



**EAST WEST UNIVERSITY**

**Project Report**

**CSE345**

**Course Title: Digital Logic Design**

**Project title: BCD to Excess-3 Code  
Generator**

**Submitted To:**

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## **Problem Statement:**

Excess-3 binary code is an unweight self- complementary BCD code. Self-complementary property means that the 1's complement of an excess-3 number is the excess-3 code of the 9's complement of the corresponding decimal number. Example, the excess-3 code for 0(0000) is 1001 and to find the excess-3 code of the complement of 0, we just need to find the 1's complement of 1001  $\rightarrow$  0110, which is also the excess-3 code for the 9's complement of 0  $\rightarrow$   $(9-0) = 9$ .

Let A, B, C, D is the bits representation of the binary numbers where A is MSB and D is LSB and w, x, y, z is the representation of the gray code of the binary numbers. Here x's mark are considered as DON'T CARE. Besides being 16 digits of combination we have to consider 10 digits as BCD is 10 digit code.

## **Design Details:**

For this process we will design the circuit by following some easy steps:

1. Normal binary code for a decimal number
2. Add 3 with the decimal number
3. For the 9's complement first, do subtraction from 9 to add result
4. Then do the 9's complement of the subtraction result.

And then according to these steps by following we will develop the truth table then k-map and from that we will develop Boolean expression to design circuit.

Truth table:

A	B	C	D	w	x	y	z
0	0	0	0	0	0	1	1
0	0	0	1	0	1	0	0
0	0	1	0	0	1	0	1
0	0	1	1	0	1	1	0
0	1	0	0	0	1	1	1
0	1	0	1	1	0	0	0
0	1	1	0	1	0	0	1
0	1	1	1	1	0	1	0

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