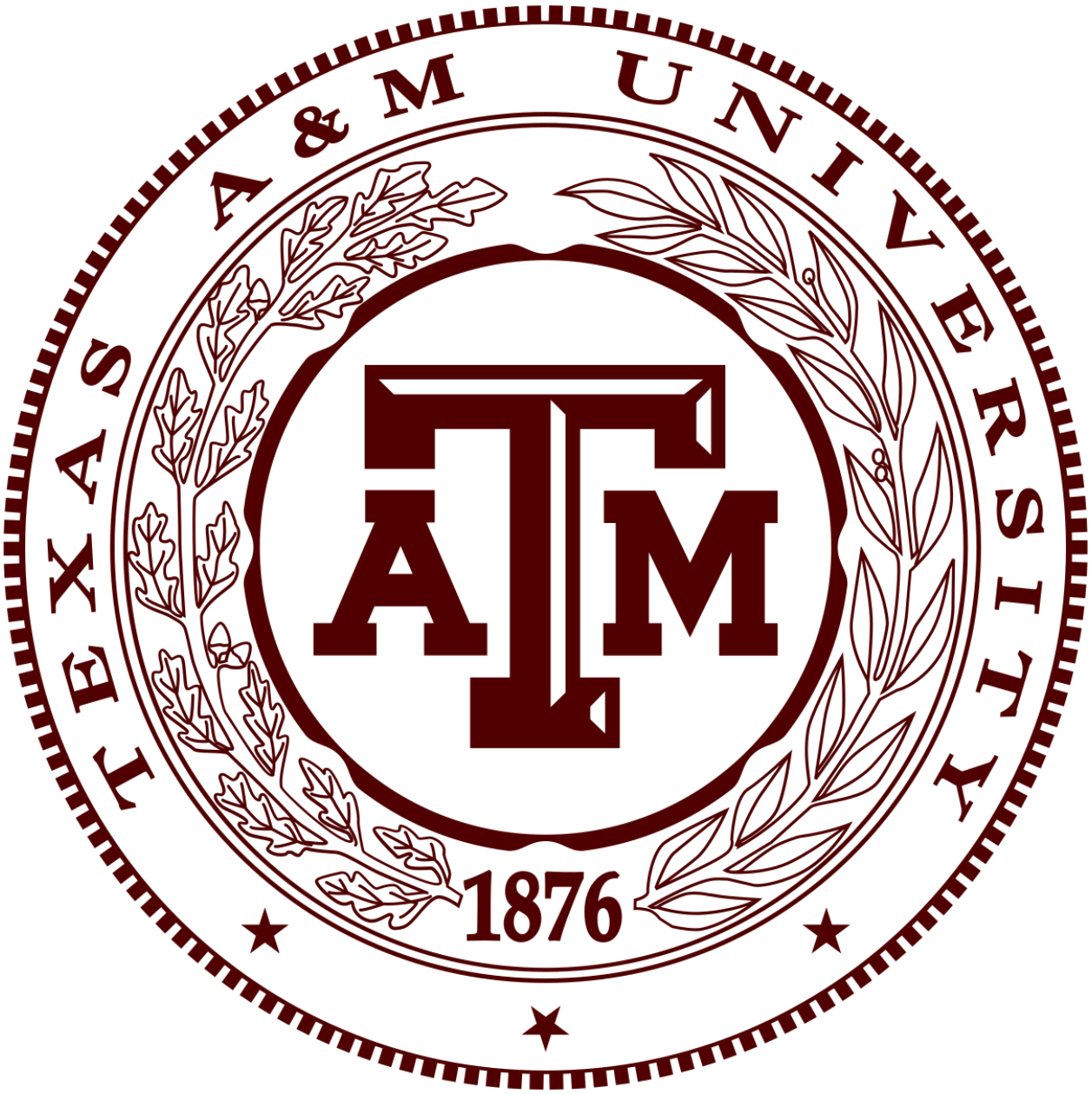
