EE477L Lab3 part2

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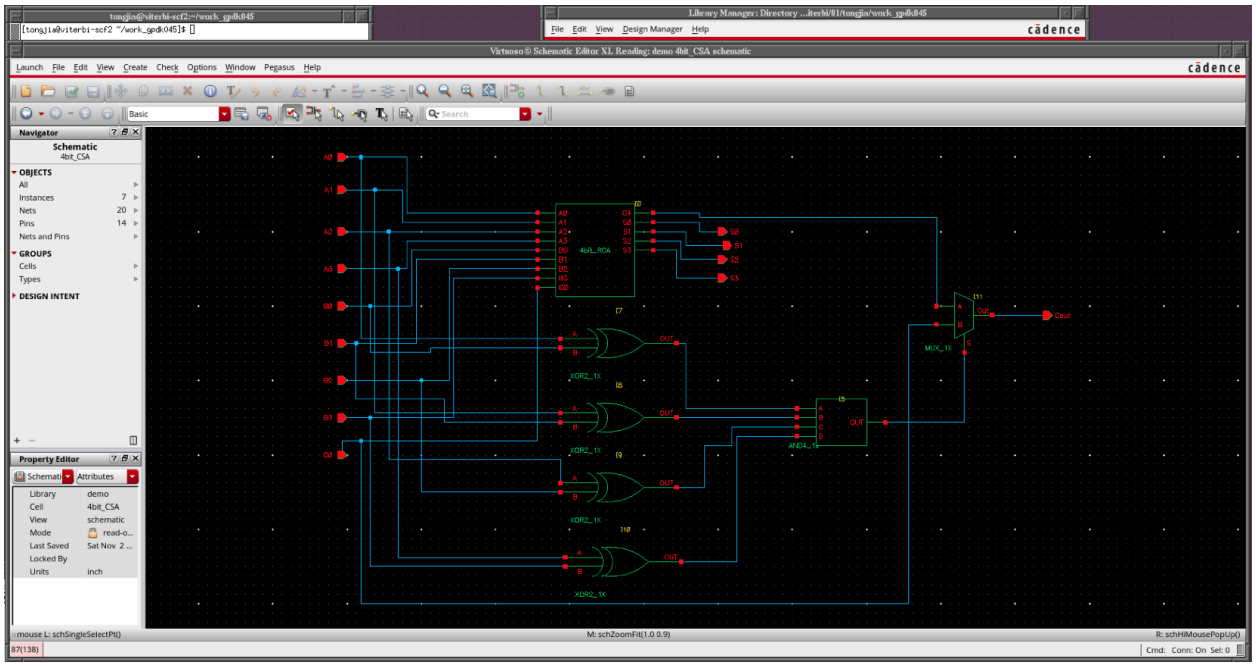
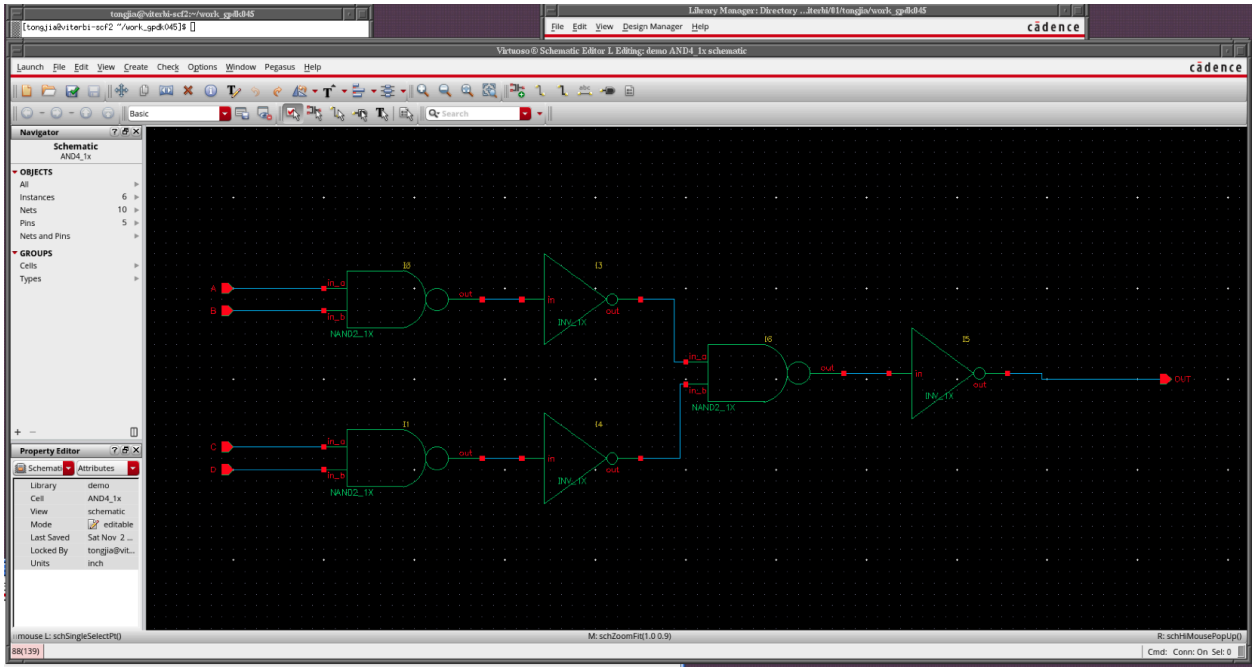
STEP 2:

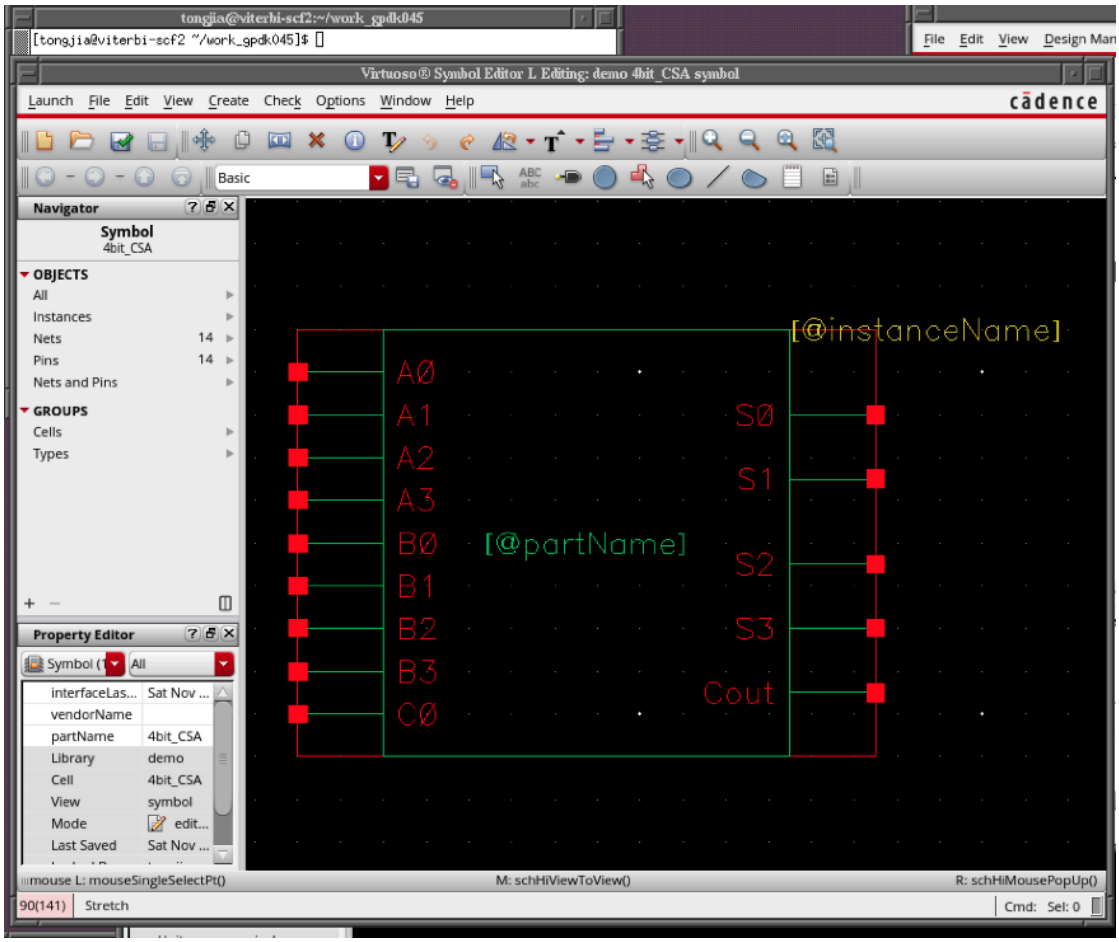
4-bit carry skip adder schematic:



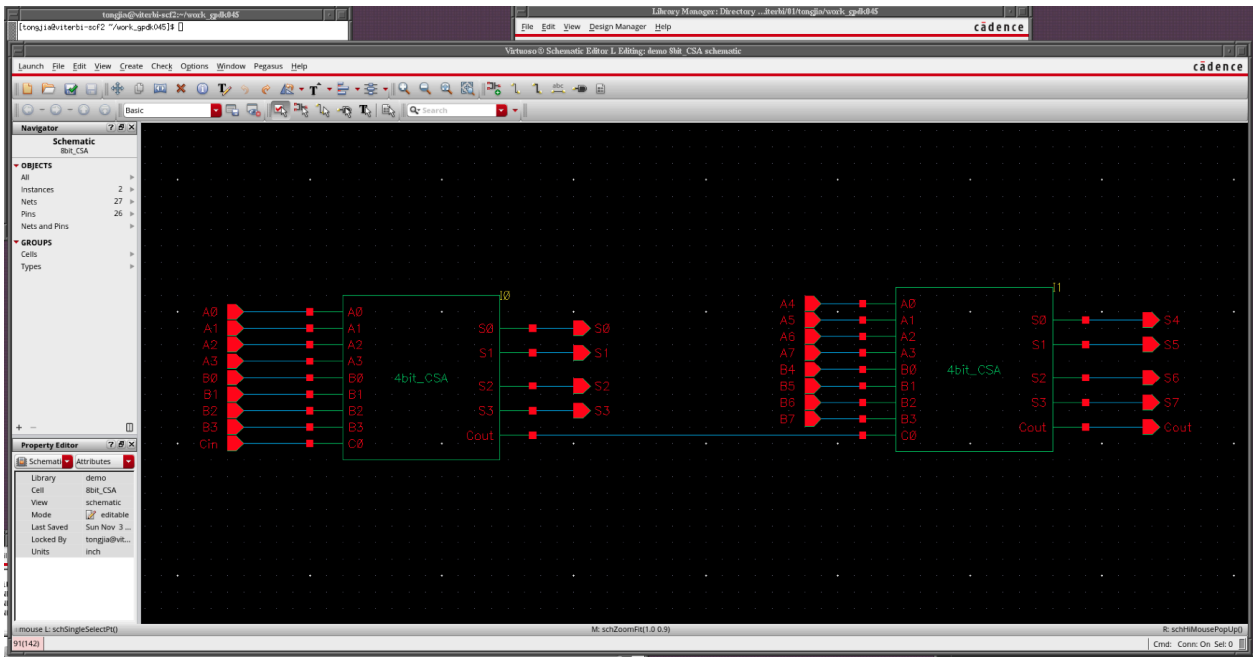
I implemented a new 4-input and gate(AND4_1x), schematic:



4-bit carry skip adder Symbol:



8-bit carry skip adder (using two 4-bit RCAs)schematic:

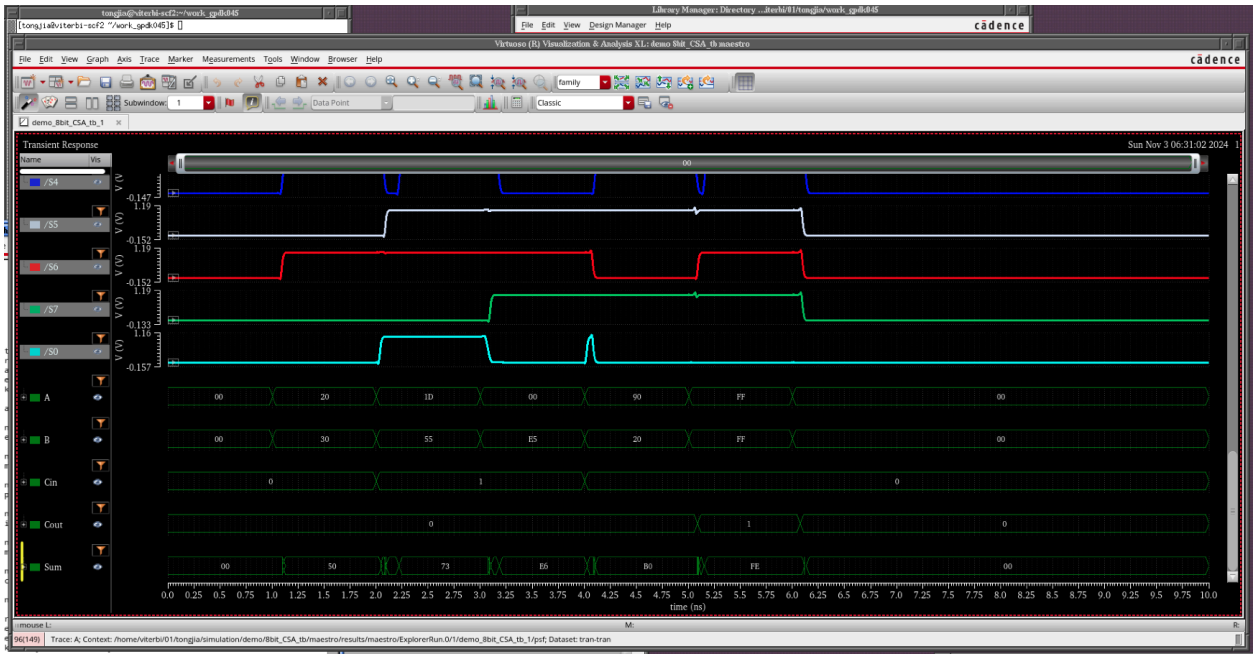


STEP 3:

test input pattern and expected result

#	A	B	Cin	Cout	Sum
0	00	00	0	0	0
1	20	30	0	0	50
2	1D	55	1	0	73
3	00	E5	1	0	E6
4	90	20	0	0	B0
5	FF	FF	0	1	FE

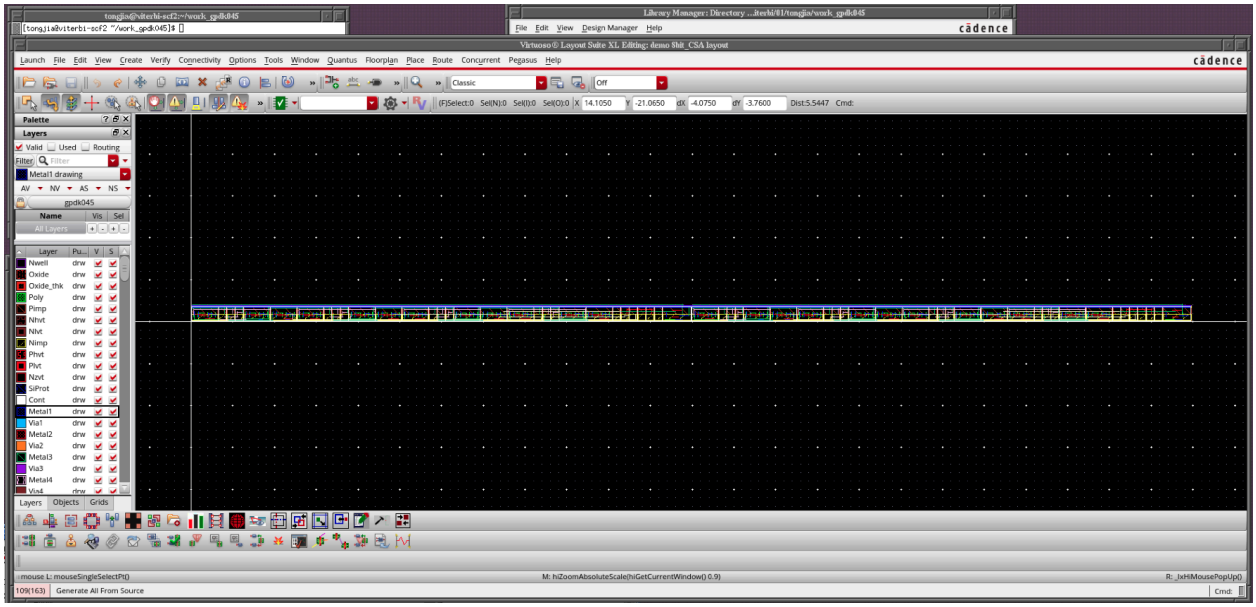
functionality verification waveform:



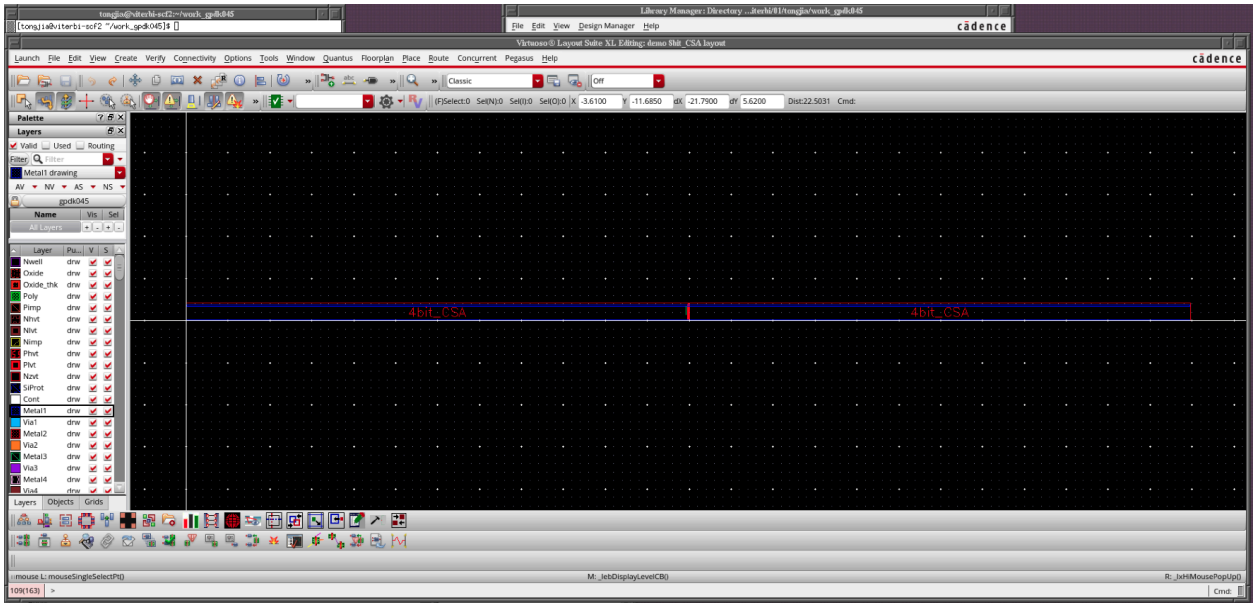
critical path would be from A0 or A1 to Cout

