

Code Converters – Binary to/from Gray Code

Binary				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	0	0	1	0	0	0	1
0	0	1	0	0	0	1	1
0	0	1	1	0	0	1	0
0	1	0	0	0	1	1	0
0	1	0	1	0	1	1	1
0	1	1	0	0	1	0	1
0	1	1	1	0	1	0	0
1	0	0	0	1	1	0	0
1	0	0	1	1	1	0	1
1	0	1	0	1	1	1	1
1	0	1	1	1	1	1	0
1	1	0	0	1	0	1	0
1	1	0	1	1	0	1	1
1	1	1	0	1	0	0	1
1	1	1	1	1	0	0	0

To find the corresponding digital circuit, we will use the K-Map technique for each of the gray code bits as output with all of the binary bits as input.

		b ₁ ,b ₀			
		00	01	11	10
b ₃ ,b ₂	00	0	1	0	1
	01	0	1	0	1
	11	0	1	0	1
	10	0	1	0	1

		b ₁ ,b ₀			
		00	01	11	10
b ₃ ,b ₂	00	0	0	1	1
	01	1	1	0	0
	11	1	1	0	0
	10	0	0	1	1

		b1,b0			
		00	01	11	10
b3,b2	00	0	0	0	0
	01	1	1	1	1
	11	0	0	0	0
	10	1	1	1	1

		b1,b0			
		00	01	11	10
b3,b2	00	0	0	0	0
	01	0	0	0	0
	11	1	1	1	1
	10	1	1	1	1

Now you try

Gray Code				Binary			
g3	g2	g1	g0	b3	b2	b1	b0
0	0	0	0	0	0	0	0
0	0	0	1	0	0	0	1
0	0	1	0	0	0	1	1
0	0	1	1	0	0	1	0
0	1	0	0	0	1	1	1
0	1	0	1	0	1	1	0
0	1	1	0	0	1	0	0
0	1	1	1	0	1	0	1
1	0	0	0	1	1	1	1
1	0	0	1	1	1	1	0
1	0	1	0	1	1	0	0
1	0	1	1	1	1	0	1
1	1	0	0	1	0	0	0
1	1	0	1	1	0	0	1
1	1	1	0	1	0	1	1
1	1	1	1	1	0	1	0

Gray Code				Binary			
g ₃	g ₂	g ₁	g ₀	b ₃	b ₂	b ₁	b ₀
0	0	0	0	0	0	0	0
0	0	0	1	0	0	0	1
0	0	1	0	0	0	1	1
0	0	1	1	0	0	1	0
0	1	0	0	0	1	1	1
0	1	0	1	0	1	1	0
0	1	1	0	0	1	0	0
0	1	1	1	0	1	0	1
1	0	0	0	1	1	1	1
1	0	0	1	1	1	1	0
1	0	1	0	1	1	0	0
1	0	1	1	1	1	0	1
1	1	0	0	1	0	0	0
1	1	0	1	1	0	0	1
1	1	1	0	1	0	1	1
1	1	1	1	1	0	1	0