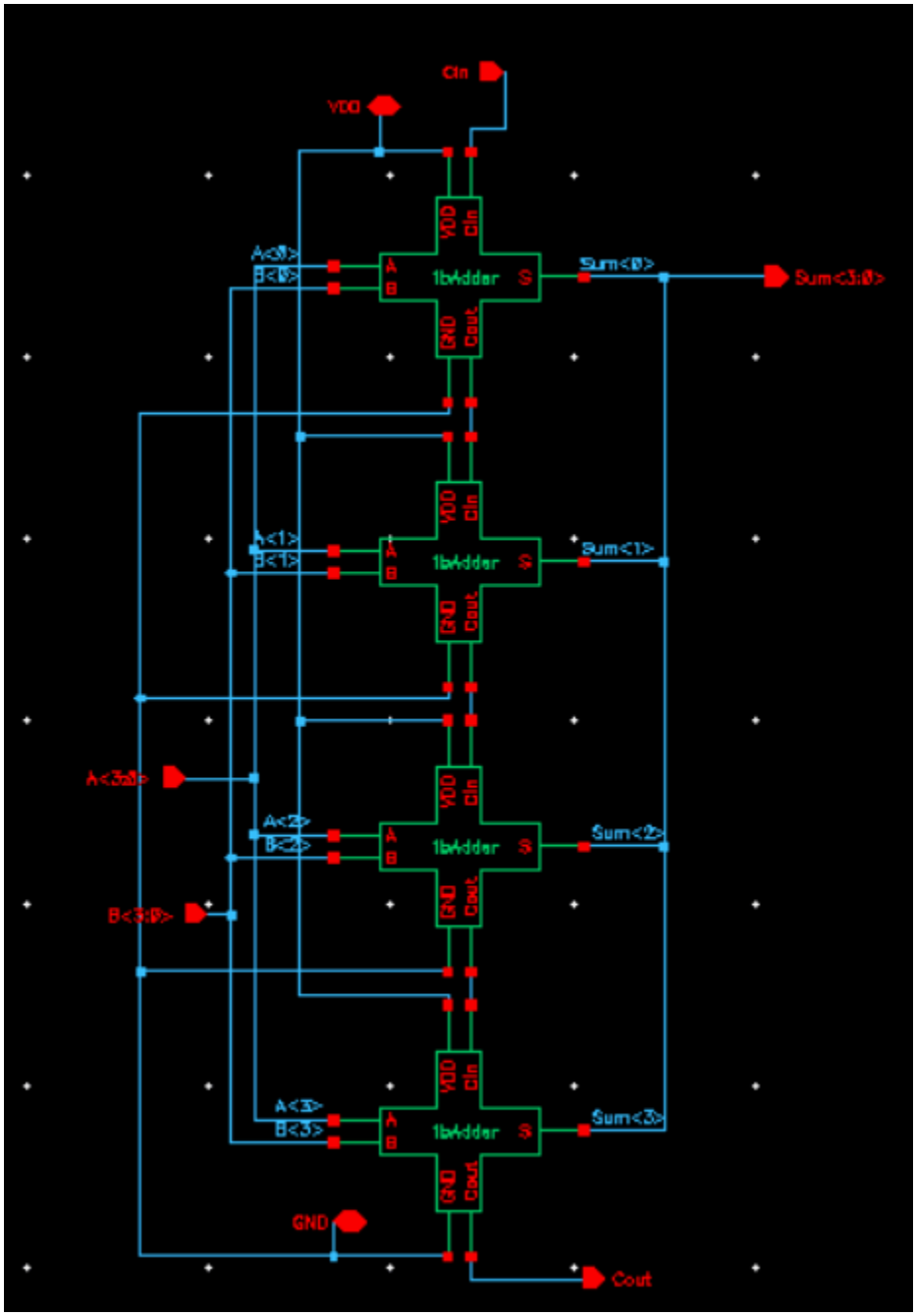


