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Lab 5

Steps in designing ALU

Step 1 : Add 2 input pins

Drop two East-facing input pins on the canvas 4-bits each Label A and B, and ensure that each input is 4 bits

Step 2 : Add the Adder/Subtractor and Gates

Now we add the sub circuits created earlier. Select the circuits under the main project folder

Step 3 : Add the multiplexers

These take on or more data inputs and generate a single output. In logisim, multiplexers are under the plexers folder, Click the multiplexer icon and drop two of them into canvas

Step 4 : Add controls

Drop two pins on the canvas north-facing with 1 data bit. Label them 0 and 1 respectively

Step 5 Add a splitter.

Next, we add a splitter into our circuit that takes our line from the second multiplexer and splits to 4 inputs to an OR gate - for a 4 bit ALU

Step 6: Add another OR gate And a NOT gate

Now we add an OR gate after the spliter, which has 4 inputs. To the right of the OR gate, add a NOT gate

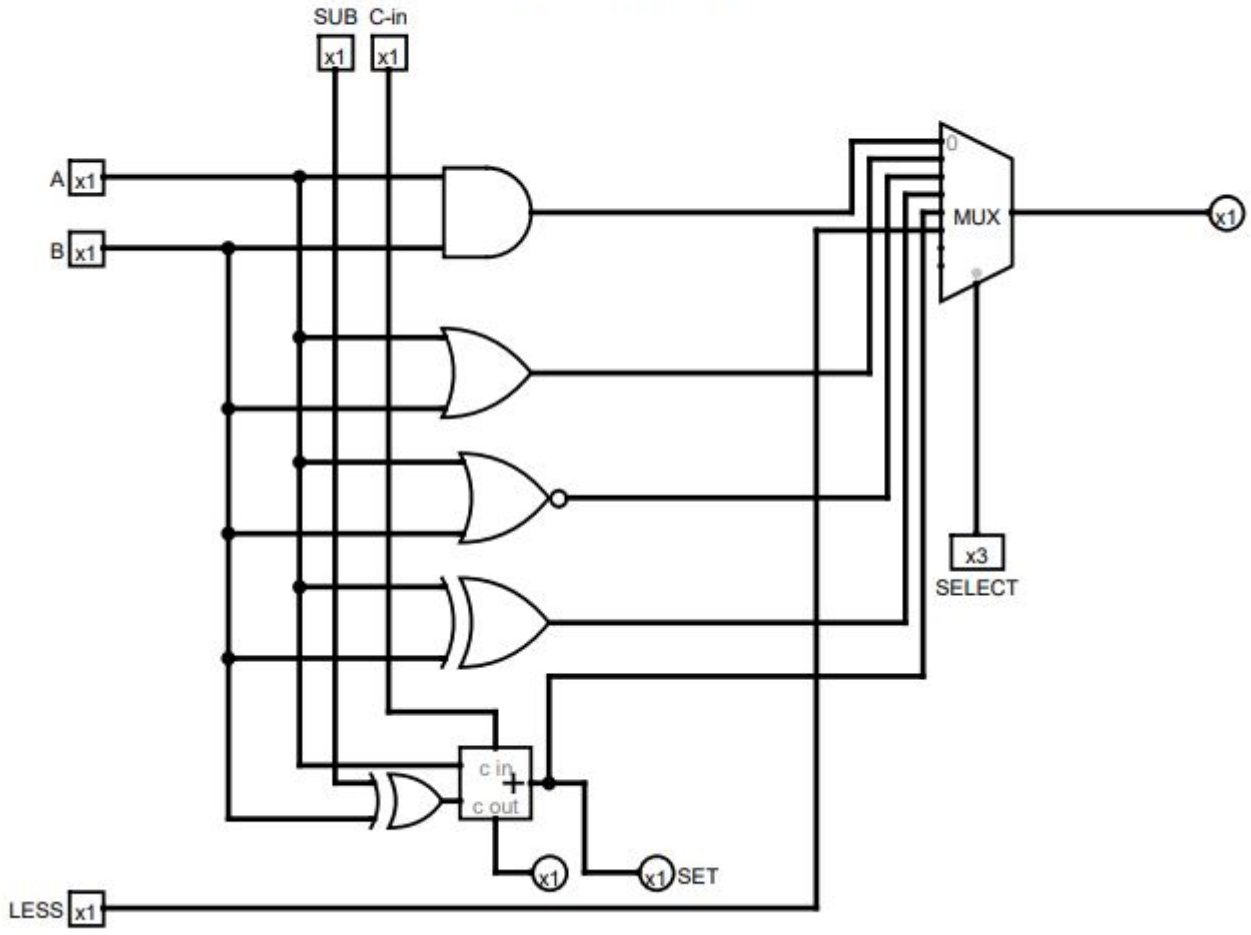
This arrangement account for zero output when All of the bits result in zero. The NOT gate following the OR gate achieves this.

