Aim :- Designing of 4-bit fulladder using CMOS Technology in Cadence virtuoso.

Introduction :-

Full adder is the adder that adds three inputs and produces two outputs. The first two inputs are A and B and the third input Carry is as Cin.

A 1-bit full adder adds three operands and generates 2-bit results.

Block Representation.

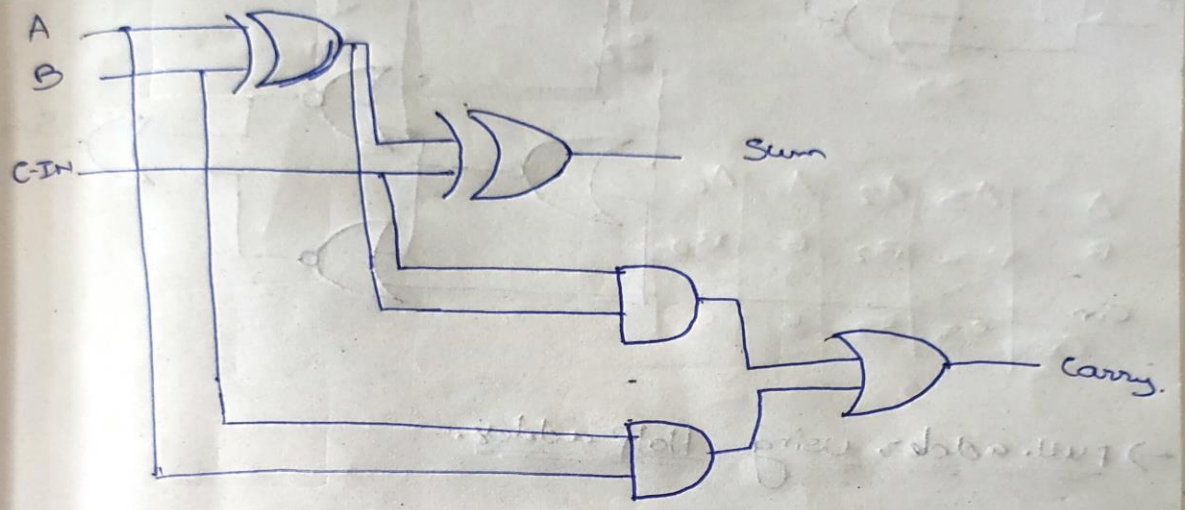
→ Logic Table :-

A	B	Cin	Sum	Carry
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1
1	0	0	1	0
1	0	1	0	1
1	1	0	0	1
1	1	1	1	1

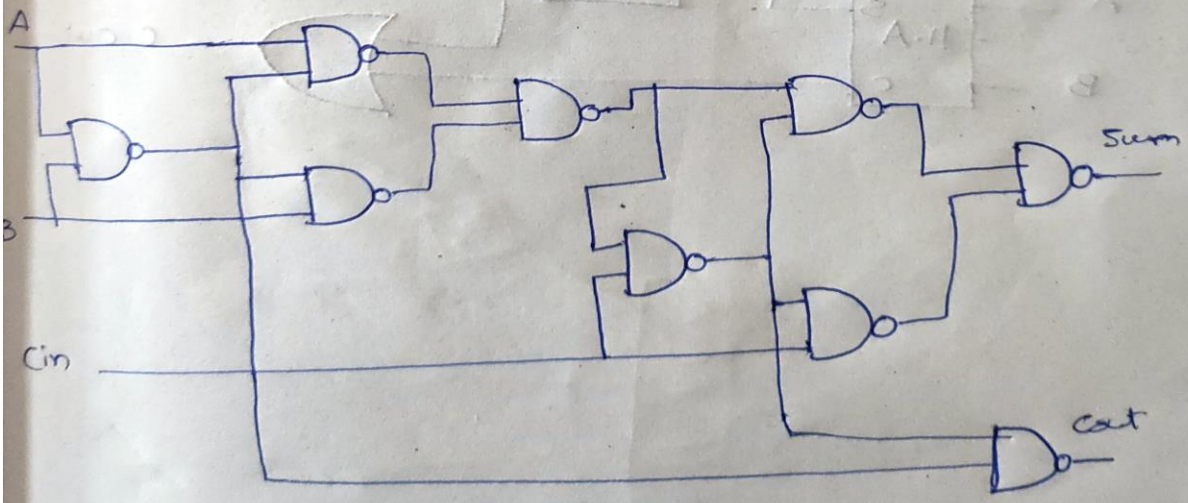
→ Gate Representation :-

Sum = A ⊕ B ⊕ Cin.