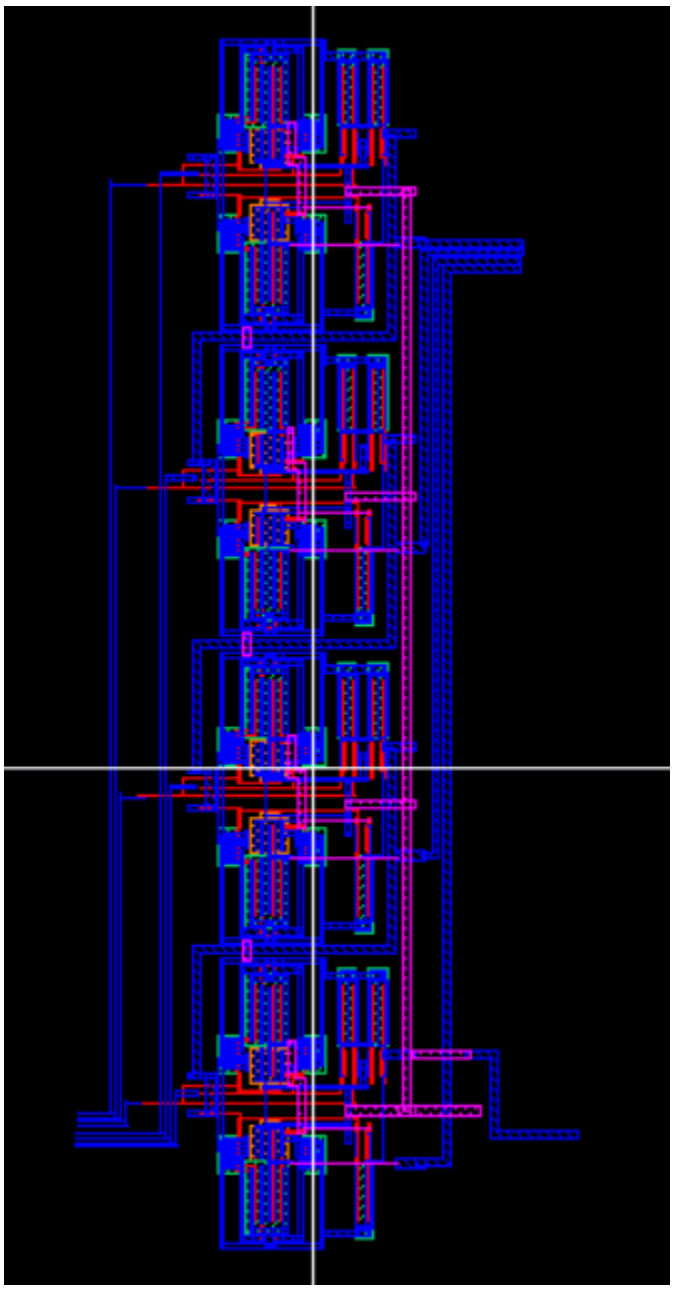
ECEN 454 - Lab 5 Report

Luke Lopez

Schematic


Cin
VDD
A<0>
B<0>
A
B
1bAdder
S
Sum<0>
Sum<3:0>
VDD
Cin
GND
Cout
A<1>
B<1>
Sum<1>
A<3:0>
A<2>
B<2>
Sum<2>
B<3:0>
A<3>
B<3>
Sum<3>
GND
Cout