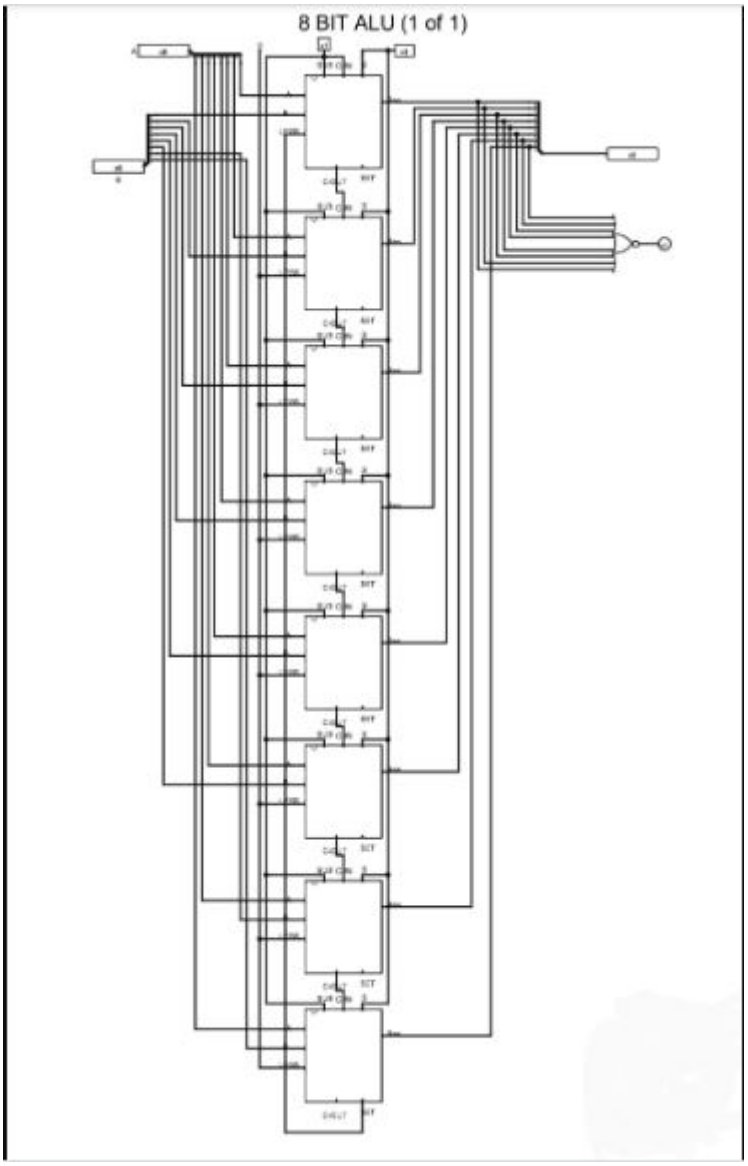
Finally, add a single bit pin after NOT gate to store the result, Label it zero

Step 7: Add a result pin for the MUX

We handled the zeroes coming from MUX, but we also need to account for valid combination inputs from A, B and the Control Inputs

