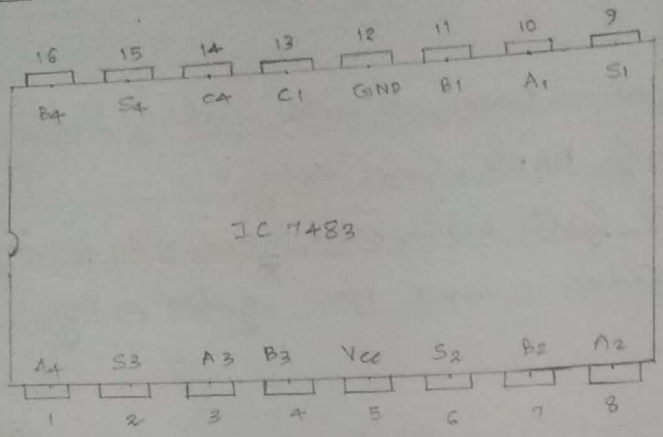
Pin diagram



A4 A3 A2 A1 } i/p
1, 3, 8, 10
B4 B3 B2 B1
16, 4, 7, 11

C1 : 13 — carry in
C4 : 14 — carry out

S4 S3 S2 S1 } o/p
15 2 6 9

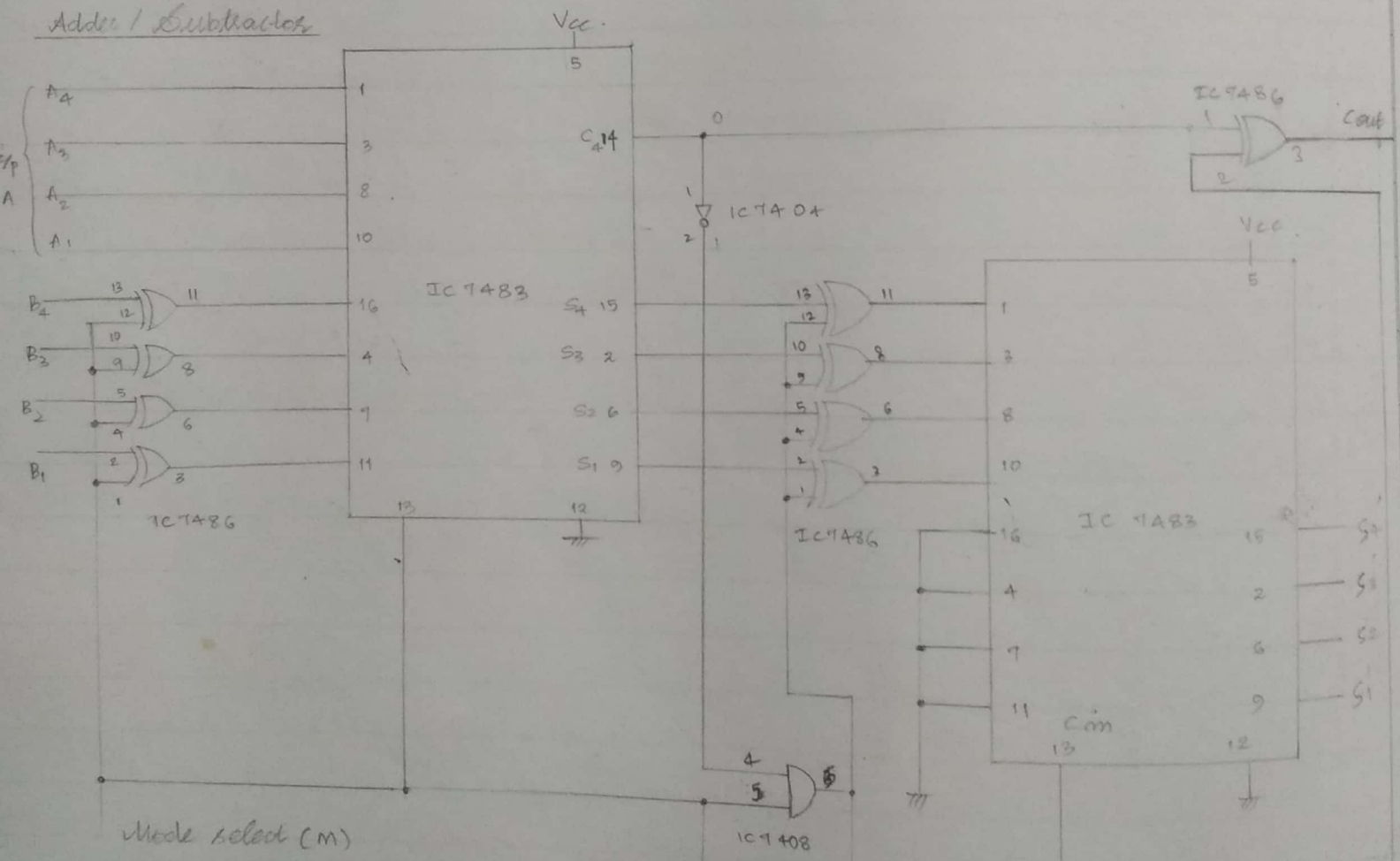
Vcc : 5
GND : 12

M 0/1

M=0 addition

M=1 subtraction

Adder / Subtractor



Addition

		Sum	carry
(a)	0101 + 0101 =	1010	0
(b)	1010 + 0111 =	0001	1

Date 18.08.2019

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4- Bit adder / subtractor and BCD adder using IC7483

Aim

To design and set up a 4 bit adder / subtractor & BCD adder using IC7483.

