International IslamicUniversity Islamabad Faculty of Engineering and Technology Department of Electricaland Computer Engineering

VLSI DESIGN LAB

EXPERIMENT Lab 7: Sequential Logic: Hierarchical Design of Half and Full Adders in LT-Spice

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Lab Performance Report#7

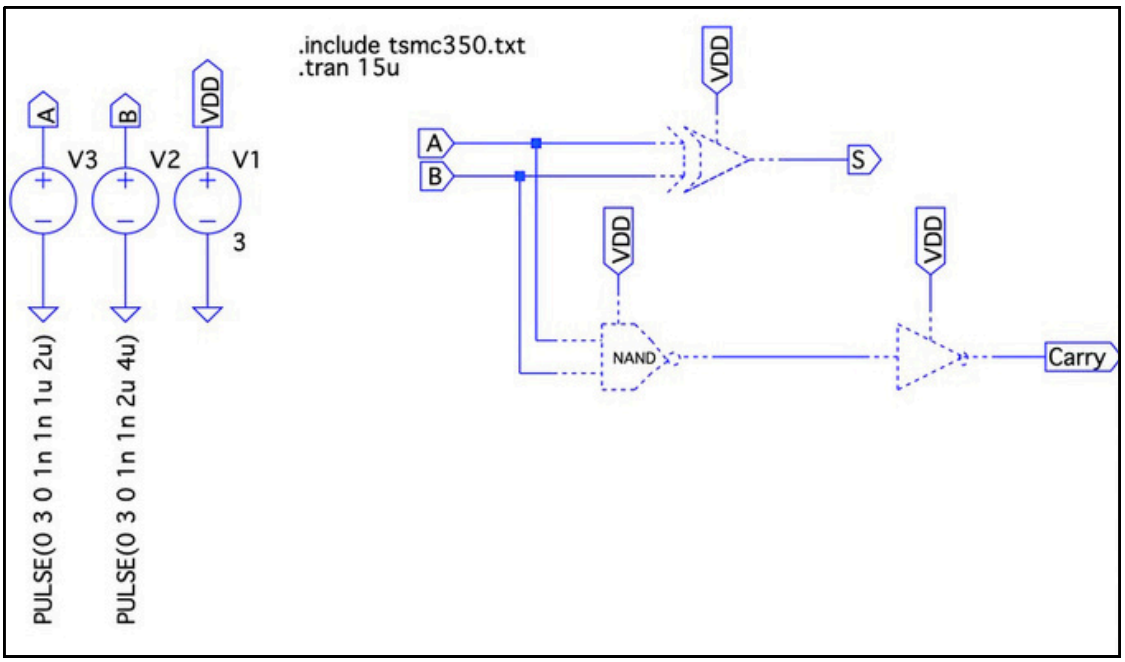
[CLO1, 2, 3]

- **Task#1**: Create the schematic of **1-Bit half adder** using XOR and AND gate symbols. Perform its transient analysis to verify the truth table. Write your observations about the output waveforms
- **Task#2**: "Save as" and modify the circuit of 1-Bit Half adder and generate its symbol. Use this symbol to create a **1-Bit Full Adder** circuit. Perform its transient analysis to verify the truth table. Write your observations about the output waveforms
- **Task#3**: "Save as" and modify the circuit of 1-Bit Full adder and generate its symbol. Use this symbol to create a **2-Bit Full Adder** circuit. Perform its transient analysis to verify the truth table. Write your observations about the output waveforms.