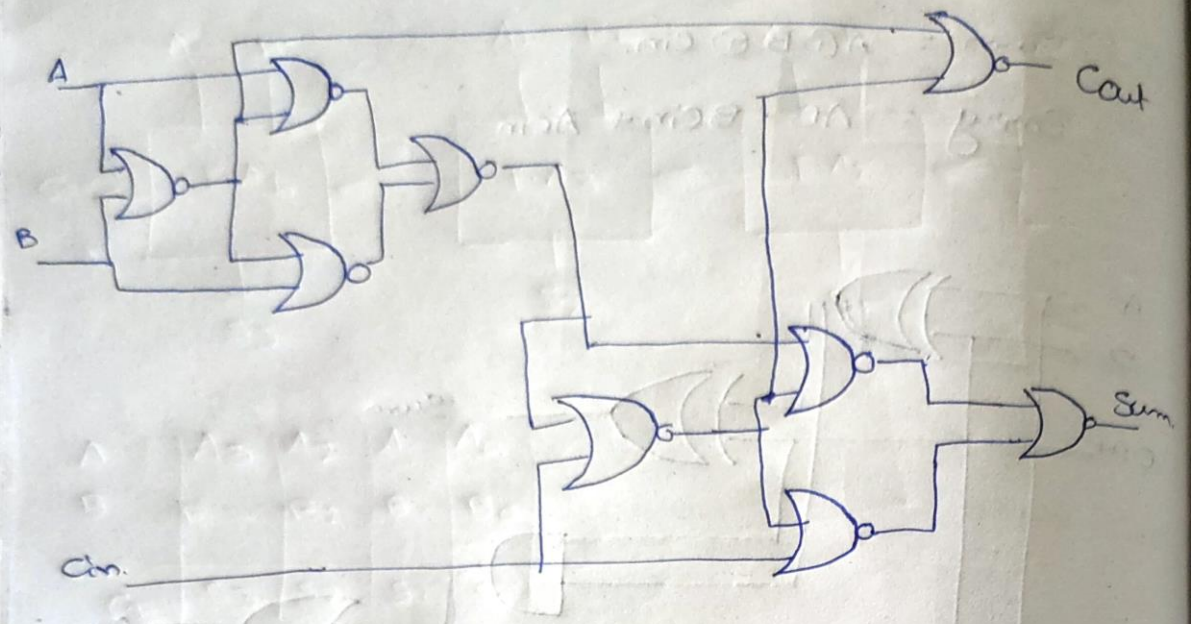
Carry = AB + BCin + ACin.



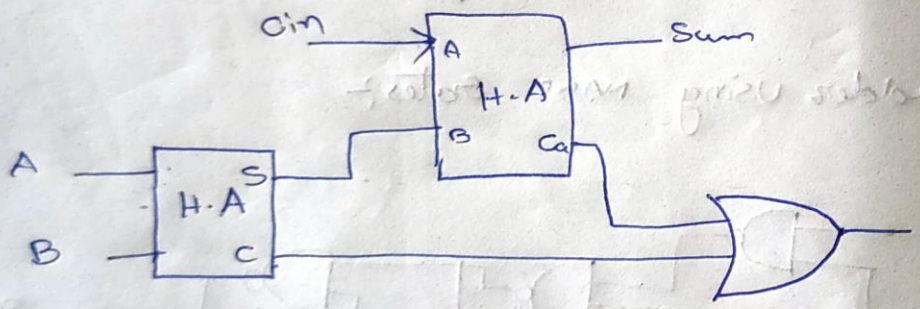
→ Full adder using NAND Gates :-



→ Full adder using NOR Gates:

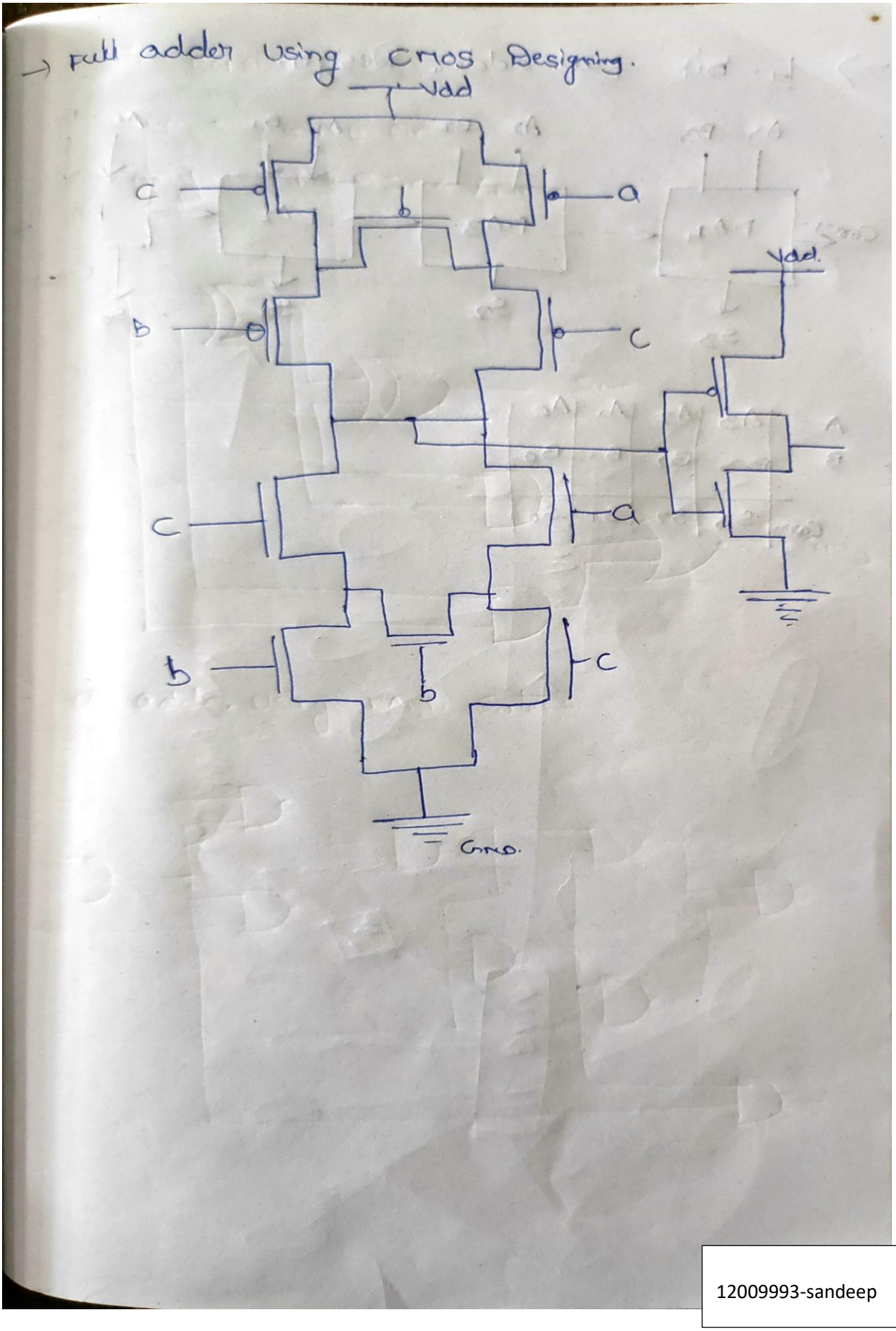


→ Full adder using Half adder.



