Date 15.3.24

Expt. No. 8

ASSIGNMENT-8

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TITLE : Design a 4 bit Composite Arithmetic Unit Using Multiplexer

Objective : To design a 4 bit Composite Arithmetic Unit Using Multiplexer

Theory : A 4 bit composite arithmetic unit using multiplexer can be designed to perform various arithmetic and logical operations on 4 bit binary numbers. The composite arithmetic unit can include addition, subtraction, AND, OR, XOR, and other operations. Multiplexers are used to select the appropriate operation based on control signals.

Function Table :

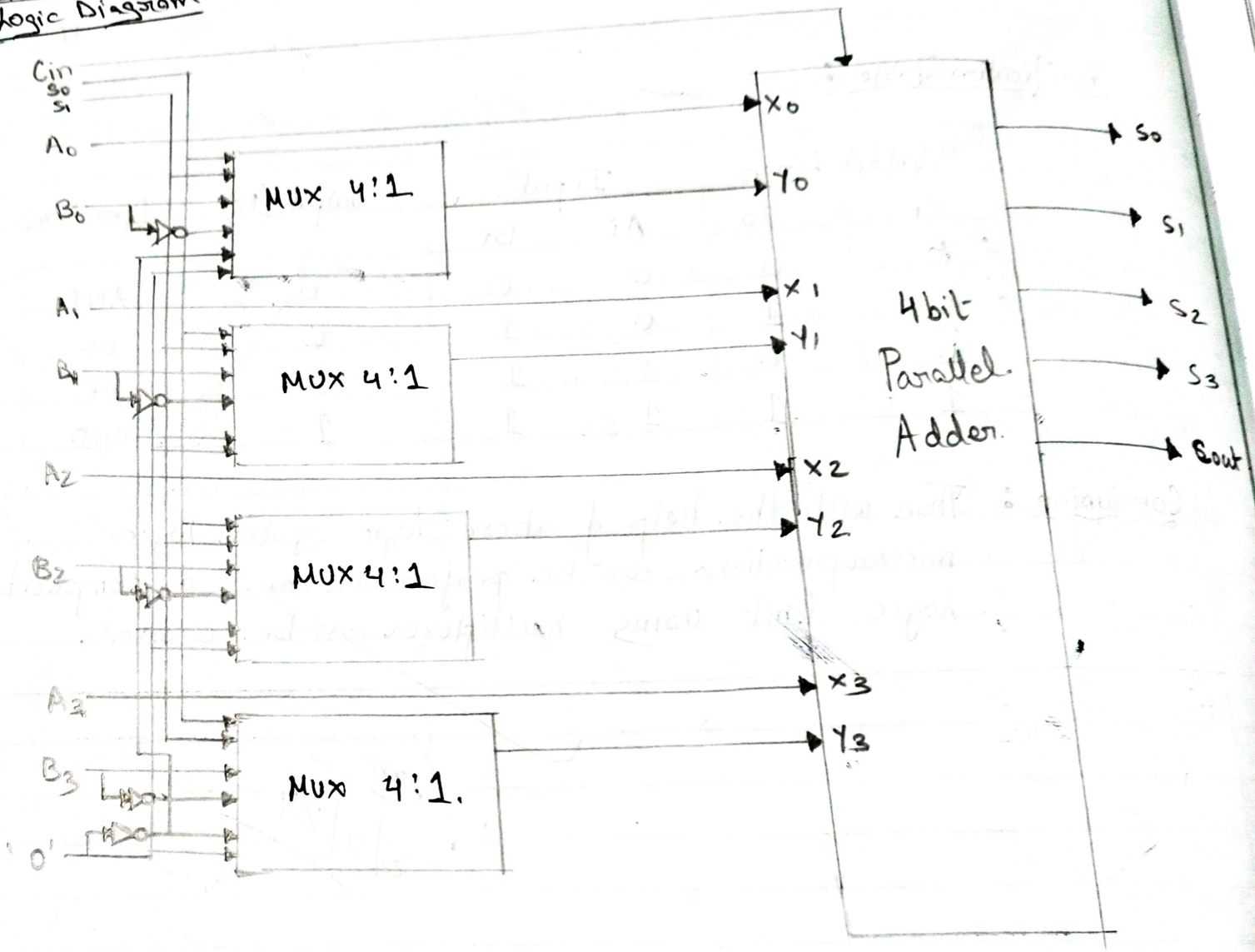
Function Selection			Output of MUX (Y)	Output (F)	Function Name
S_1	S_0	C_{in}			
0	0	0	B	F = A+B	Add B to A
0	0	1	B	F = A+B+1	Add B to A plus 1
0	1	0	B′	F = A+B′	Add 1's complement of B to A
0	1	1	B′	F = A+B′+1	Add 2's complement of B to A
1	0	0	0	F = A	Transfer A
1	0	1	0	F = A+1	Increment A
1	1	0	All 1's	F = A−1	Decrement A
1	1	1	All 1's	F = A	Transfer A

Instruments & Components Required :

Sl No.	Item	Specification	Qty
1	IC-4008	IC-4008	1
2	IC-4539	IC-4539	1
3	NOT Gate	IC-4069	1

Teacher's Signature _____

Logic Diagram



4-bit Arithmetic Unit

Pin Diagram

IC-4008

(Top)

IC-4539

IC-4069

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Verification Table:

Function Selection			Output of MUX (Y)	Output (F)	Function Name
S_1	S_0	C_{in}			
0	0	0	B	F = A + B	Add B to A.
1	0	0	0	F = A	Transfer A.
1	1	0	All 1's	F = A − 1.	Decrement A.
1	1	1	All 1's.	F = A'	Transfer A

Conclusion: Thus will the help of above ICs and multiplexers, a 4 bit Composite Arithmetic Unit can be designed.