



Department of Computer Engineering

CLASS: S.E.COMP

SUBJECT :DEL

EXPT. NO.:2

DATE:

TITLE : CODE CONVERTER

OBJECTIVE :

1. Design and Implement 4-bit Binary to Gray code converter using minimum number of logic gates and Vice-versa
2. Design and Implement Excess-3 to BCD code converter using minimum number of logic gates and Vice-versa

APPARATUS :

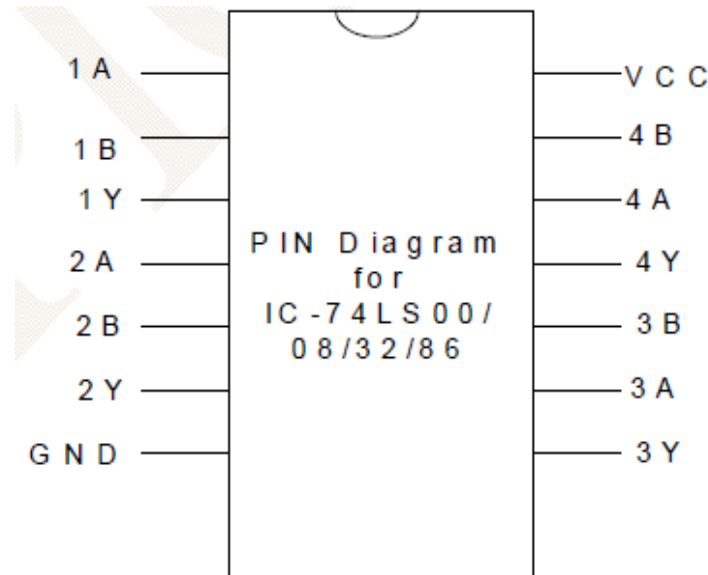
Digital-Board, GP-4Patch-Cords, IC-74LS86, IC-74LS32, IC-74LS08 / IC-74LS04 and Required Logic gates if any.

THEORY :

Code converter is combinational logic circuits, which can be used to convert one number system to another. Binary code is a weighted code having base 2. Gray code is a code in which one bit change is obtained; Gray code is also called *unit distance code or reflected code*. BCD code is basically a 4-bit binary code but it is valid from 0 to 9. Excess-3 code is basically 4-bit binary code which can be obtained by adding 3 to each binary, that is Excess-3 code are valid from 3 to 15. Excess-3 code is Non-Weighted code. Excess-3 code is also called as *sequential code or self-complementary code*.

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PIN DIAGRAM:



PROCEDURE :

1. Make the connections as per the Logic circuit of 4-bit Binary to 4-bit Gray Code converter and Vice-versa and Verify its Truth Table.
2. Make the connections as per the Logic circuit of 4-bit BCD to 4-bit Excess-3 Code converter and Vice-versa and Verify its Truth Table



