# Four Bit Adder Activity

Date: September 6, 2019

**Name:**

1. Navigate to https://logic.ly/demo and build your half adder again. Be sure to include switches and light bulbs—those will be your inputs and outputs. Name each switch and light bulb by clicking on it and entering a signal name in the lower right corner. Use your screenshot as a reference.

2. Once you've gotten your adder built again, highlight all of its components and click the lego block in the top toolbar. This will generate a block from the logic you've built. After you've created the Integrated Circuit, you should see a custom component in the list of logic components on the left side of the window (scroll down to the bottom).
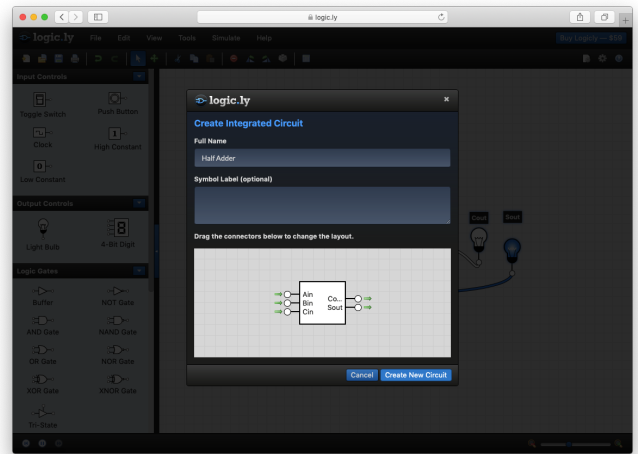


**Building a 4-bit Ripple Carry Adder:** Daisy chain your full adders together to make a four bit adder as in the diagram to the right. Connect the first carry in to 0 (Low Constant). Then connect the carry out of the first adder to the carry in of the next. Connect the $S_{out}$ signals to the inputs of a 4-bit digit. Use four switches to set the inputs of A and B as in the diagram.

   Once this is working, flag Neil down and demo it. Screenshot your adder circuit and save it.

3.
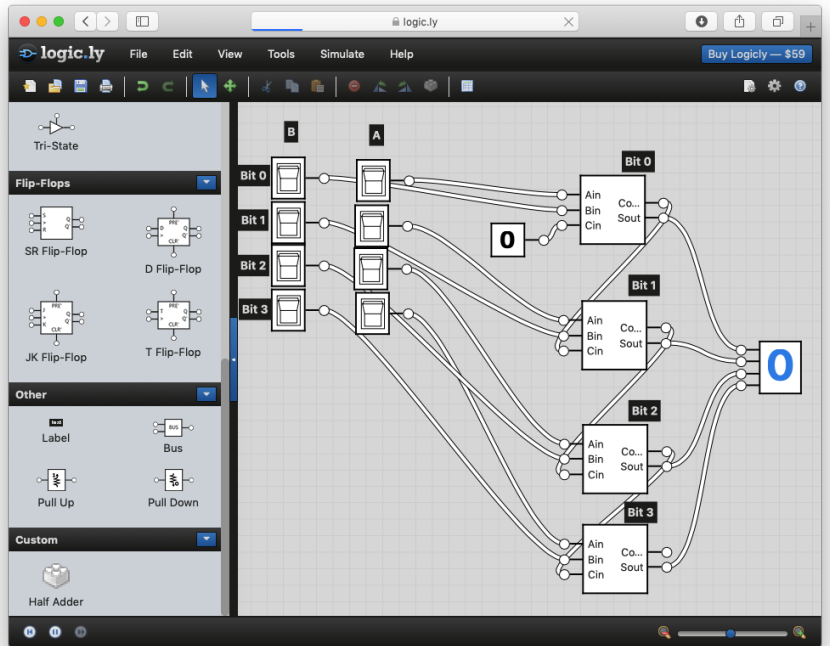


4. If the propagation delay through each gate is 10 ms, what is the overall delay through this 4-bit adder circuit? How does the delay scale as we increase the number of bits in the adder?