09/06/15

(Lec no 15, 16) Chp no 4: Register Transfer Language
& Micro-operations

- Defining data Transfer from one register to other register using symbols is called Register Transfer Language.

These are common symbols:-
'→' shows direction, ( ) shows length, ',' shows seperation.
':' used for conditional signals.

Example:- P : $R_1 \rightarrow R_2$, $R_2 \rightarrow R_1$
(If P signal exists) (Then do this)

:- Common Bus :-

- This circuit is usually available for all registers.
Suppose we have two four bits - wide registers.

(B)

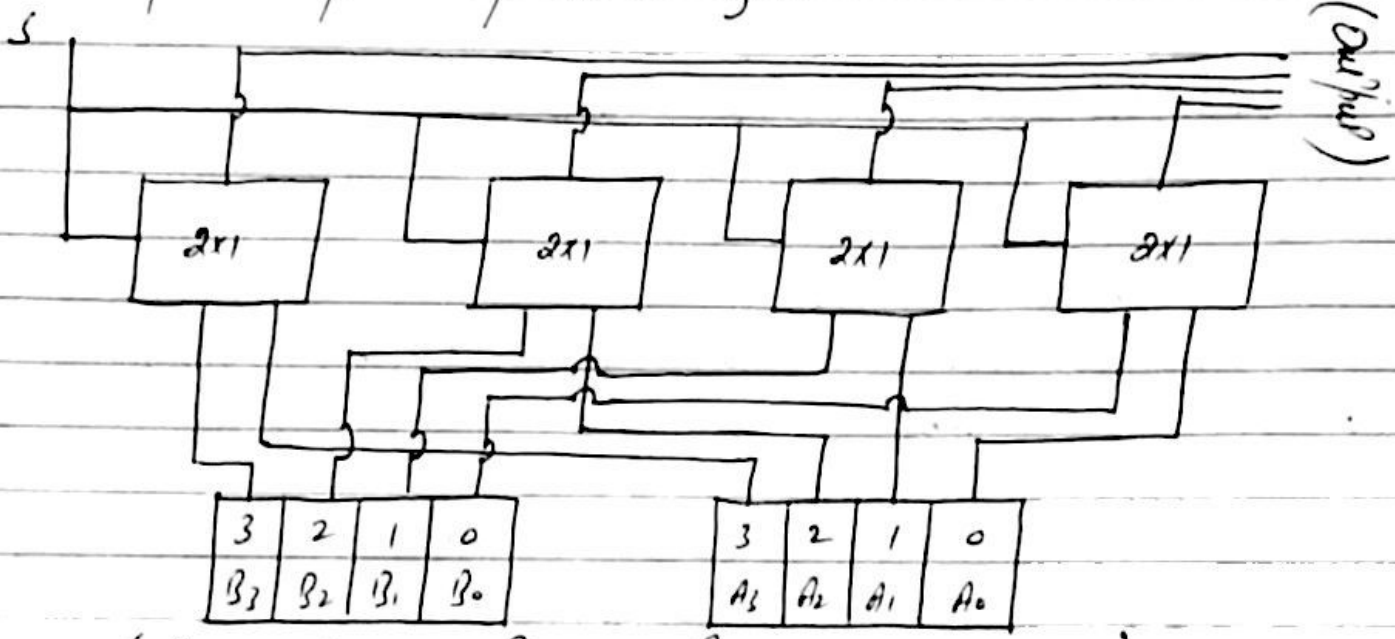
3	2	1	0
B_3	B_2	B_1	B_0

3	2	1	0
A_3	A_2	A_1	A_0

(A)

- Multiplexer will be used for developing Common Bus Circuit.
- Multiplexer has always 1 output.
- Number of Multiplexer depends upon bits of registers.
- Size of Multiplexer depends upon number of registers.
- First bits of both registers will attach to first Multiplexer.