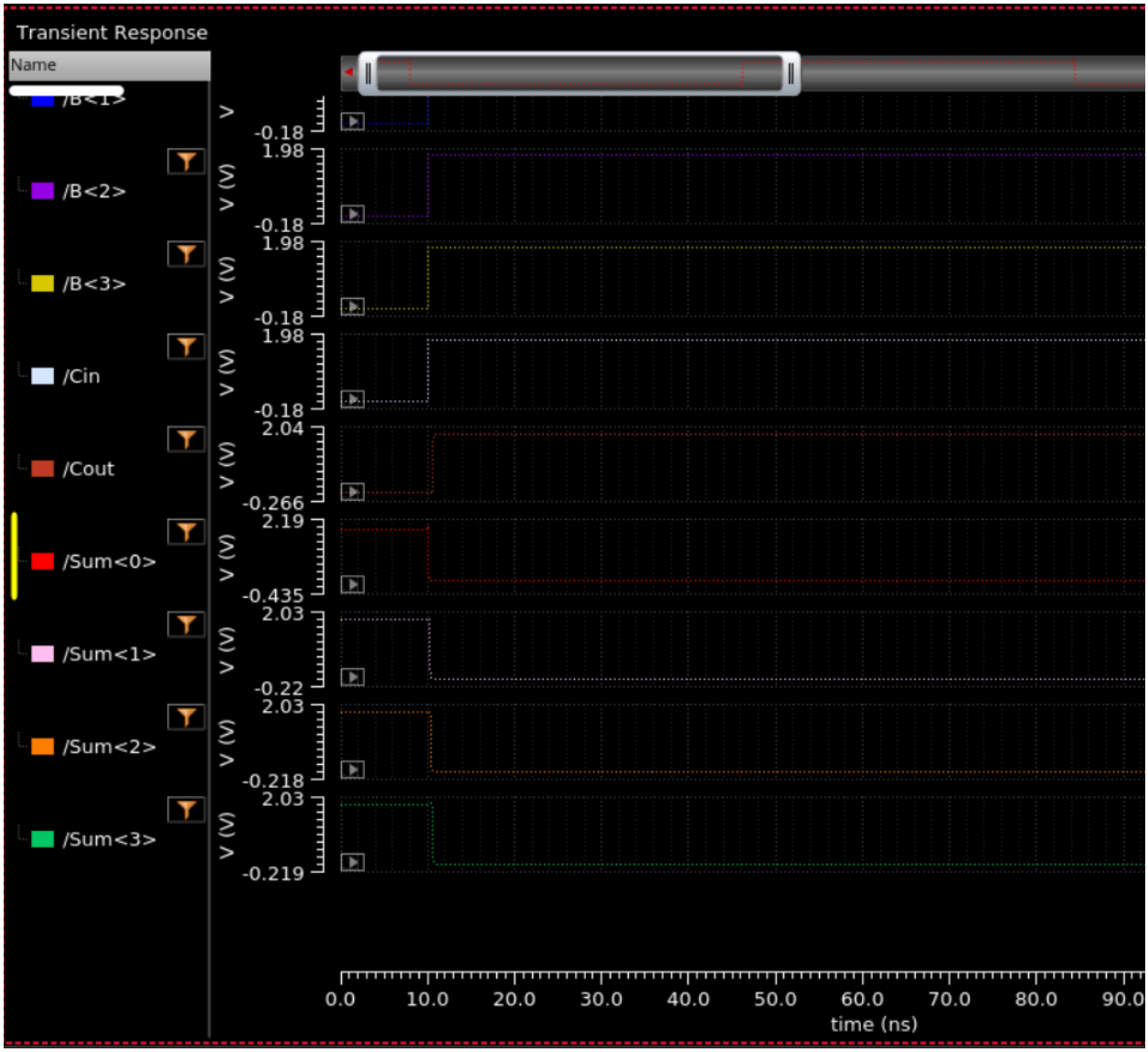
Layout || LVS



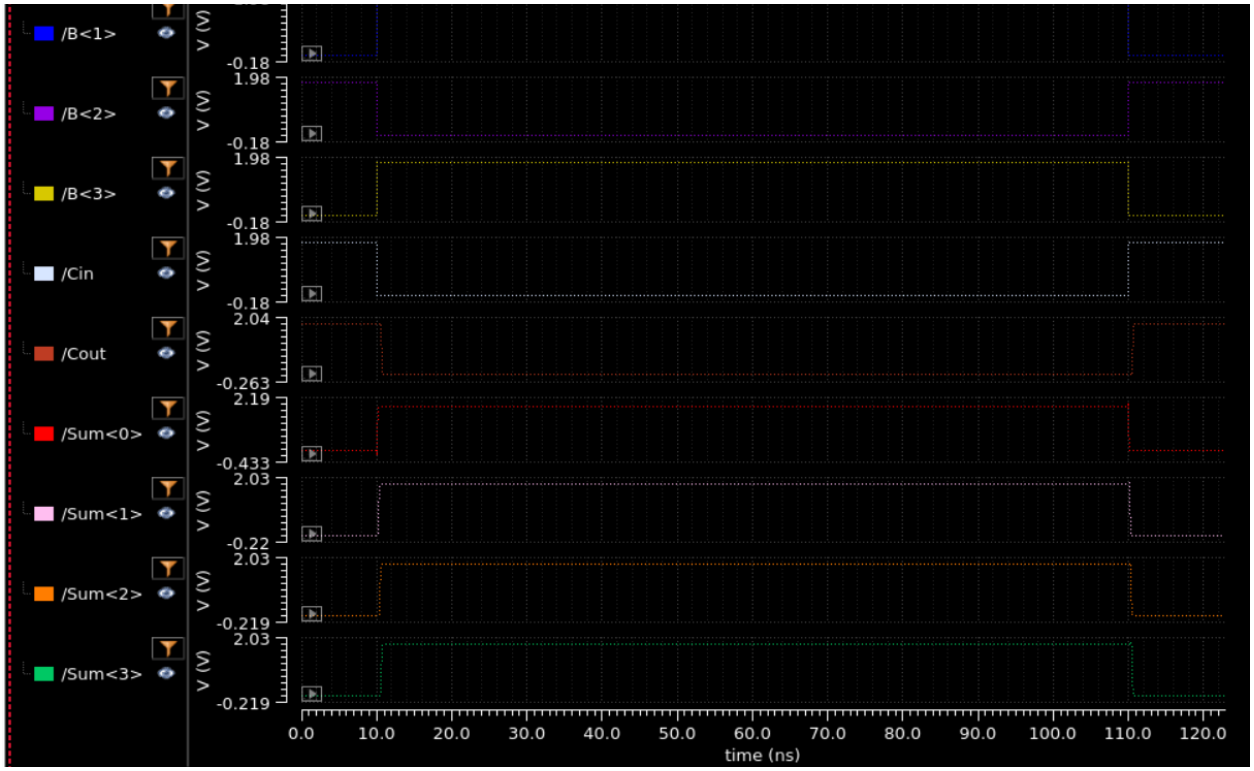
```
Compiling Diva LVS rules...

    Net-list summary for /home/ugrads/s/skywalker499/454-ECEN/LVS/layout/netlist
       count
         151             nets
         16              terminals
         1440            pmos
         656             nmos

    Net-list summary for /home/ugrads/s/skywalker499/454-ECEN/LVS/schematic/netlist
       count
         91              nets
         16              terminals
         72              pmos
         72              nmos


    Terminal correspondence points
    N142      N4        A<0>
    N140      N3        A<1>
    N137      N6        A<2>
    N135      N7        A<3>
    N150      N5        B<0>
    N147      N0        B<1>
    N145      N2        B<2>
    N143      N1        B<3>
    N144      N8        Cin
    N146      N11       Cout
    N139      N10       GND
    N141      N18       Sum<0>
    N138      N17       Sum<1>
    N136      N16       Sum<2>
    N149      N15       Sum<3>
    N148      N9        VDD

Devices in the rules but not in the netlist:
        cap nfet pfet nmos4 pmos4

The net-lists match.
```

