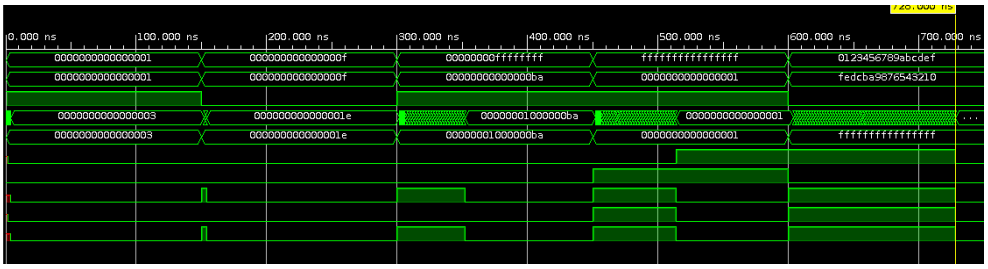
Leonardo Mattos Martins
U25267206
Lab 3 Write up

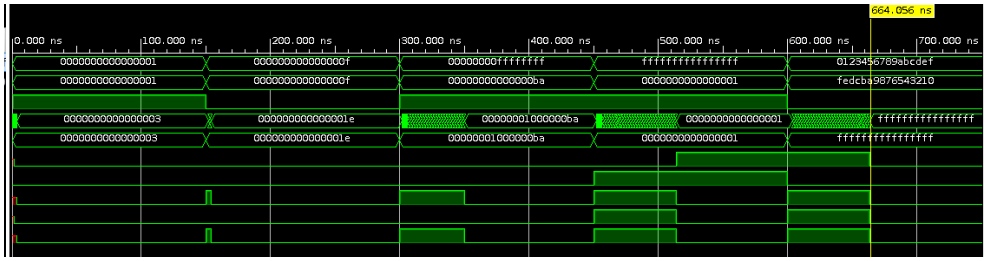
Sample Waveforms:

With delay:

Ripple Carry Adder

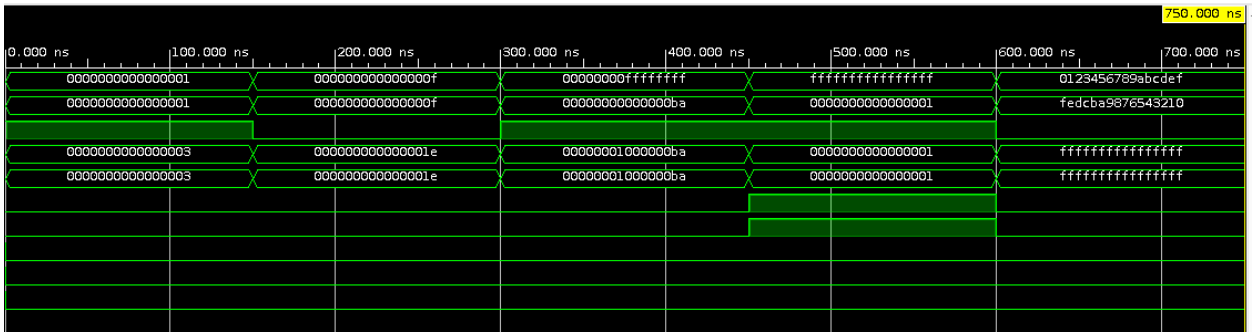


2x32 Carry Select Adder



Without delay:

Ripple Carry Adder



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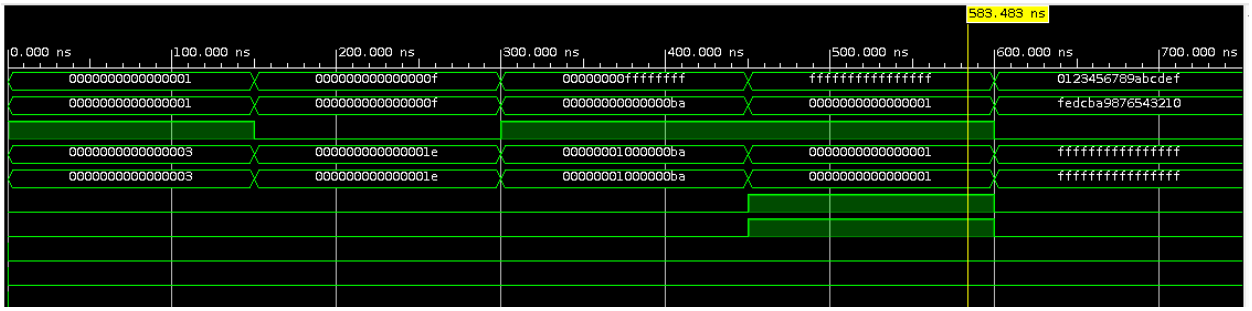
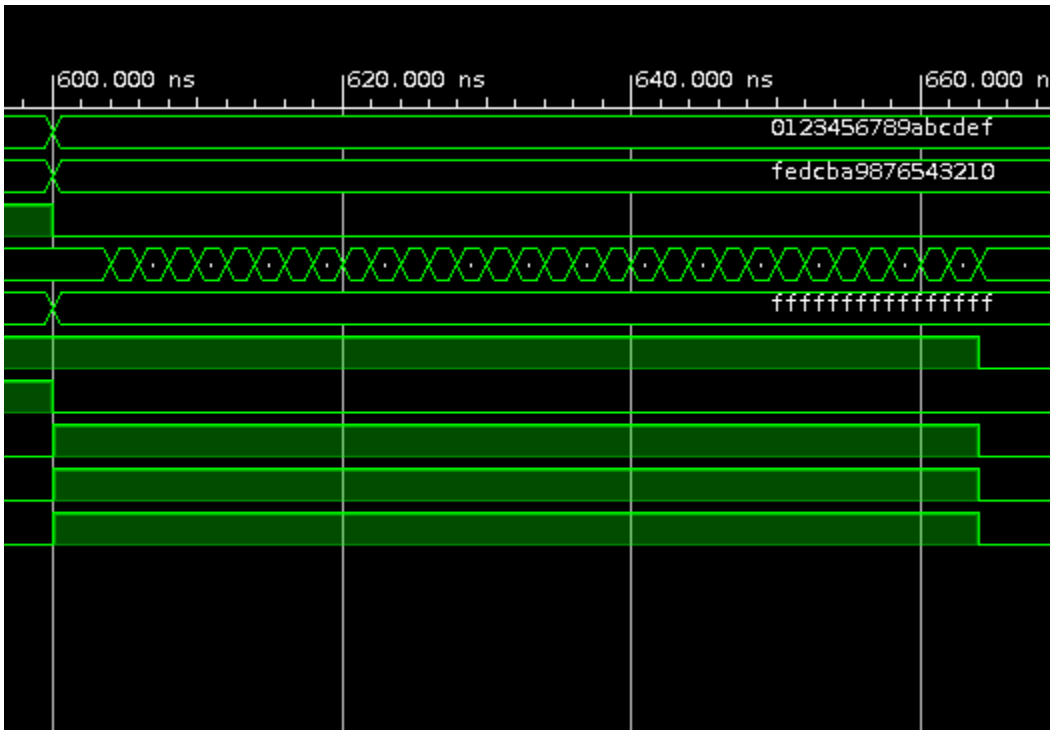
2x32 Carry Select Adder



Comparison of longest path delay:

Ripple Carry Adder



2x32 Carry Select Adder

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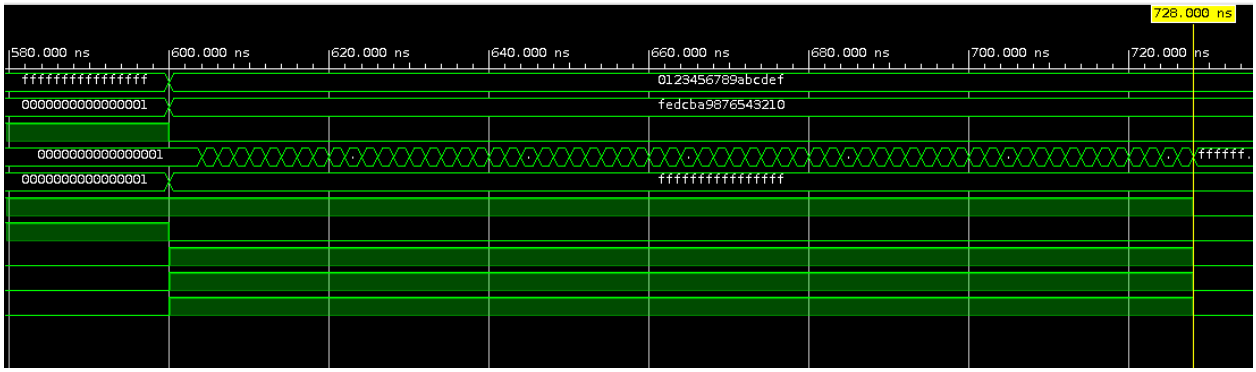
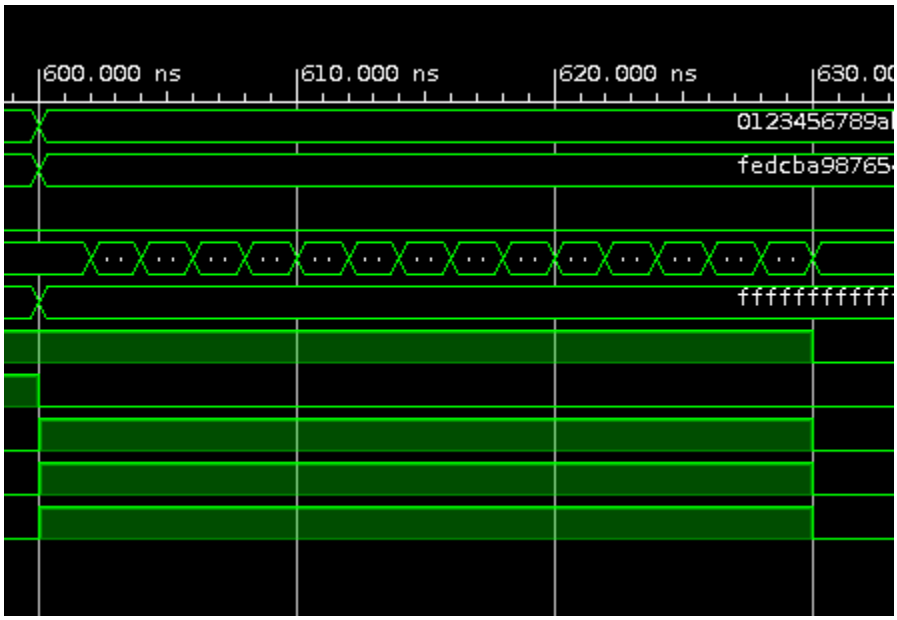


8x8 Carry Select Adder



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Questions to Answer:

What are the timings of your adders in gate delays?

RCA = 2N

= 2 * 64

= 128 gate delays

2x32 CSA = 2k + 2(j - 2)

= 2*32 + 2(2 - 2)

= 64 gate delays

8x8 CSA = 2*8 + 2(8 - 2)

= 28 gate delays

Are they what you expect? Why or why not?

The values above are reflected in the waveforms as the longest path delay. It is also shown how in most cases the bits do not propagate all the way through the adder and the time required is less than what was calculated.

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Explanation of timings: All testbenches use the same conditions to best evaluate their performance against each other. The test cases are: forcing an overall carry out, random large A&B input (w/ and w/o carry), random small A&B input (w/ and w/o carry), random combinations, and the largest amount of delay.