STEP 4:

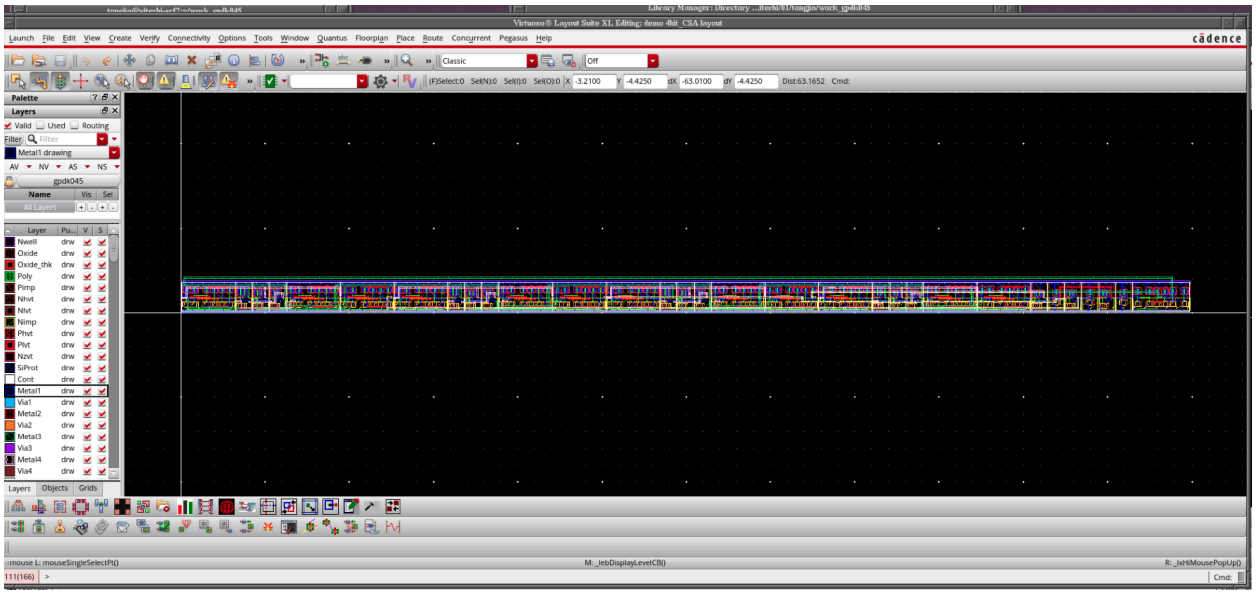
8-bit carry skip adder layout:

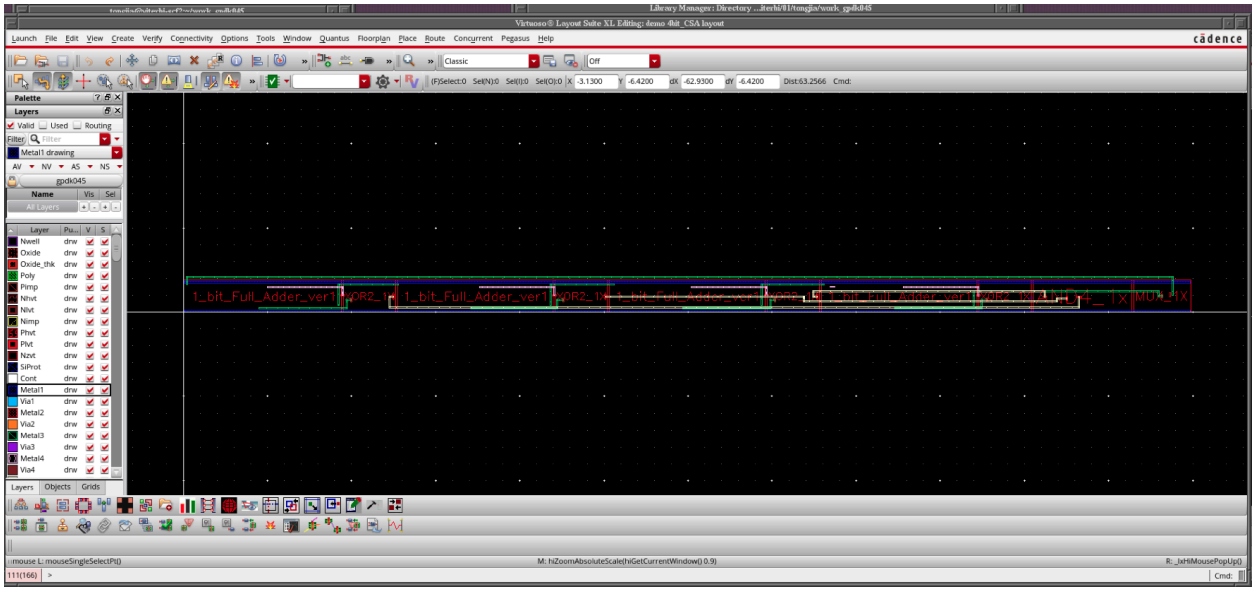


Or

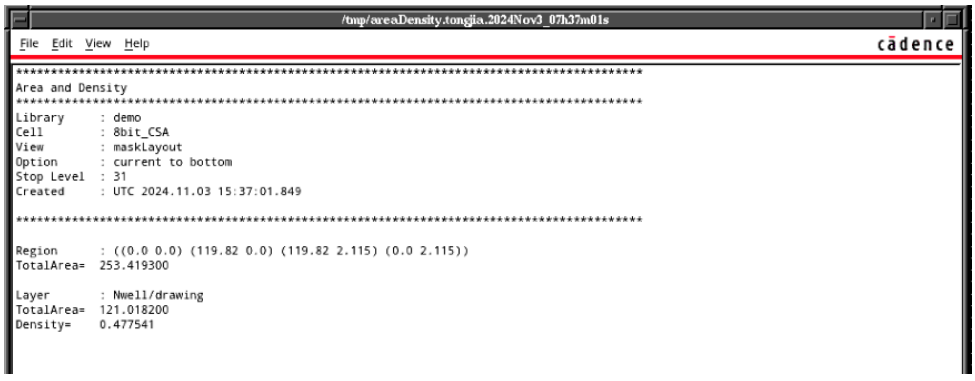


(ps: 4 bit CSA layout)



