# Ripple Full Adder-Subtractor Experiment

- **Design of Ripple Carry Adders:**

Arithmetic operations like addition, subtraction, multiplication, division are basic operations to be implemented in digital computers using basic gates like AND, OR, NOR, NAND etc. Among all the arithmetic operations if we can implement addition then it is easy to perform multiplication (by repeated addition), subtraction (by negating one operand) or division (repeated subtraction). Half Adders can be used to add two one bit binary numbers. It is also possible to create a logical circuit using multiple full adders to add N-bit binary numbers. Each full adder inputs a Cin, which is the Cout of the previous adder. This kind of adder is a Ripple Carry Adder, since each carry bit "ripples" to the next full adder. The first (and only the first) full adder may be replaced by a half adder. The block diagram of 4-bit Ripple Carry Adder is shown here below.
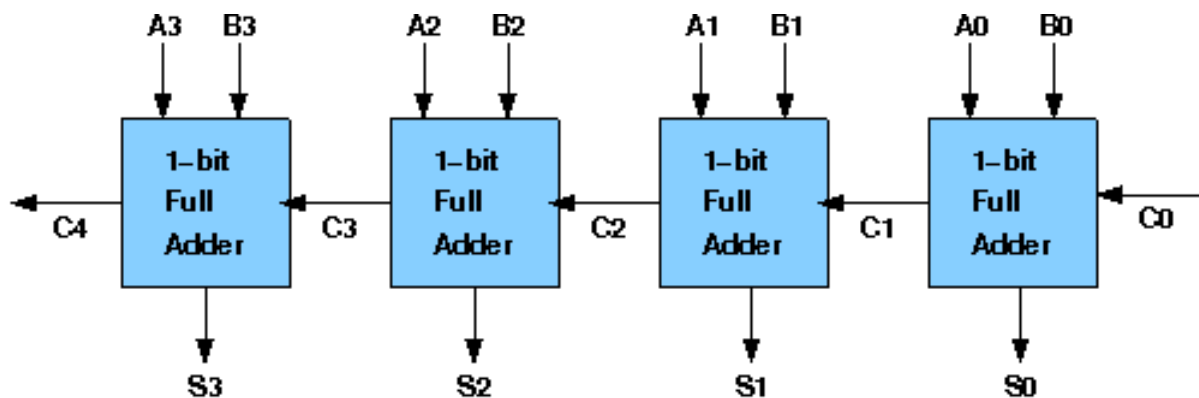
- **Assignment Statements:**
    1. Create a half adder circuit using only logic gates and test it by giving proper input (Truth table and function).
    2. Create a full adder circuit using only logic gates and test it by giving proper input (Truth table and function).
    3. Create a full adder circuit using half adder and test it by giving proper input.

4. Create a 4-bit ripple carry adder circuit using half adders and full adders and test it by giving proper input.
5. Create a 4-bit Adder-subtractor circuit using half adders and full adders and test it by giving proper input.
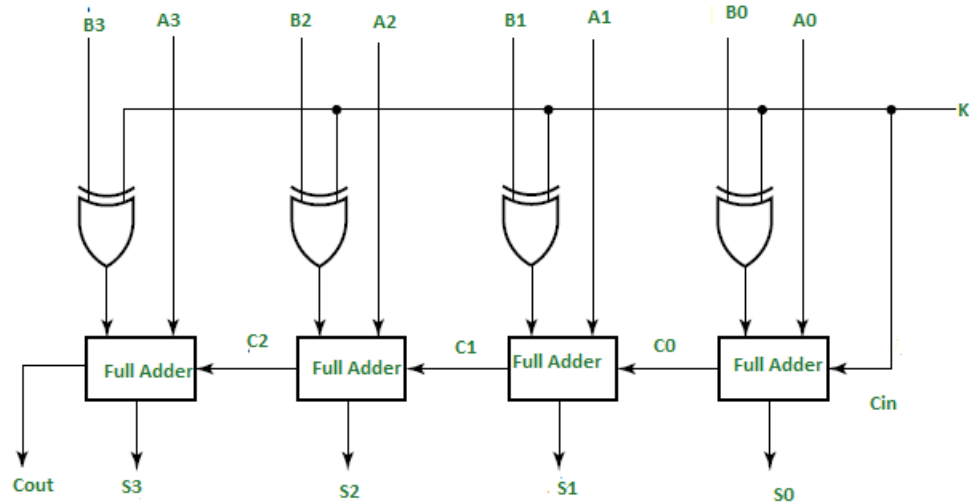
- **Report:**
   1. Impalement a 2 bit multiplier.
   2. Impalement a 4 bit multiplier.