1 BIT ALU (1 of 1)




8 BIT ALU (1 of 1)

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Lab 6

Step 1: Add RAM

Select a seperate load and store operation for RAM

Step 2: Add Counter

Connect Counter, Clock and Controlled Buffer to the RAM

Step 3: Add TTY

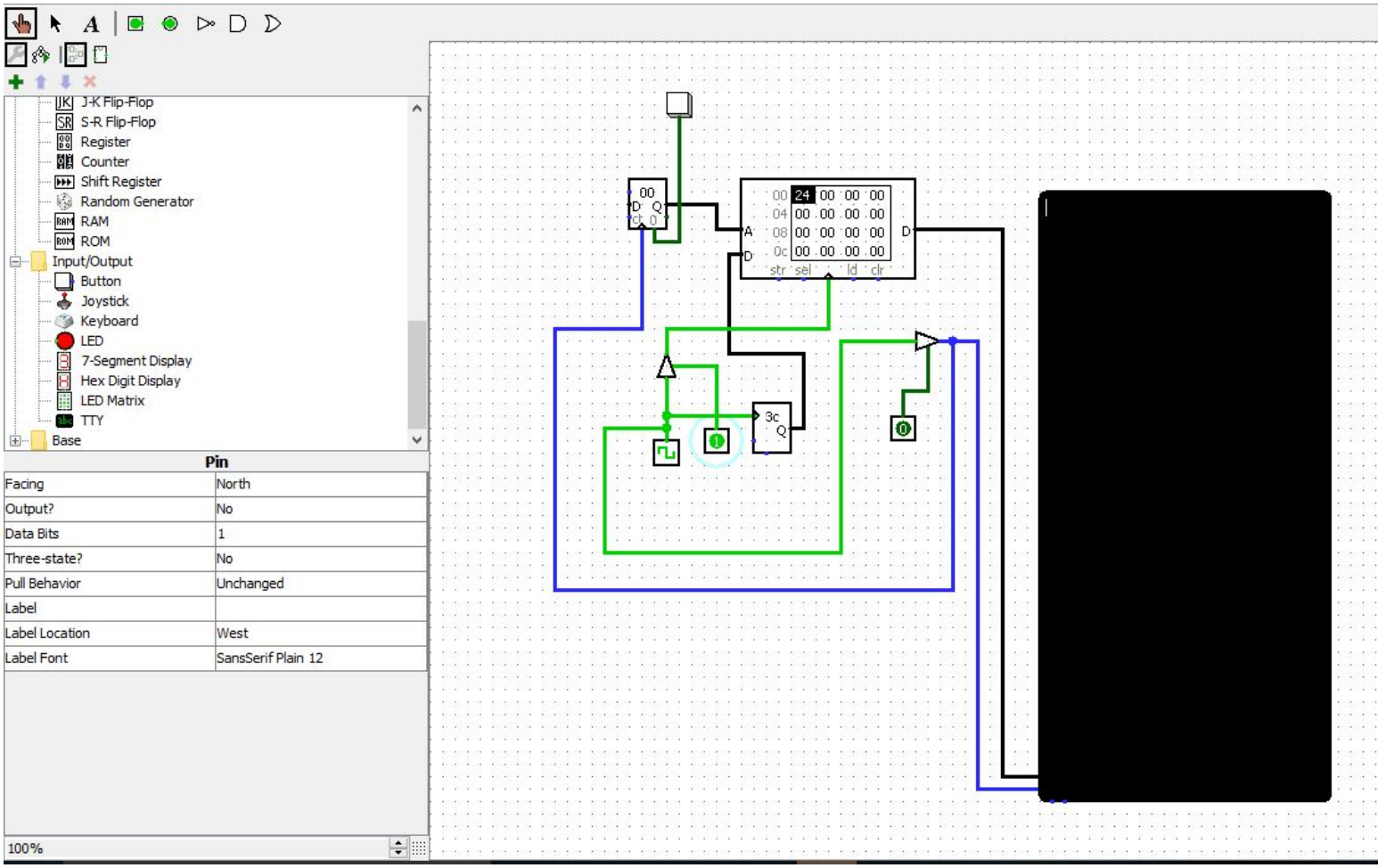
To display the data.