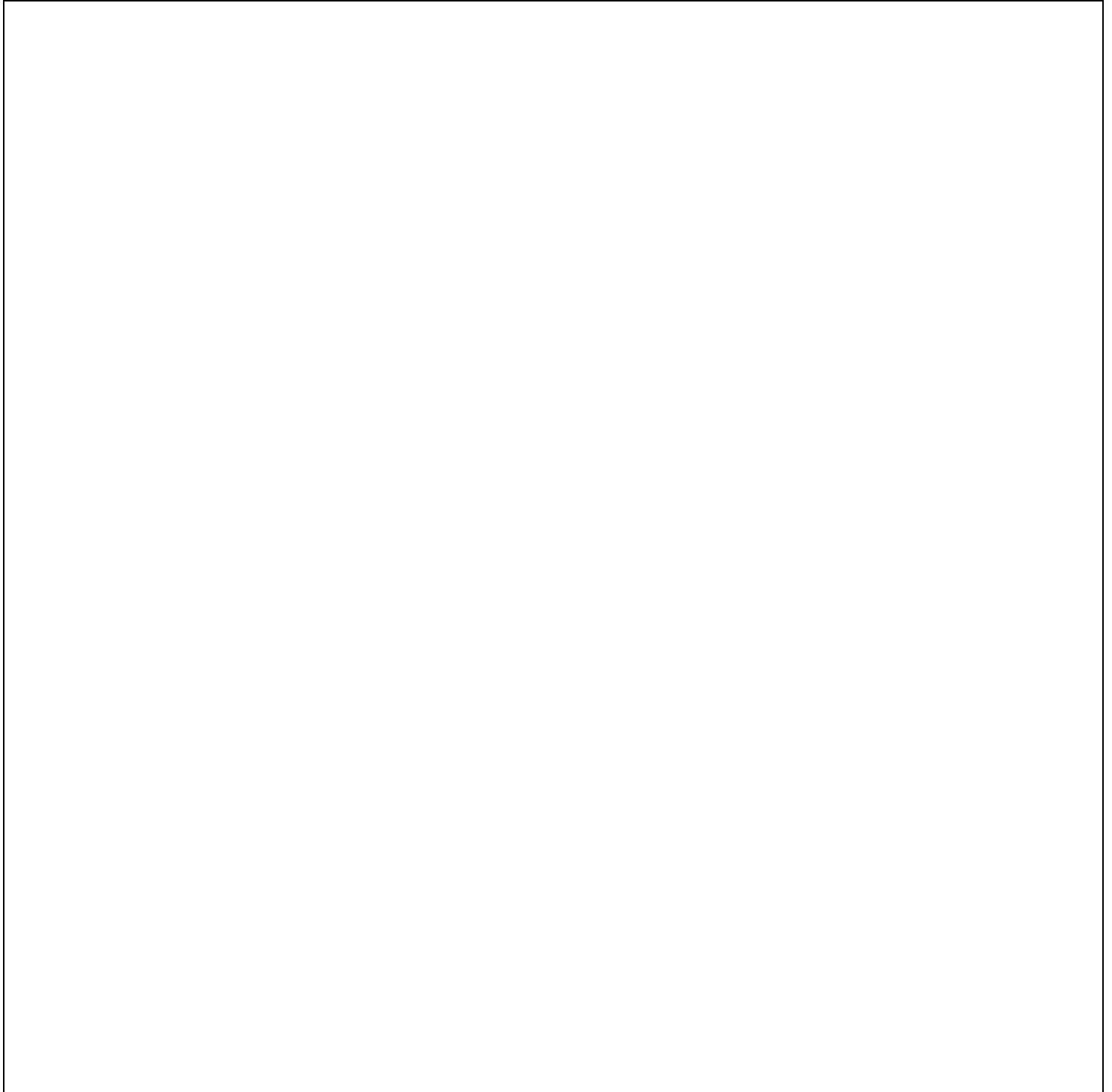
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Design of 4-bit Binary to Gray code converter

Dec. Equ.	<i>Binary code Input</i>				Gray code Output			
	B₃	B₂	B₁	B₀	G₃	G₂	G₁	G₀



K-Map Simplification for G3, G2, G1, Go



Logic Diagram:

Figure 1 consists of nine scatter plots arranged in a 3x3 grid. The rows represent three countries: USA (top row), Canada (middle row), and Australia (bottom row). The columns represent three different years: 1990 (left column), 1995 (middle column), and 2000 (right column). Each plot shows the relationship between the number of children in the household (x-axis) and the number of children in the family (y-axis). The x-axis ranges from 0 to 10, and the y-axis ranges from 0 to 10. The plots show a positive correlation, with the number of children in the family generally increasing as the number of children in the household increases. The plots are labeled with the country and year in the top left corner.

Country	Year	Number of children in the household	Number of children in the family
USA	1990	0	0
		1	1
		2	2
	1995	0	0
		1	1
		2	2
	2000	0	0
		1	1
		2	2
Canada	1990	0	0
		1	1
		2	2
	1995	0	0
		1	1
		2	2
	2000	0	0
		1	1
		2	2
Australia	1990	0	0
		1	1
		2	2
	1995	0	0
		1	1
		2	2
	2000	0	0
		1	1
		2	2


Design of 4-bit Gray to Binary code converter

[illegible]

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[illegible]

K-Map Simplification for B3, B2, B1, B0



Logic Diagram:

[illegible]


Design of BCD code to Excess-3Code converter

[illegible]


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[illegible]

K-Map Simplification for E3, E2, E1, Eo



Logic Diagram:



Design of Excess-3 code to BCD Code converter

[illegible]

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[illegible]