Circuit for Multiplexer of Serial Bus:-



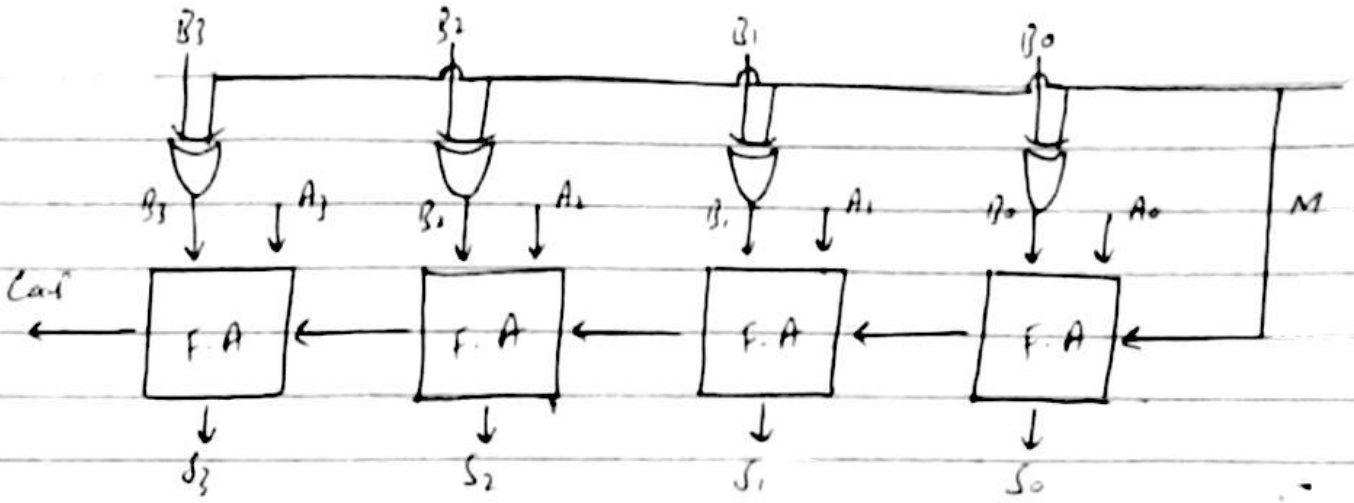
(Common Bus for two registers of four-bits)

In Selection Line for four bits registers, we have two options:-

- If we put 0 at S, it will get value from A at output.
- If we provide 1 at S, it will get value from B at output.

Adder and Subtractor:-

We will build both adder and subtractor in one circuit:-



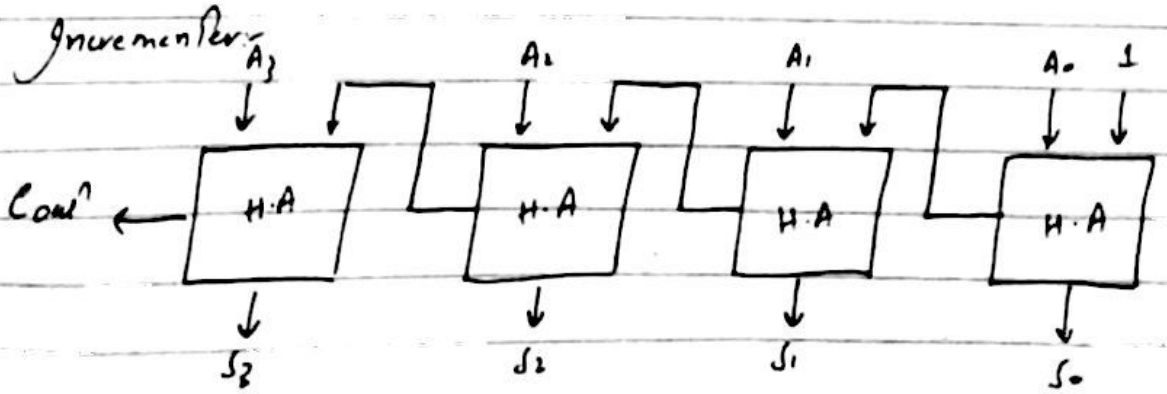
(Adder & Substractor)

Two input exclusive OR Gate -

Same Values.
Different The.

