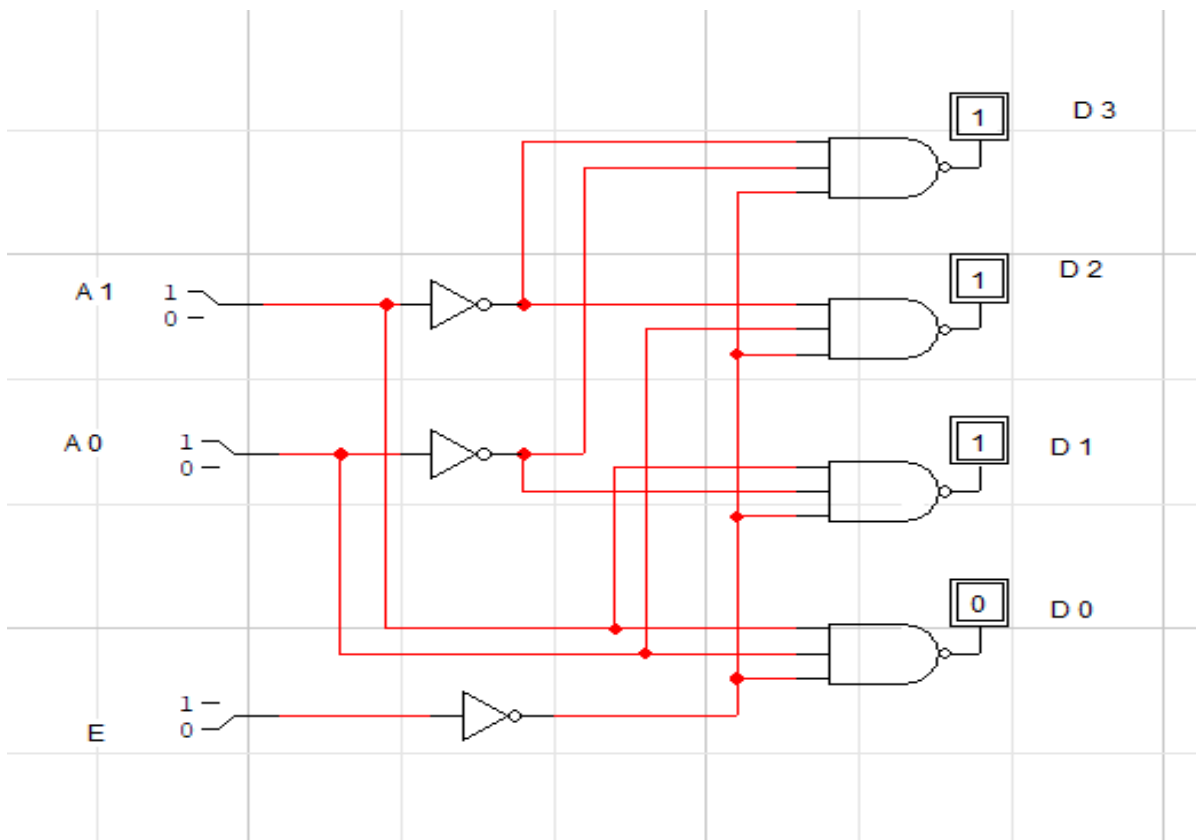ROLL_NO: 20k-0409

NAME: MUKAND KRISHNA

LAB TASK#1

A) Design and implement a 2-to-4-line decoder input E.

Truth Table

Decimal Digit	Enable	Binary Inputs A1 A0	Outputs D3 D2 D1 D0
0	1	X X	1 1 1 1
1	0	0 0	**0** 1 1 1
2	0	0 1	1 **0** 1 1
3	0	1 0	1 1 **0** 1
	0	1 1	1 1 1 **0**

B) Find minimal SOP and POS expressions

$D0$	A 0	A 0~
A1		
A1~		**1**

	A 0	A 0~	$D1$
A1			
A1~	**1**		

$D2$	A0	A 0~
A1		**1**
A1~		

	A 0	A 0~	$D3$
A1	**1**		
A1~			

SOP Expression

D0=A'B'   D1=AB'

D2= A'B   D3= AB

POS Expression

D0=A+B   D1=A~+B

D2= A+B~   D3= A~+B~

Lab Task #2

3-8-line Decoder using IC 74LS138.

| Inputs | | | | | | Outputs | | | | | | | |
| Enable | | Select | | | | | | | | | | | |
G1	G2 A~	G2 B~	A2	A1	A0	Y0~	Y1~	Y2~	Y3~	Y4~	Y5~	Y6~	Y7~
1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
1	0	0	0	0	1	0	0	0	0	0	0	**1**	0
1	0	0	0	1	0	0	0	0	0	0	**1**	0	0
1	0	0	0	1	1	0	0	0	0	**1**	0	0	0
1	0	0	1	0	0	0	0	0	**1**	0	0	0	0
1	0	0	1	0	1	0	0	**1**	0	0	0	0	0
1	0	0	1	1	0	0	**1**	0	0	0	0	0	0
1	0	0	1	1	1	**1**	0	0	0	0	0	0	0