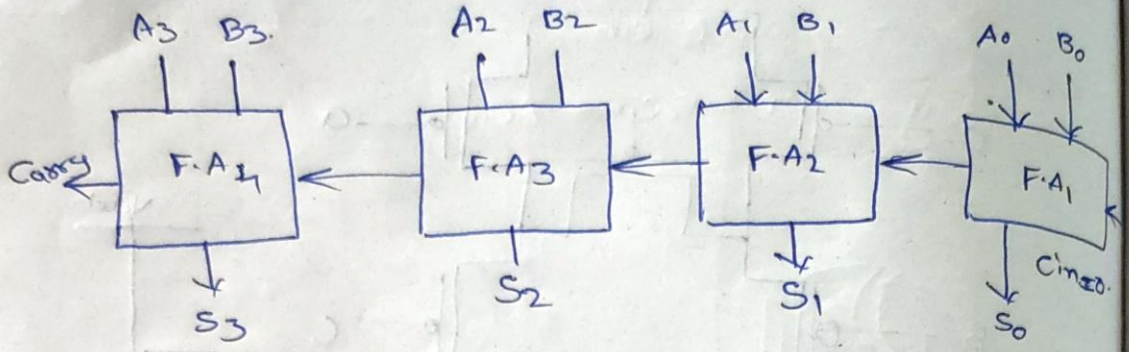
12009993-sandeep

→ Full adder using CMOS Designing.



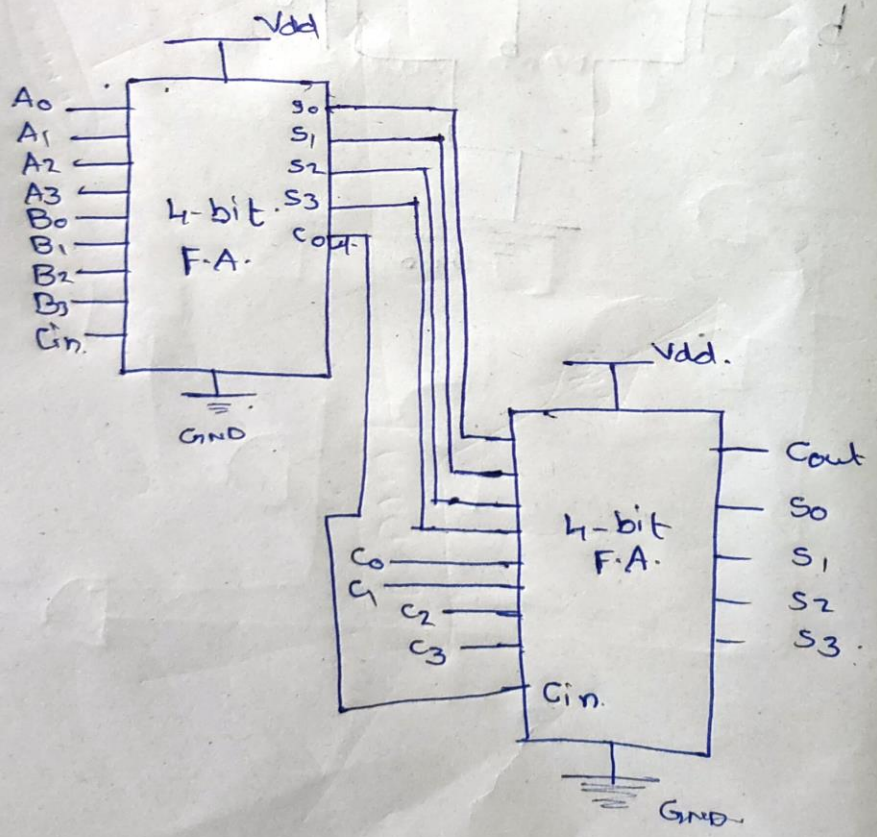
12009993-sandeep

→ 4-bit Full adder Design.