Components required

IC 74-83, IC 7432, IC 7408, IC 7486 and connecting wires

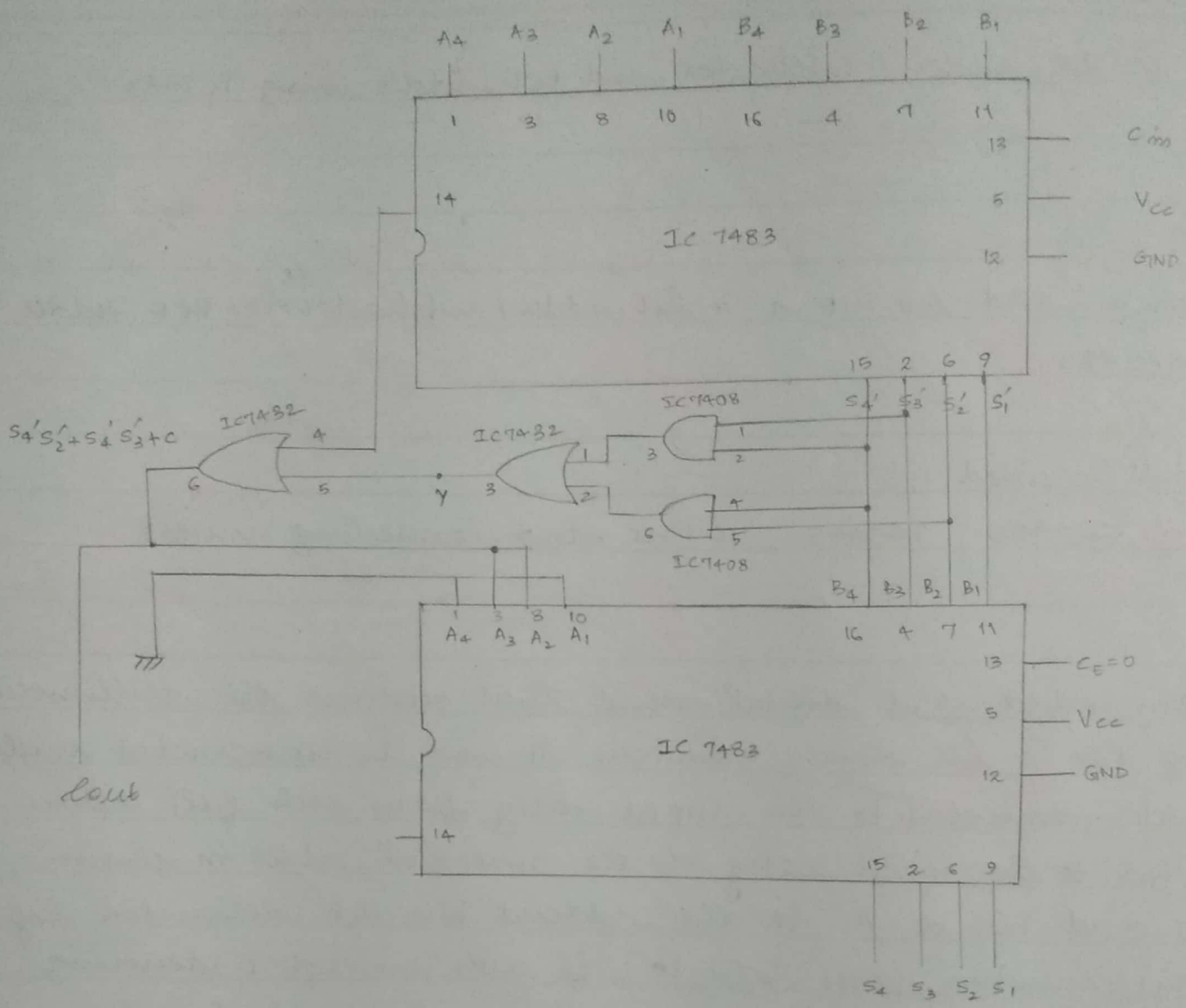
Theory

A binary adder is a digital circuit that produces the arithmetic sum of two 4 bit binary numbers. It can be constructed with full adder connected to the input carry from each full adder connected to the input carry of the next full adder in chain. The augend bits of A & the addend bits of B designated by subscript numbers from right to left with subscript 0 denoting the least significant bits. The carries are connected in chain through full adder. The input carry to the adder is C_0. So it ripples through the full adder to the output carry C_4.

Using a mod control line, it can act as both adder & subtractor. When m=0, the circuit works as an adder & when m=1, it acts as a subtractor. BCD adder follows BCD addition rule & thus requires an extra 6 for sum correction. This is achieved using two IC 7483 s.