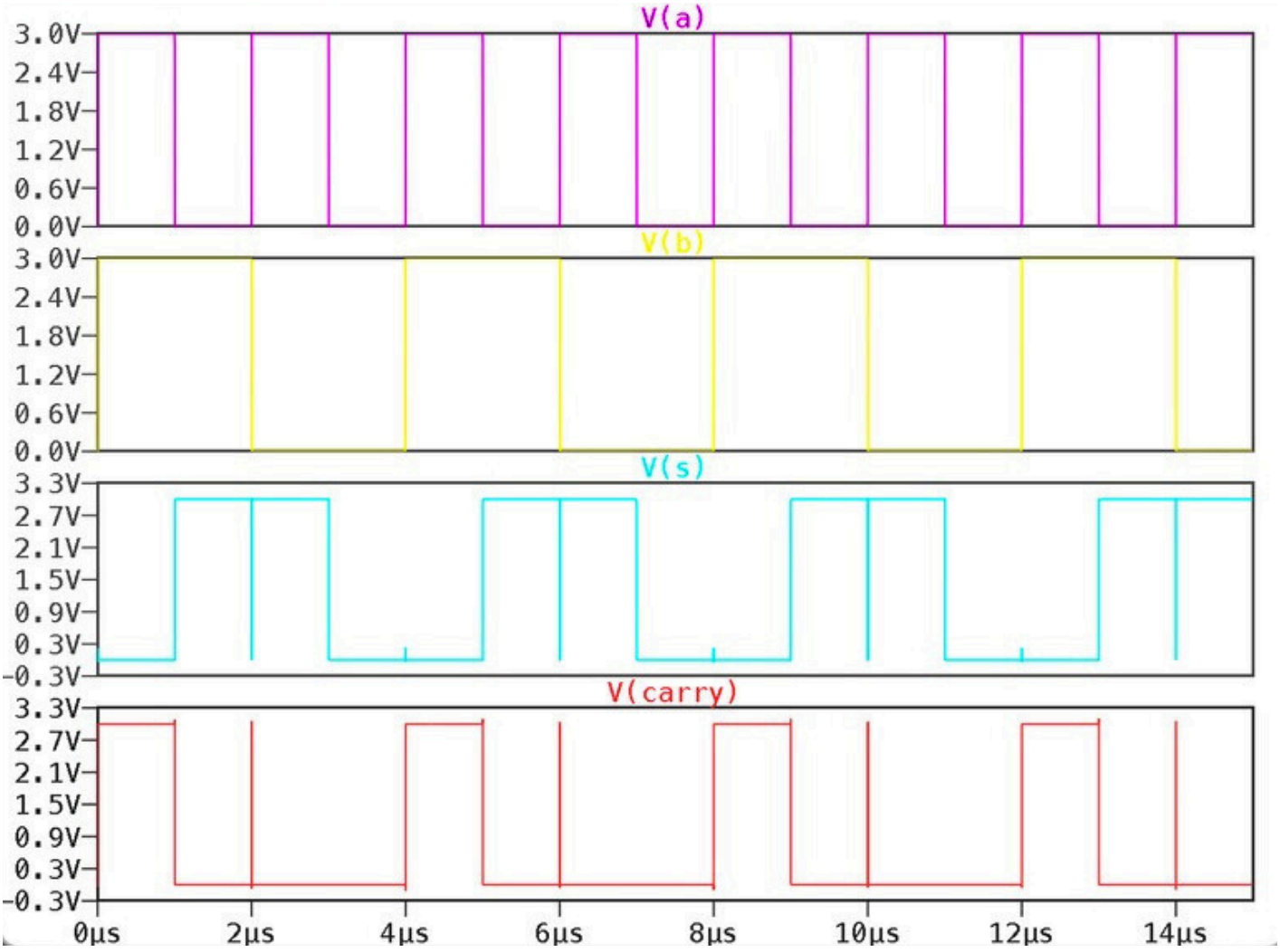
- Submit a report in MS-Word format in Google Class whose structure should be:
  - Title Page
  - Screenshots of each of the above tasks. **Each task** should be arranged on **one page** i.e. schematic on top, its waveform/outputs below it and your remarks/analysis in a few lines.
- **Caution**: There is no unique solution to this assignment. All submissions should be different, like wiring of your schematic and selection of circuit parameters, inputs and outputs. **Zero marks will be awarded for exact copies, so avoid sharing your assignments with friends**.

Task 1 :