A =	A_3	A_2	A_1	A_0
B	B_3	B_2	B_1	B_0
Carry	S_3	S_2	S_1	S_0

→ 3-Input 4-bit Full Adder.



→ Learning Outcomes :-

* We have understood that how to implement a logic with CMOS.
* Usage of PMOS & NMOS as pull-up and pull-down networks.
* Logical Behaviour of Fulladder is known.
* Designing of 4-bit Fulladders using 1bit Full Adders.

→ Applications :-

* Used in Arthematic operations.
* Used in Calculators.
* used in various Digital electsonics.
* Used in increment and Decrement operators.
* It is used to Reduce Complexity of circuits.

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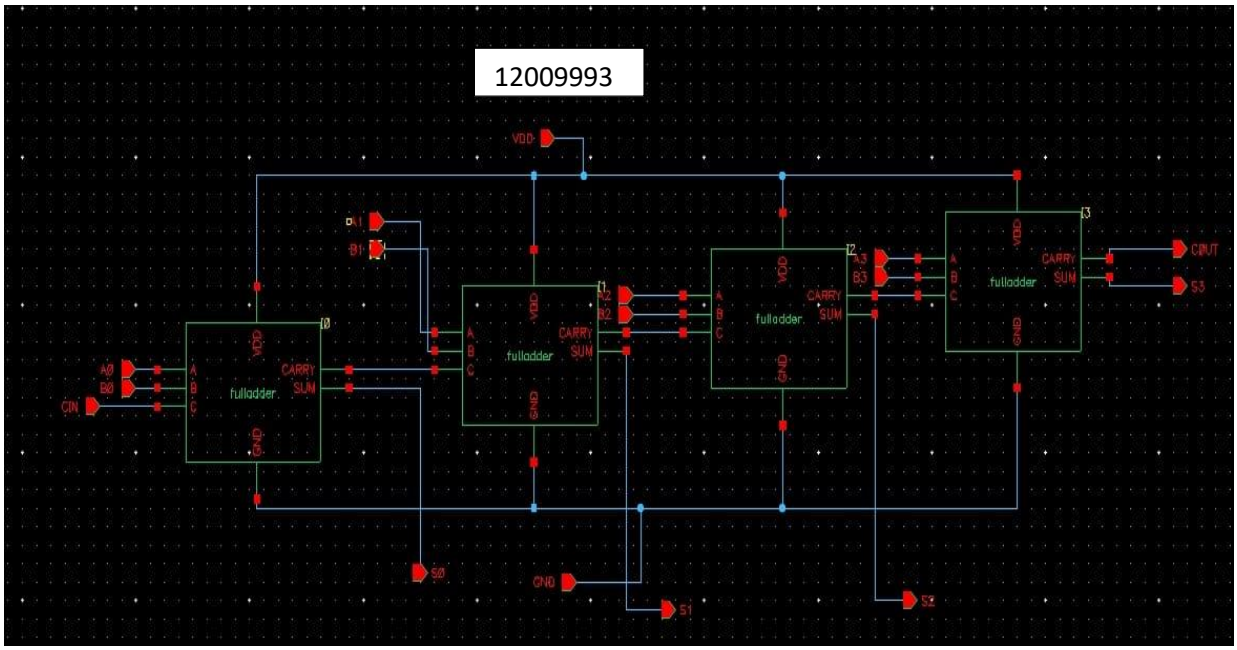
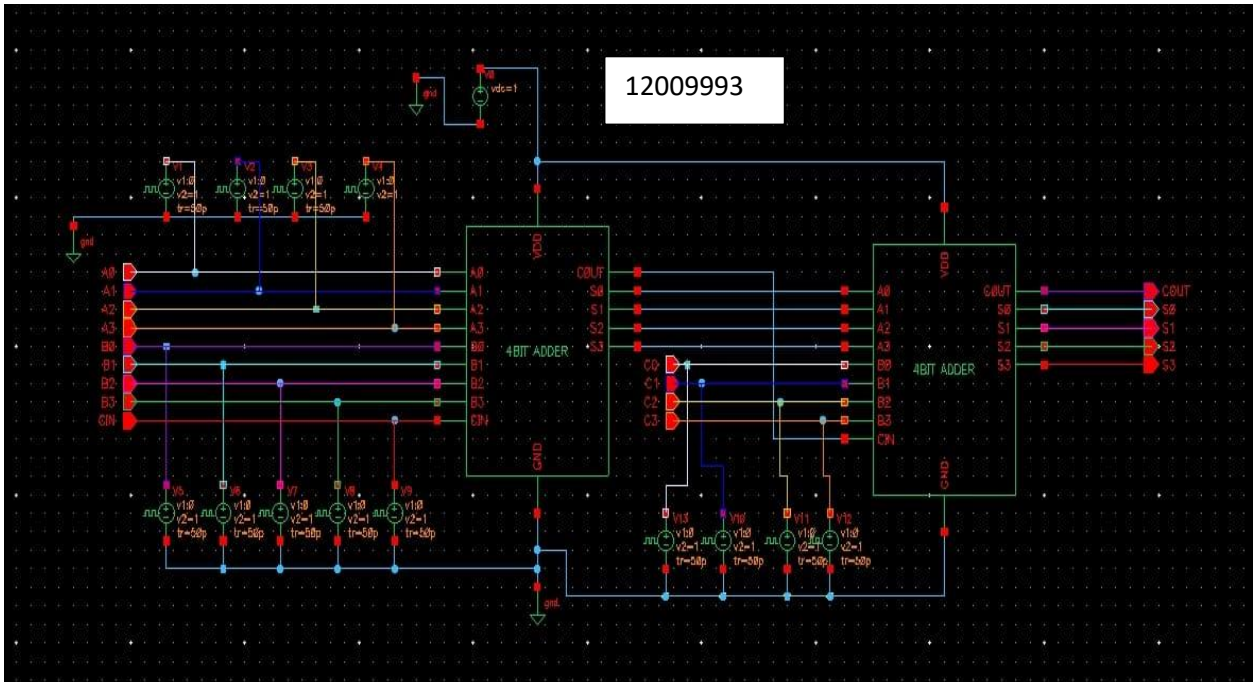
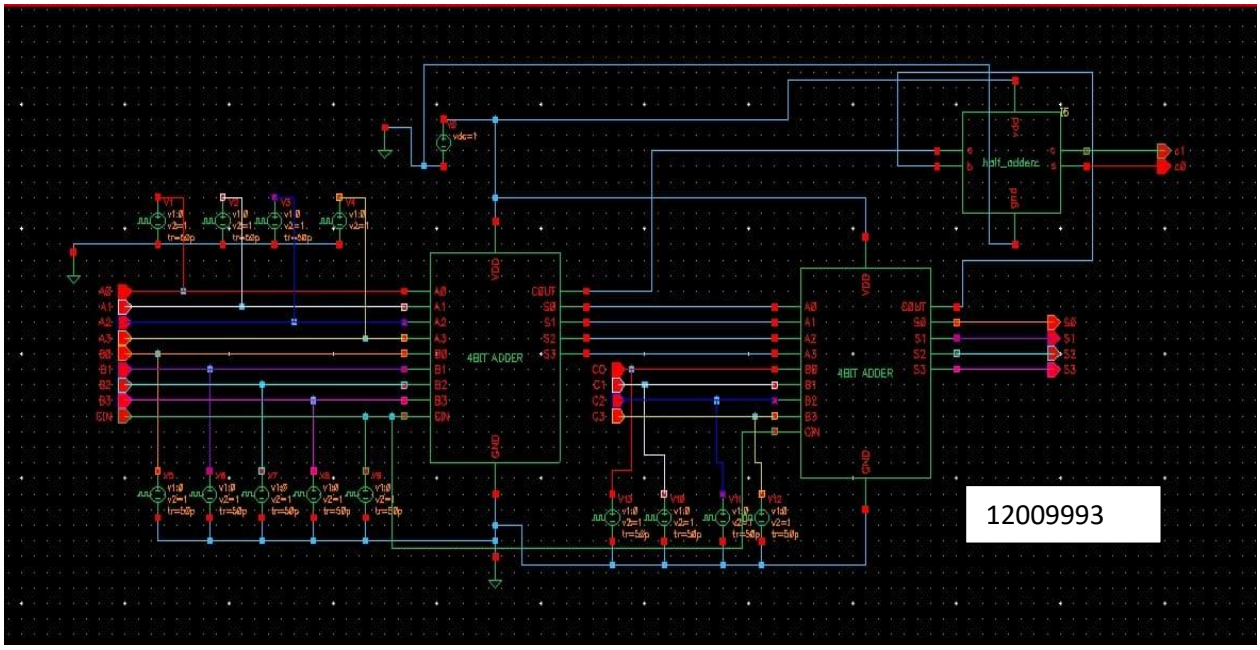
