

# Assignment - 1

Topic : ALS Unit

Roll No : 18BLE248

## \* Variables :-

$S_1, S_0$  : Selection inputs

$C_{in}$  : Carry in

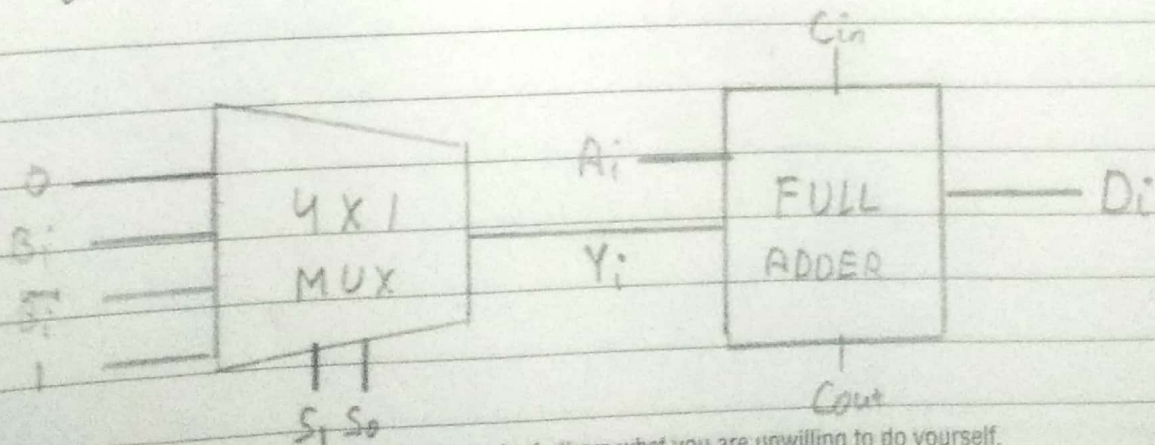
$C_{out}$  : Carry Out

$A_i$  (i.e.  $A_1, A_2, A_3, A_4$ ) : Operand A input bits

$B_i$  (i.e.  $B_1, B_2, B_3, B_4$ ) : Operand B input bits

$D_i$  (i.e.  $D_1, D_2, D_3, D_4$ ) : Output

## \* Arithmetic Unit :-

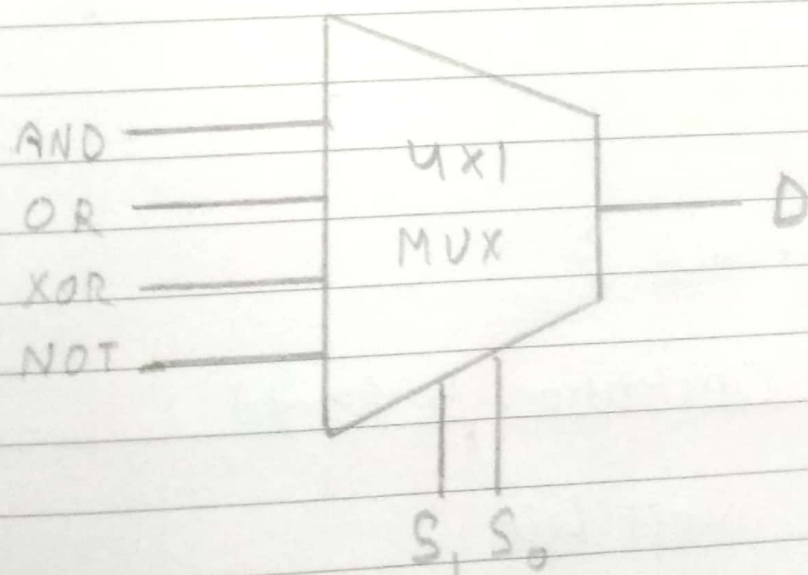


## \* Arithmetic Circuit table :-

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	$S_1$	$S_0$	$C_{in}$	Input Y	Output D	Operation performed
8	0	0	0	0	A	Transfer A
9	0	0	1	0	$A+1$	Increment A
10	0	1	0	B	$A+B$	Add
11	0	1	1	B	$A+B+1$	Add with Carry
12	1	0	0	$B'$	$A+B'$	Subtract with Borrow
13	1	0	1	$B'$	$A+B'+1$	Subtract
14	1	1	0	1	$A-1$	Decrement A
15	1	1	1	1	A	Transfer A

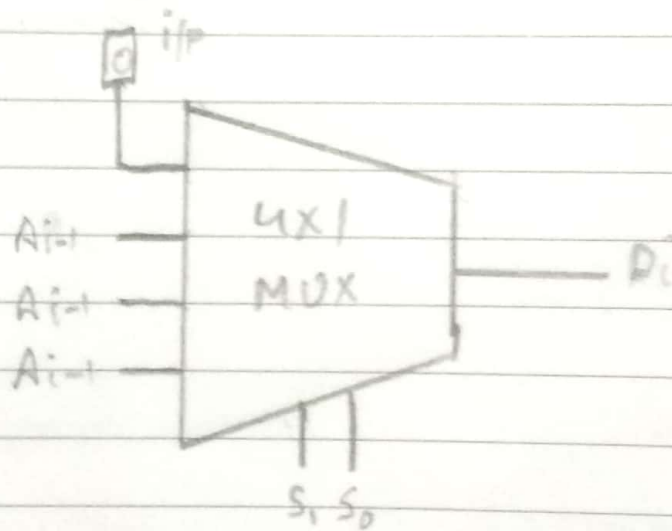
## \* Logic Unit :-



## \* Logical circuit table :-

	$S_1$	$S_0$	Output	Operation Performed
8				
9	0	0	$A \wedge B$	AND
	0	1	$A \vee B$	OR
10	1	0	$A \oplus B$	XOR
	1	1	$\bar{A}$	NOT
11				

\* Shift Unit :-



\* Shift Unit Circuit table :-

$S_1$	$S_0$	Operation Performed
0	0	Shift Left
0	1	Shift Right
1	0	Circular Shift Left
1	1	Circular Shift Right



## \* Arithmetic Shift Table :-

$S_0$	Operation Performed
0	Arth Shift Left
1	Arth Shift Right

## \* Complete ALU Unit Table :-

$S_1$	$S_0$	$C_{in}$	Operation Performed
0	0	0	Transfer A
0	0	1	Increment A
0	1	0	Add
0	1	1	Add with Carry
1	0	0	Subtract with Borrow
1	0	1	Subtract
1	1	0	Decrement A
1	1	1	Transfer A
0	0	X	AND
0	1	X	OR
1	0	X	XOR
1	1	X	NOT
0	0	X	Shift Left
0	1	X	Shift Right
1	0	X	Circ Shift Left
1	0	X	Circ Shift Right
1	1	X	Arth Shift Left
1	1	X	Arth Shift Right

X Skill and confidence are an unconquered army.