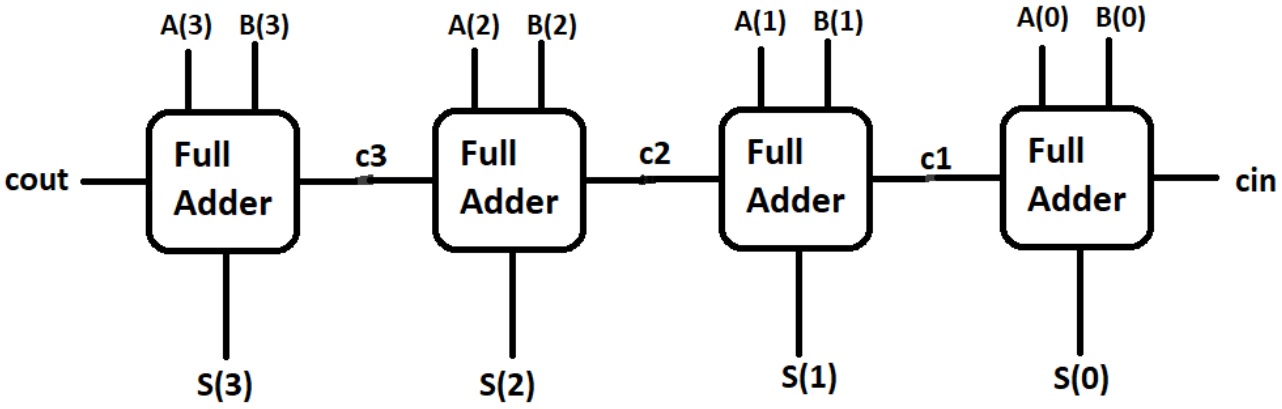
Roll - 200050006
Ques - 2:

In this question, we have to design a 4-bit ripple carry adder.
In the input ‘a’ and ‘b’ are the two 4-bit unsigned numbers that are to be added.
‘cin’ is a single-bit input carry that should be added with ‘a’ and ‘b’.
‘sum’ is the 4-bit unsigned addition output and ‘cout’ is the single-bit output carry.

The constraint is that we can only use the instances of 1-bit full adder designed in the previous question and no other gates are allowed for the purpose.

The design of 1-bit full adder used in this question is completely described in the previous report. So here in the circuit implementation, I will show the 1-bit full adder as a simple box for easy visualization of overall circuit

Circuit Implementation using 1-bit full adder:



Using the above circuit , we can easily design a 4-bit ripple adder using four 1-bit full adder circuits. The basic idea is the carry of first adder circuit acts as cin of second adder circuit, the carry of second adder circuit acts as cin for third and so on….

And Each single bit full adder gives one bit output for the final output.