Teacher's Signature

BCD Adder



4 bit adder

m	A4	A3	A2	A1	B4	B3	B2	B1	Co	S4	S3	S2	S1
0	1	1	0	0	0	0	1	1	0	1	1	1	1
0	0	0	1	1	1	1	0	0	0	1	1	1	1
1	1	1	1	1	1	0	1	0	1	0	1	0	1
1	1	0	0	1	1	0	1	0	0	0	0	0	1
1	1	1	1	0	1	1	1	1	1	0	0	0	1
0	1	0	1	0	1	0	1	1	1	0	1	0	1

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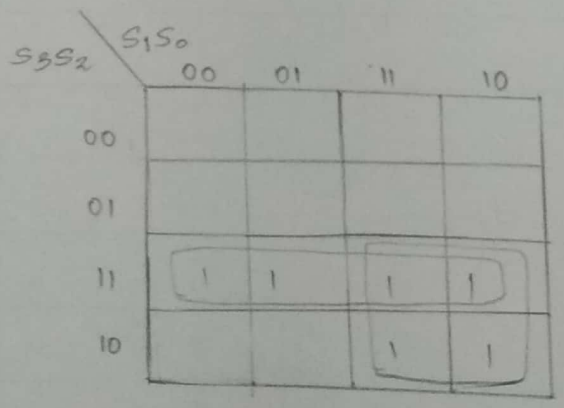
Procedure

1. Place the IC's on the bread board of the digital trainer kit.
2. Make the suitable connections.
3. Provide various inputs to the circuit and verify the output.

BCD Adder

A_3	A_2	A_1	A_0	B_3	B_2	B_1	B_0	C_{out}	S_3	S_2	S_1	S_0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	1	0	0	0	0	1	1	0	0	1	1	1
0	1	0	1	0	0	1	1	0	1	0	0	0
1	0	0	0	0	1	0	0	1	0	0	1	0
1	0	0	1	1	0	0	1	1	1	0	0	0



$Y = S_3S_2 + S_3S_1$

Date _____

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Result

Design and set up a 4 bit adder / subtractor and BCD adder using IC 7483 was completed and output was verified.