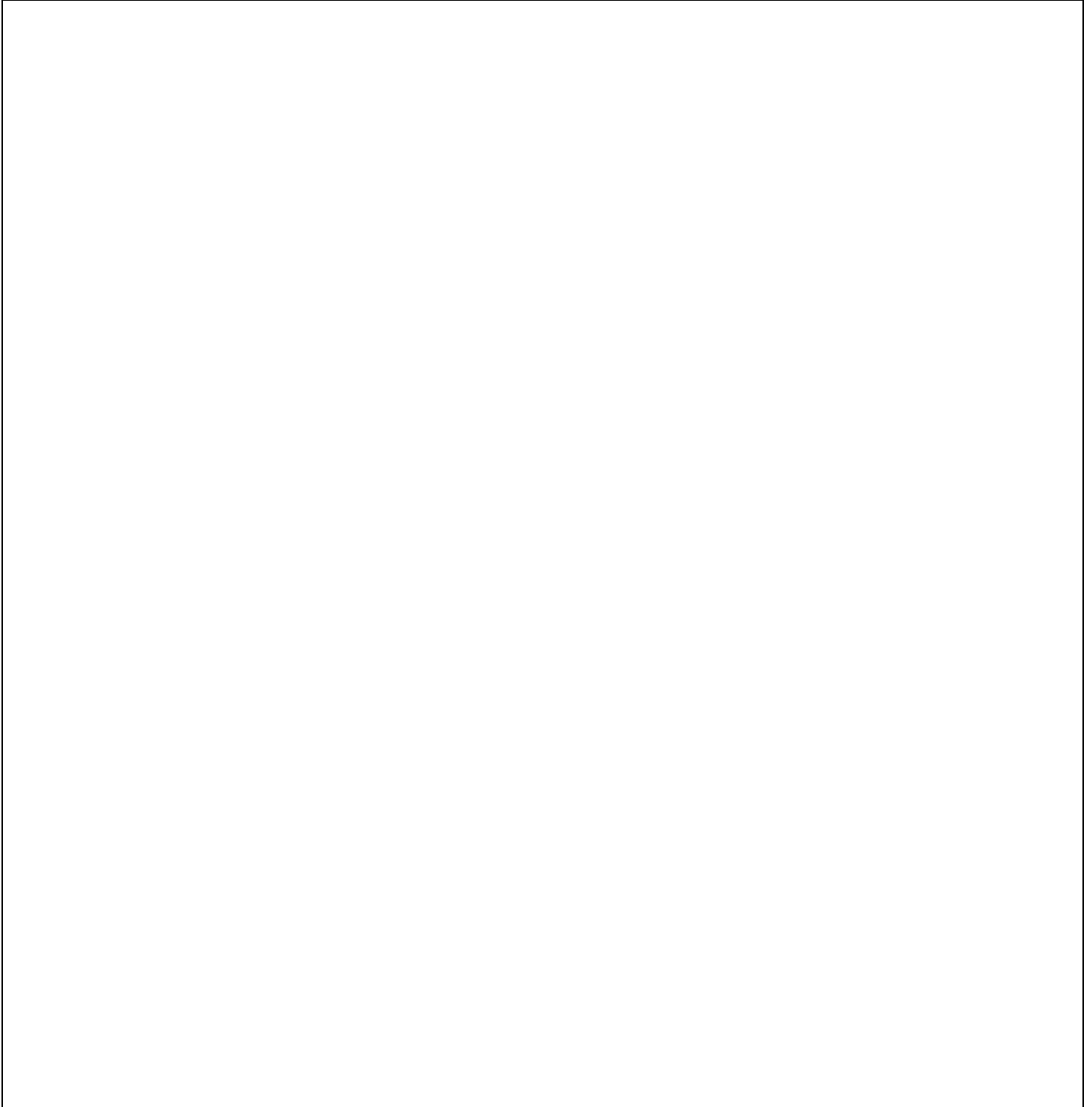
K-Map Simplification for B3, B2, B1, Bo

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Logic Diagram:





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Logic Gates / MSI Device required for Implementation:

Sr.No.	Title	Name of the IC	Number of Gates	IC Required
01	Binary to Gray code			
	Gray to Binary code			
02	BCD to Excess-3code			
	Excess-3to BCD			

CONCLUSION:

REFERENCE:

1. R.P.Jain "Modern Digital Electronics" TMH 4th Edition
2. D.Leach,Malvino,Saha,"Digital Principles and Applications",TMH

Subject teacher Sign with Date

Remark