schematic

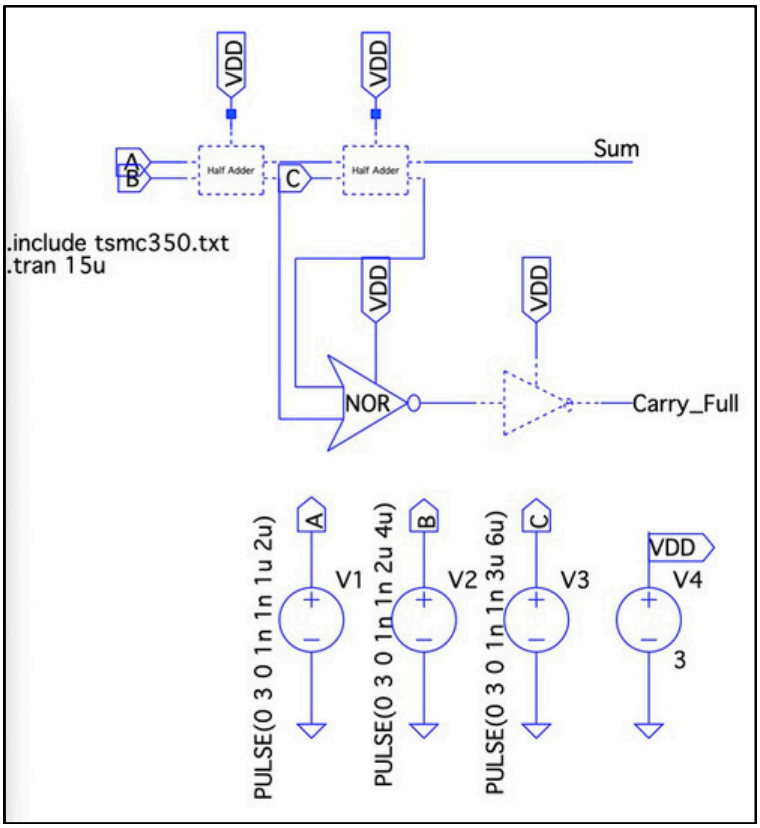


WAVEFORM



Task2 :

