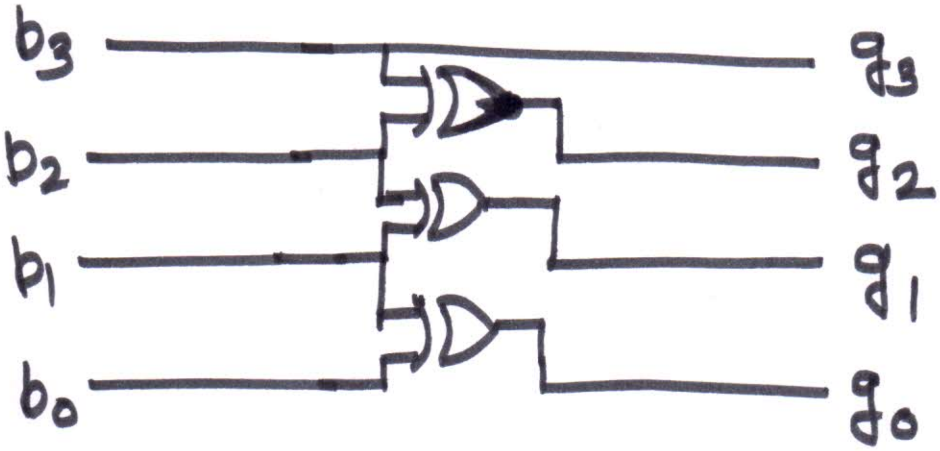
g_0

$$g_0 = \sum m(1, 2, 5, 6, 9, 10, 13, 14)$$

$b_3b_2 \backslash b_1b_0$	00	01	11	10
00		1		1
01		1		1
11		1		1
10		1		1

$$g_0 = \overline{b_1}\, b_0 + b_1 \overline{b_0}$$
$$= b_1 \oplus b_0$$

Ckt



MSB

ex A = 01100 1010

Gray Code

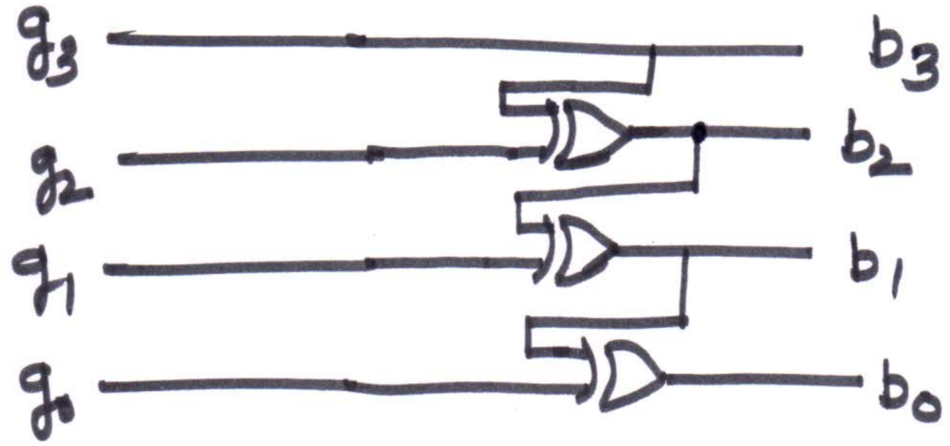
01010 1111

4-bit Gray to Binary Code Conversion:

$$g_3 = b_3$$
$$g_2 = b_3 \oplus b_2$$
$$g_1 = b_2 \oplus b_1$$
$$g_0 = b_1 \oplus b_0$$

So,
$$b_3 = g_3$$
$$b_3 \oplus g_2 = \underline{b_3 \oplus b_3} \oplus b_2$$
$$= 0 \oplus b_2 = b_2$$
$$\Rightarrow b_2 = b_3 \oplus g_2$$

Similarly
$$b_1 = b_2 \oplus g_1$$
$$b_0 = b_1 \oplus g_0$$



<u>ex</u> $G = 0110101001$

<u>binary No.</u>

$0\ 1\ 1\ 0\ 1\ 0\ 1\ 0\ 0\ 1$

$B = 0\ 1\ 0\ 0\ 1\ 1\ 0\ 0\ 0\ 1$ ✓