Circuit Diagram
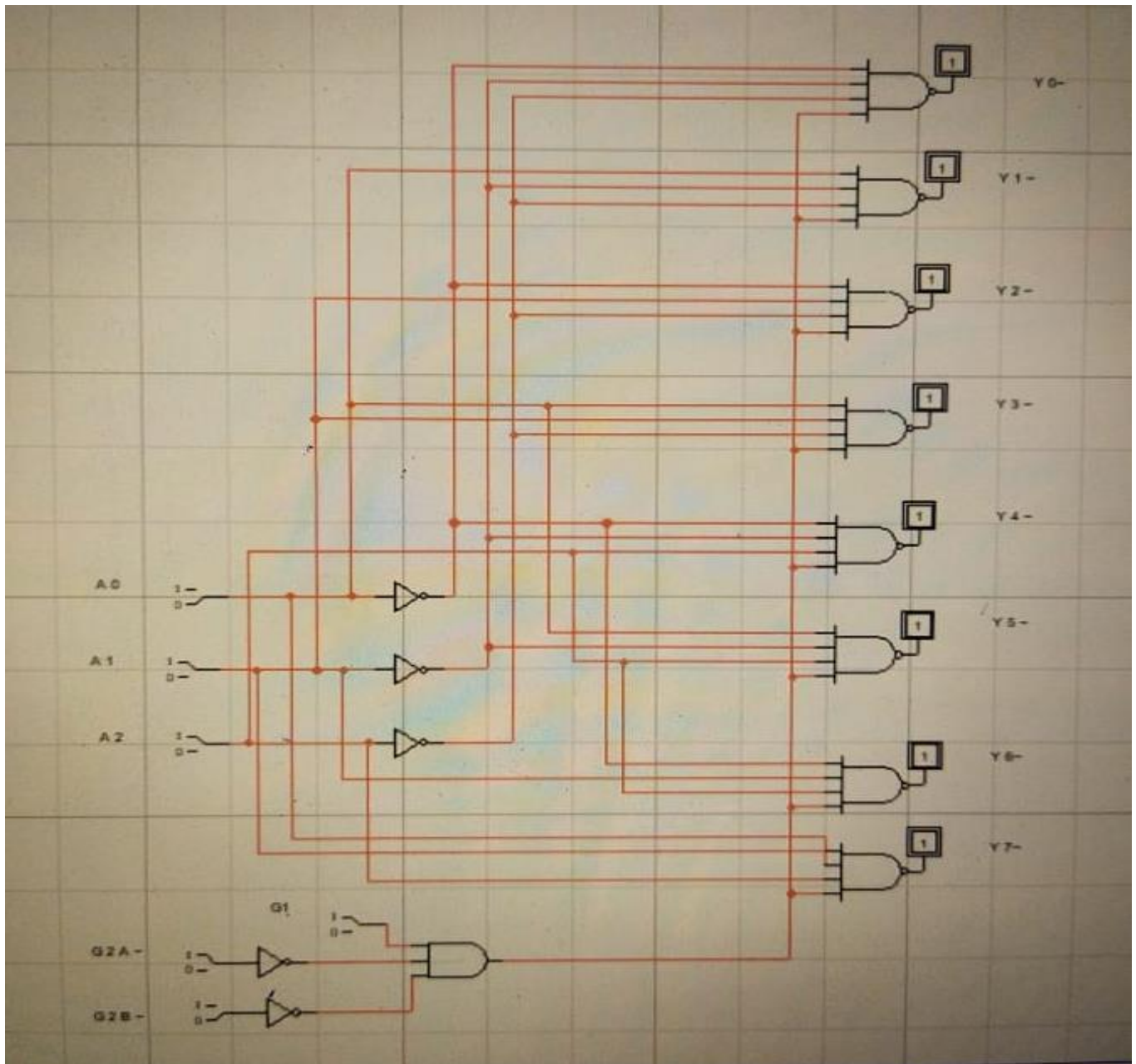
Lab Task #3

BCD to Seven Segment Decoder using IC 74LS47

Inputs							Outputs							DIGITS
LT~	RBI~	RBO~	A3	A2	A1	A0	a~	b~	c~	d~	e~	f~	g~	
1	1	1	0	0	0	0	0	0	0	0	0	0	**1**	0
1	1/0	1	0	0	0	1	1	**0**	**0**	1	1	1	1	1
1	1/0	1	0	0	1	0	0	0	**1**	0	0	**1**	0	2
1	1/0	1	0	0	1	1	0	0	0	0	**1**	**1**	0	3
1	1/0	1	0	1	0	0	**1**	0	0	**1**	**1**	0	0	4
1	1/0	1	0	1	0	1	0	**1**	0	0	**1**	0	0	5
1	1/0	1	0	1	1	0	0	**1**	0	0	0	0	0	6
1	1/0	1	0	1	1	1	0	0	0	**1**	**1**	**1**	**1**	7
1	1/0	1	1	0	0	0	0	0	0	0	0	0	0	8
1	1/0	1	1	0	0	0	0	0	0	**1**	**1**	0	0	9