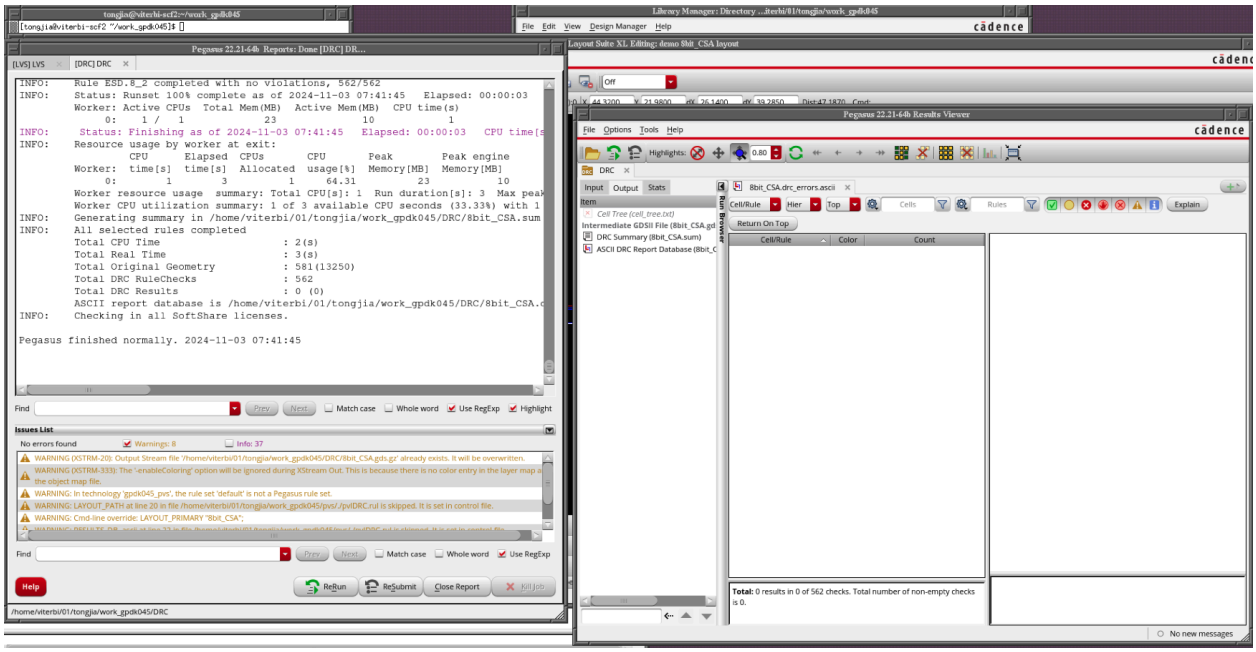


AREA = 253.42

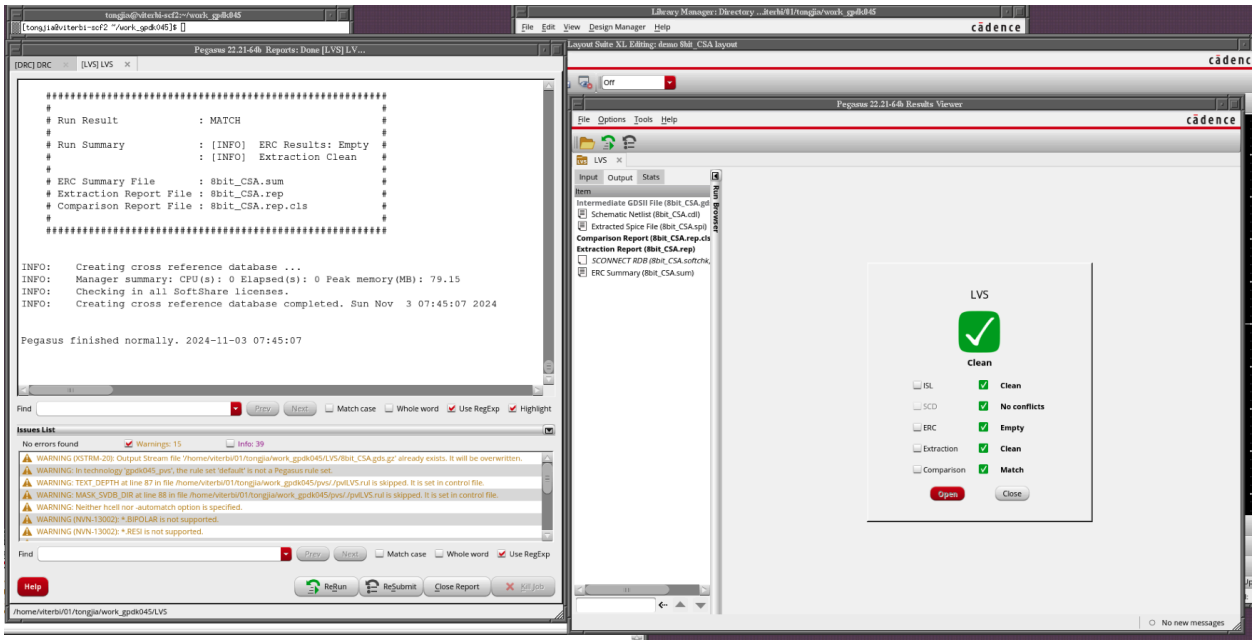


```
/tmp/areaDensity.tongjia.2024Nov3_07h37m01s
File  Edit  View  Help                                                    cadence

*****************************************************************************************
Area and Density
*****************************************************************************************
Library      : demo
Cell         : 8bit_CSA
View         : maskLayout
Option       : current to bottom
Stop Level   : 31
Created      : UTC 2024.11.03 15:37:01.849

*****************************************************************************************

Region       : ((0.0 0.0) (119.82 0.0) (119.82 2.115) (0.0 2.115))
TotalArea=  253.419300

Layer        : Nwell/drawing
TotalArea=  121.018200
Density=    0.477541
```