A	B	A ⊕ B
0	0	0
0	1	1
1	0	1
1	1	0

- If we will provide 0 at M, then it will act as adder.
- If we will provide 1 at M, then it will act as Substractor.



Arithmetic Logic Unit (ALU):-

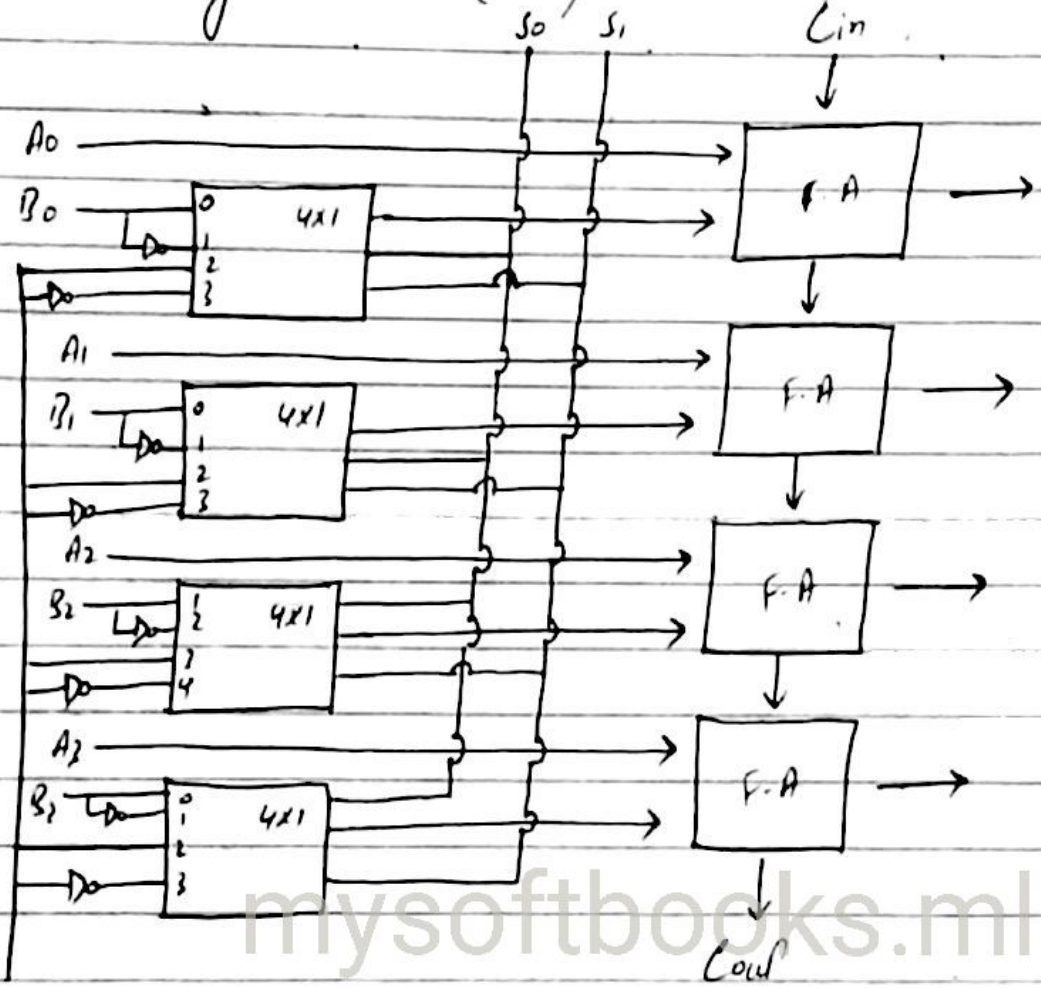


Table:-

S0	S1	Cin	Description	
0	0	0	A+B+0	
0	0	1	A+B+1	
1	0	0	Subtraction (with borrow)	$A+\bar{B}$
1	0	1	Subtraction (Compliment)	$A+\bar{B}+1$
0	1	0	A (Data Transfer)	
0	1	1	A+0+1 (Increment)	
1	1	0	A-1	
1	1	1	A+1+1	