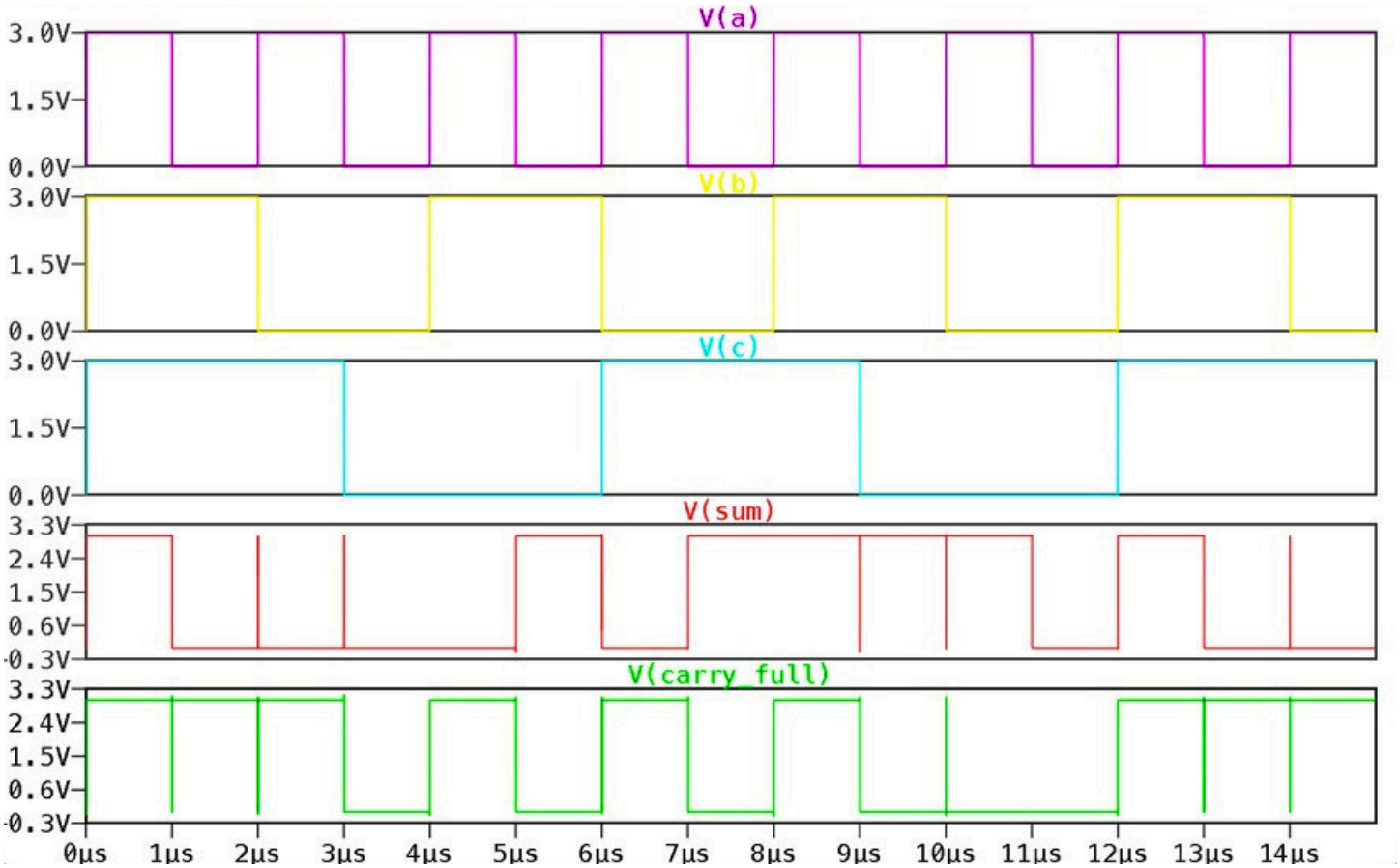
schematic



truthTable

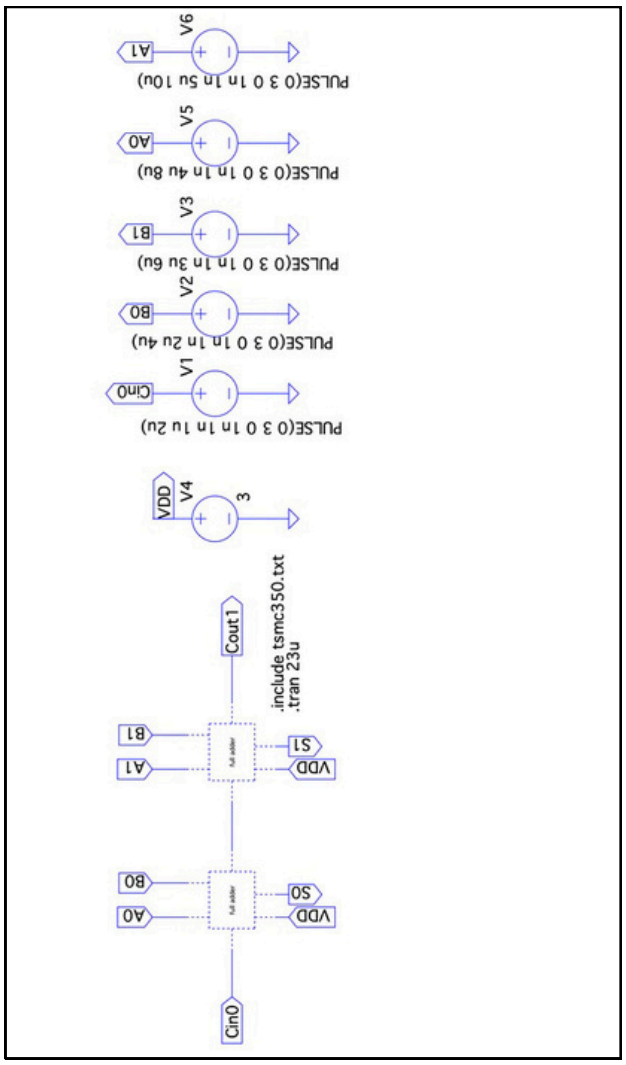
Input			Output	
A	B	C	Sum = S	Carry = C
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1
1	0	0	1	0
1	0	1	0	1
1	1	0	0	1
1	1	1	1	1

WAVEFORM



task 3 :

schematic



truthTable

A_1A_0	B_1B_0	C_0	S1	S0	Cout1	Cout0
0 0	0 0	0	0	0	0	1
0 0	0 0	1	0	1	0	1
0 0	0 1	0	0	1	0	1
0 1	0 0	0	0	1	0	1
0 0	0 1	1	1	0	0	1
0 1	0 0	1	1	0	0	1
0 1	0 1	0	1	0	0	1
0 1	0 1	1	1	1	0	1
0 0	1 0	0	1	0	0	1
0 0	1 0	1	1	1	0	1
0 0	1 1	0	1	1	0	1
0 1	1 0	0	1	1	0	1
0 0	1 1	1	0	0	1	0
0 1	1 0	1	0	0	1	0
0 1	1 1	0	0	0	1	0
0 1	1 1	1	0	1	1	0
1 0	0 0	0	1	0	0	1
1 0	0 0	1	1	1	0	1
1 0	0 1	0	1	1	0	1
1 1	0 0	0	1	1	0	1
1 0	0 1	1	0	0	1	0
1 1	0 0	1	0	0	1	0
1 1	0 1	0	0	0	1	0
1 1	0 1	1	0	1	1	0
1 0	1 0	0	0	0	1	0
1 0	1 0	1	0	1	1	0
1 0	1 1	0	0	1	1	0
1 1	1 0	0	0	1	1	0
1 0	1 1	1	1	0	1	0
1 1	1 0	1	1	0	1	0
1 1	1 1	0	1	0	1	0
1 1	1 1	1	1	1	1	0

WAVEFORM