Waveforms

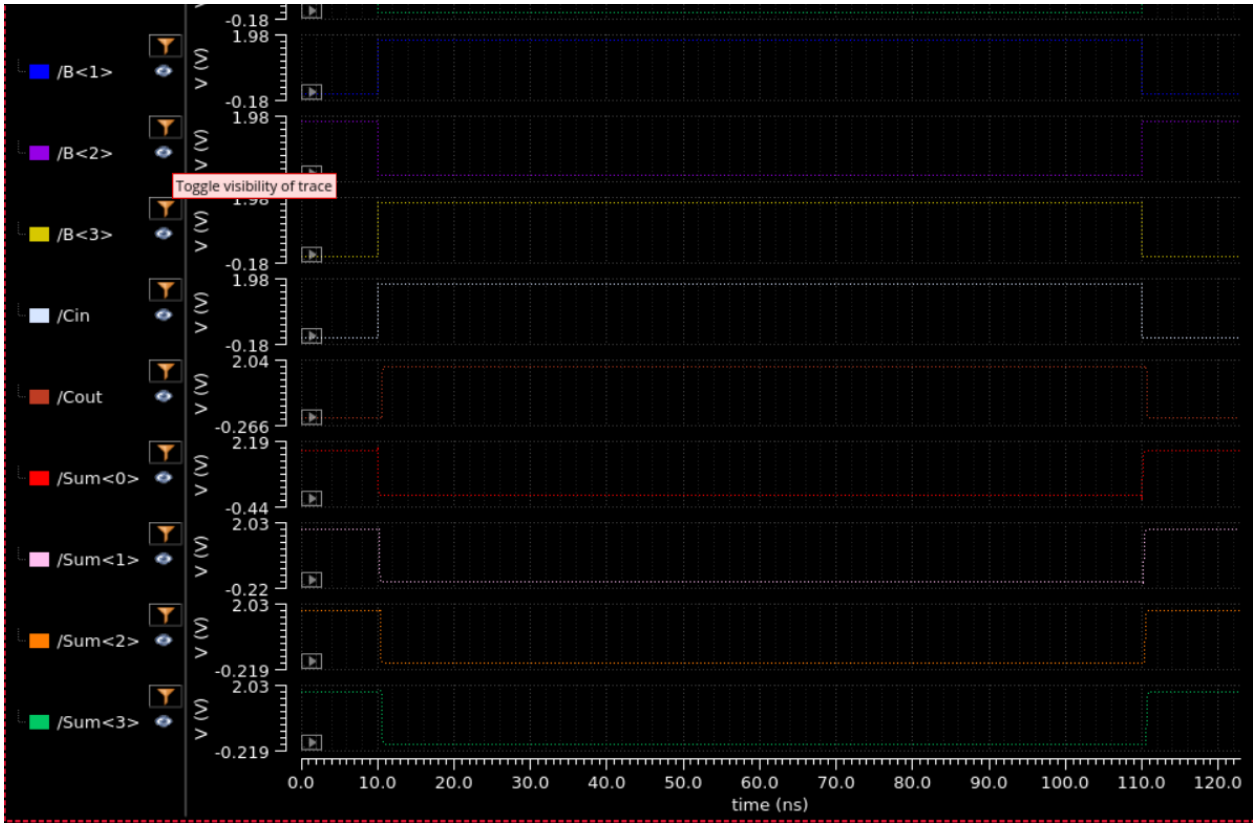
A=0000, B=1111, Carry In=1



A=1010, B=0101, Carry In=0



A=1010, B=0101, Carry In=1



A=1100, B=1000, Carry In=0

Delays

15	D_Sum0	-64.43p
16	D_Sum<1>	-233.9p
17	D_Sum<2>	-393.3p
18	D_Sum<3>	-552.7p
19	D_Cout	-593.5p

We can see that the delays are linear, this makes sense because the values of the cout needs to ripple through to reach the actual value for its output. Cout being similar to D_Sum<3> also

makes sense since each of these needed to go through the same number of stages. Cout is only slightly slower since it has to go through 1 extra XOR gate.

Power

Mode	Power W
• A=0000, B=1111, Carry In=1	1.529u
A=1010, B=0101, Carry In=0	1.103u
A=1010, B=0101, Carry In=1	1.415u
A=1100, B=1000, Carry In=0	1.388u