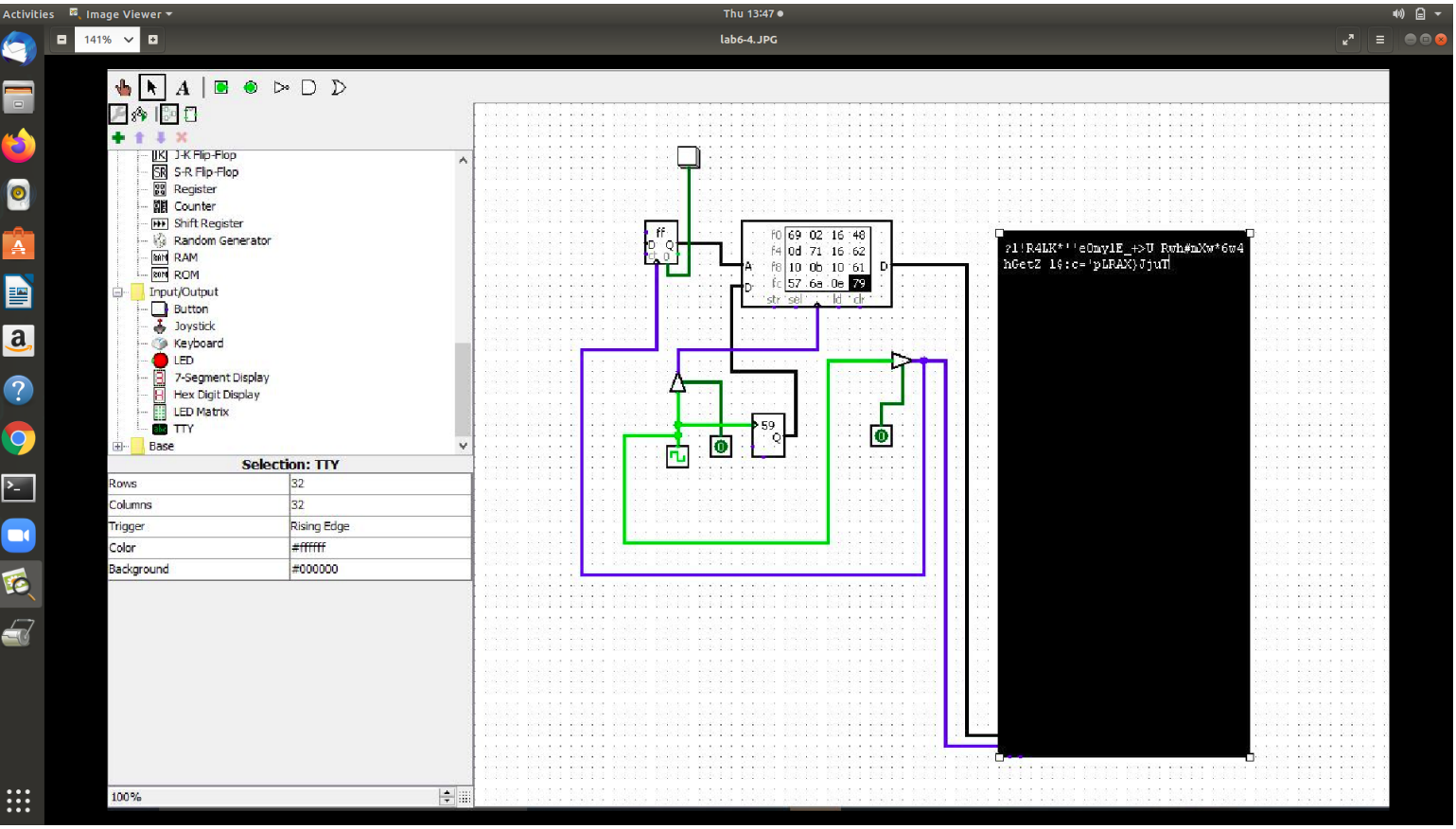
Step 4: Add Random Generator

To generate diffrent address location. Add input and another Controlled Buffer to the Random Generator.

Step 5: Add Button

Connect Button to Counter.


J-K Flip-Flop
S-R Flip-Flop
Register
Counter
Shift Register
Random Generator
RAM
ROM
Input/Output
Button
Joystick
Keyboard
LED
7-Segment Display
Hex Digit Display
LED Matrix
TTY
Base
Pin
Facing North
Output? No
Data Bits 1
Three-state? No
Pull Behavior Unchanged
Label
Label Location West
Label Font SansSerif Plain 12
100%


Activities
Image Viewer
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141%
lab6-4.JPG
J-K Flip-Flop
S-R Flip-Flop
Register
Counter
Shift Register
Random Generator
RAM
ROM
Input/Output
Button
Joystick
Keyboard
LED
7-Segment Display
Hex Digit Display
LED Matrix
TTY
Base
Selection: TTY
Rows 32
Columns 32
Trigger Rising Edge
Color #ffffff
Background #000000
100%
ff
59
f0 69 02 16 48
f4 0d 71 16 62
f8 10 0b 10 61
fc 57 6a 0e 79
A
D
p1!R4LK*''eOmylE_+>U Rvh#mXw*6w4
hGetZ 1$:c='pLRAX)JjuT