EXPT NO.: 5

DESIGN A 4-BIT COMPOSITE ADDER-SUBTRACTOR UNIT

AIM:

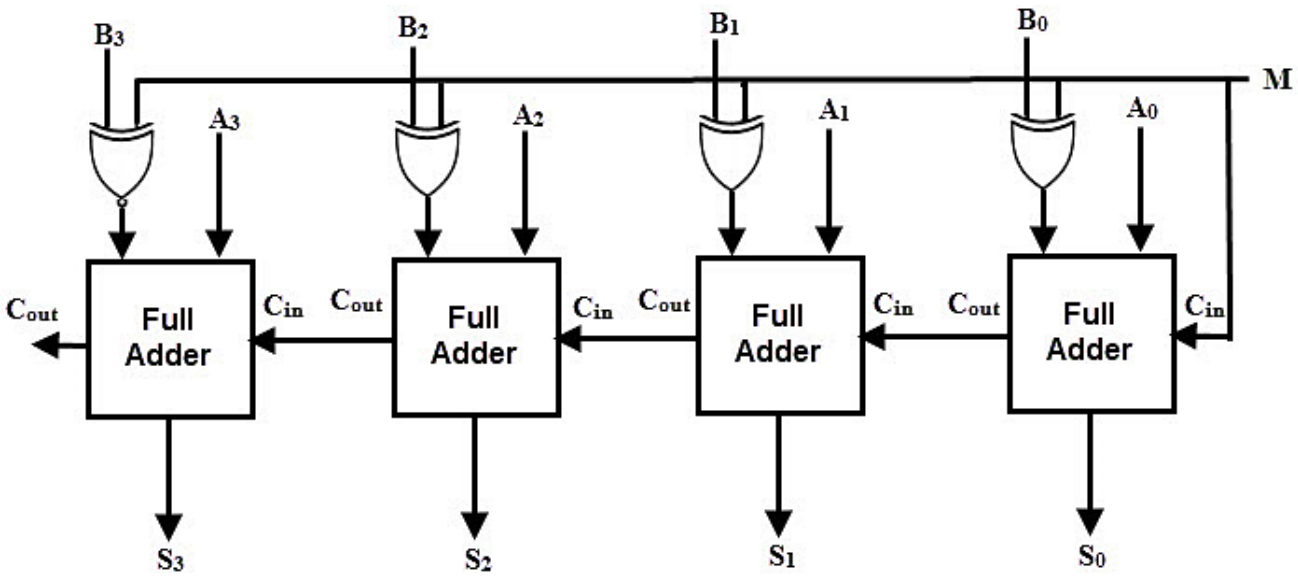
To design and simulate a 4-bit composite adder-subtractor unit.

4-BIT COMPOSITE ADDER-SUBTRACTOR:

The operations of both addition and subtraction can be performed by a one common binary adder. Such binary circuit can be designed by adding an Ex-OR gate with each full adder as shown in below figure. The figure below shows the 4-bit parallel binary adder/subtractor which has two 4 bit inputs as $A_3A_2A_1A_0$ and $B_3B_2B_1B_0$.

The mode input control line M is connected with carry input of the least significant bit of the full adder. This control line decides the type of operation, whether addition (logic 0) or subtraction (logic 1).

The block diagram of a 4-bit composite adder-subtractor unit is given below:



The i/o ports for the formation of 4-bit composite adder-subtractor unit is given below:

Port Name	INPUT/OUTPUT	Bus
A	In	4-Bit Bus (3 downto 0)
B	In	4-Bit Bus (3 downto 0)
M	In	No
SUM	Out	4-Bit Bus (3 downto 0)
Cout	Out	No

NB: Use temporary variable where ever necessary.