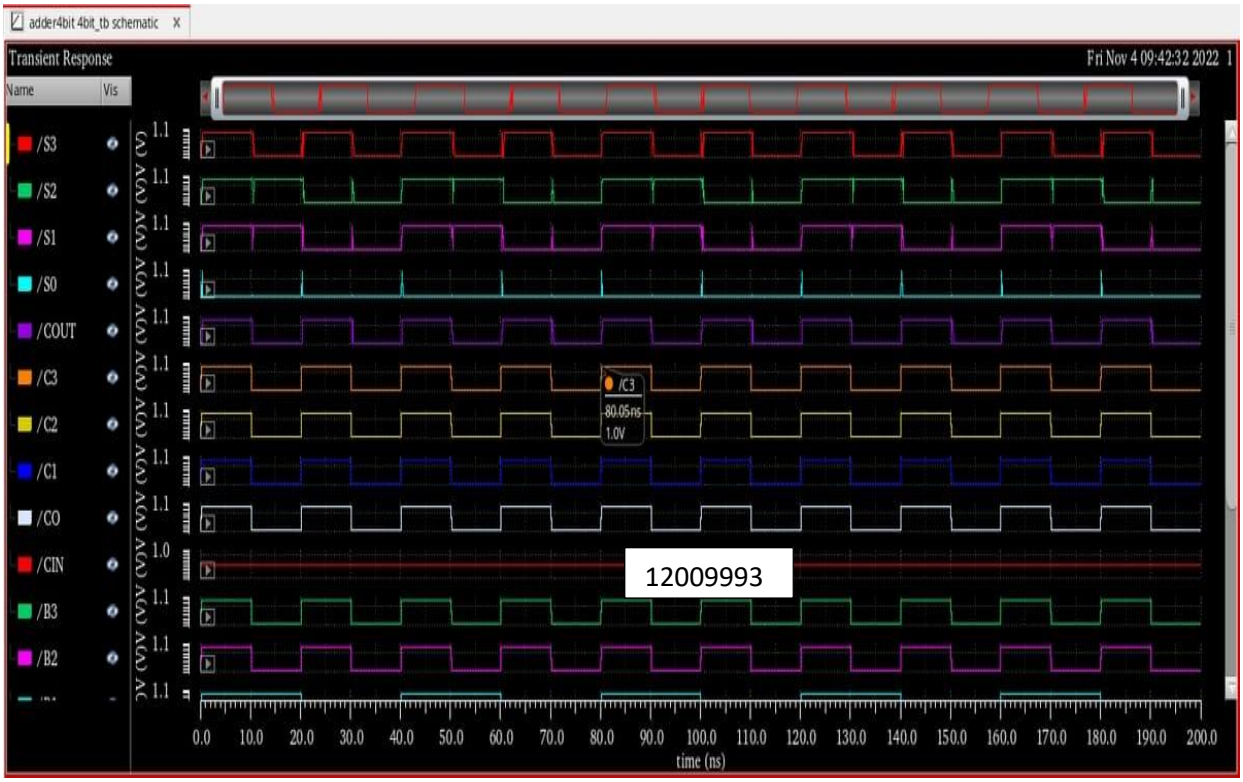
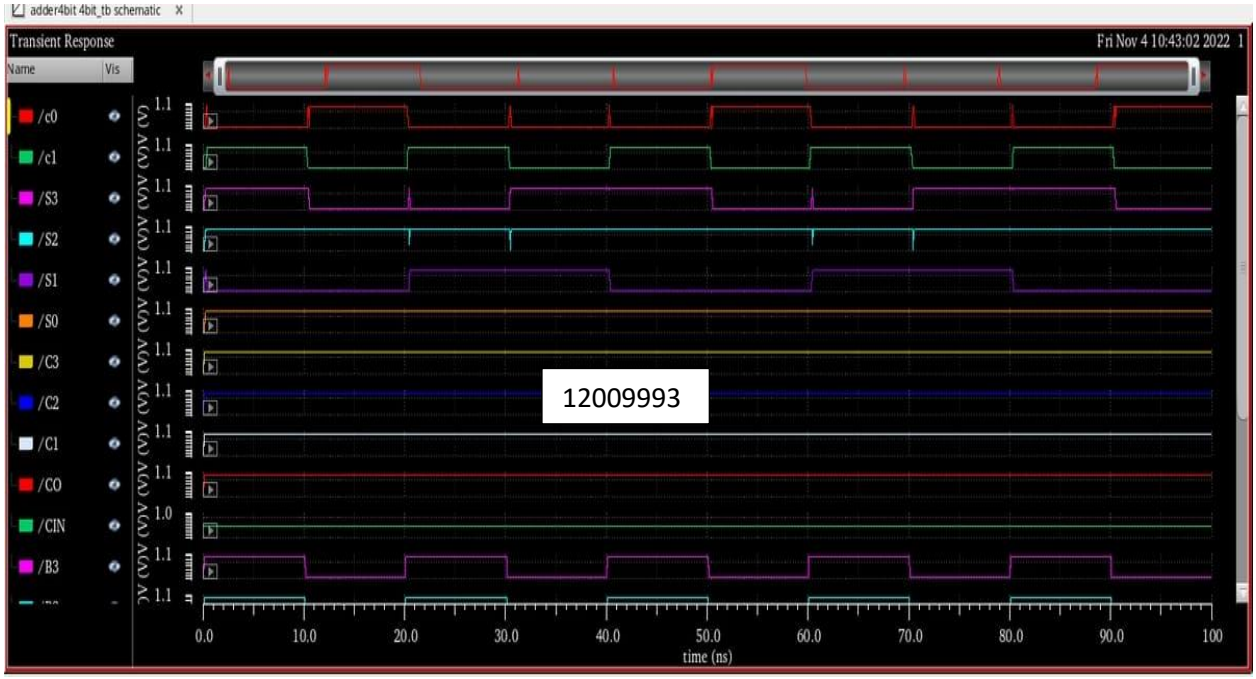

12009993
VDD
A0
B0
CIN
fulladder
CARRY
SUM
GND
S0
S1
S2
S3
COUT


12009993
4BIT ADDER
4BIT ADDER
vdc=1
gnd


4BIT ADDER
4BIT ADDER
12009993


adder4bit 4bit_tb schematic
Transient Response
Fri Nov 4 09:42:32 2022
Name
Vis
/S3
/S2
/S1
/S0
/COUT
/C3
/C2
/C1
/C0
/CIN
/B3
/B2
/C3
80.05 ns
1.0V
12009993
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
110.0
120.0
130.0
140.0
150.0
160.0
170.0
180.0
190.0
200.0
time (ns)


adder4bit 4bit_tb schematic
Transient Response
Fri Nov 4 10:43:02 2022
Name
Vis
/c0
/c1
/S3
/S2
/S1
/S0
/C3
/C2
/C1
/CO
/CIN
/B3
1.1
1.0
12009993
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100
time (ns)