DRC：

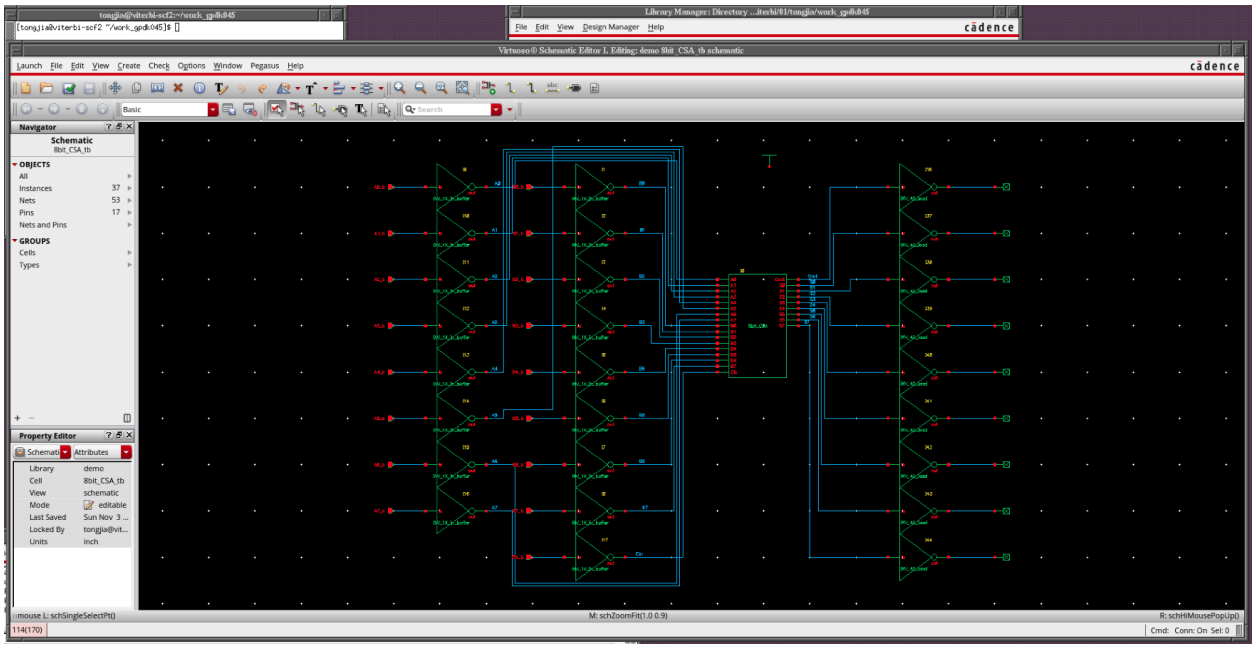

Pegasus 22.21-64b Reports: Done [DRC] DR...
INFO: Rule ESD.8_2 completed with no violations, 562/562
INFO: Status: Runset 100% complete as of 2024-11-03 07:41:45 Elapsed: 00:00:03
INFO: Status: Finishing as of 2024-11-03 07:41:45 Elapsed: 00:00:03
INFO: Resource usage by worker at exit:
Total CPU Time : 2(s)
Total Real Time : 3(s)
Total Original Geometry : 581(13250)
Total DRC RuleChecks : 562
Total DRC Results : 0 (0)
INFO: Checking in all SoftShare licenses.
Pegasus finished normally. 2024-11-03 07:41:45
Pegasus 22.21-64b Results Viewer
Total: 0 results in 0 of 562 checks. Total number of non-empty checks is 0.

LVS：

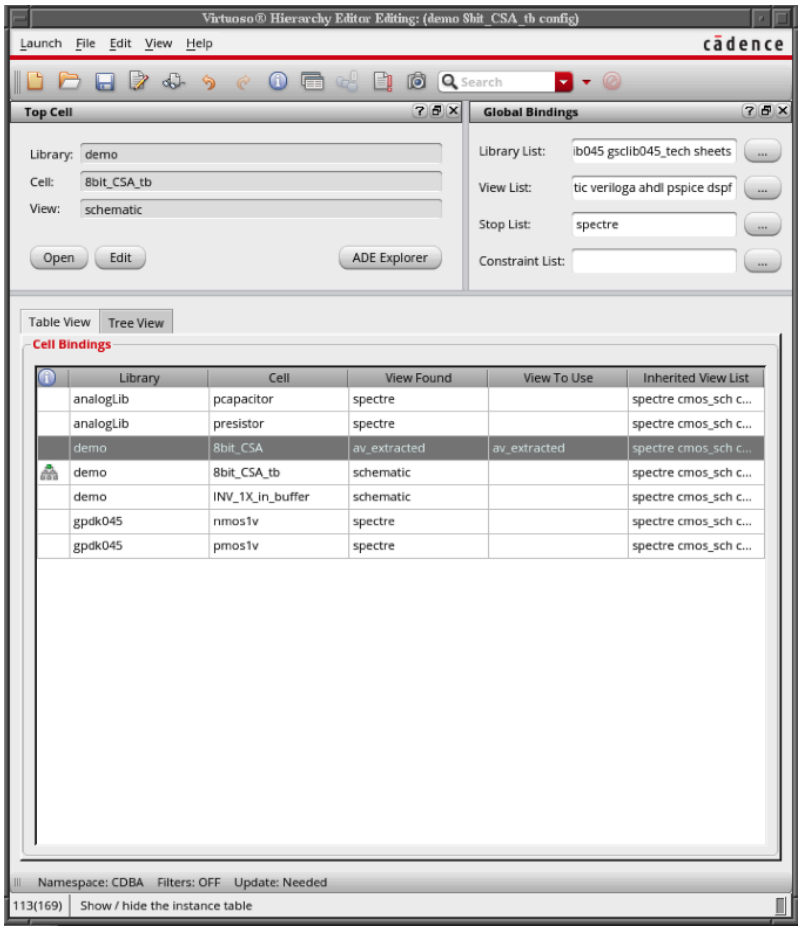

Pegasus 22.21-64b Reports: Done [LVS] LV...
Run Result : MATCH
Run Summary : [INFO] ERC Results: Empty
: [INFO] Extraction Clean
ERC Summary File : 8bit_CSA.sum
Extraction Report File : 8bit_CSA.rep
Comparison Report File : 8bit_CSA.rep.cls
INFO: Creating cross reference database ...
INFO: Manager summary: CPU(s): 0 Elapsed(s): 0 Peak memory(MB): 79.15
INFO: Checking in all SoftShare licenses.
INFO: Creating cross reference database completed. Sun Nov 3 07:45:07 2024
Pegasus finished normally. 2024-11-03 07:45:07
LVS
Clean
ISL
SCD
ERC
Extraction
Comparison
Clean
No conflicts
Empty
Clean
Match
Open
Close

Post-layout simulation

testbench schematic:



Config:



functionality verification waveform：