Ramaiah Institute of Technology
(Autonomous Institute, Affiliated to VTU)

Department of CSE

Programme: B.E **Term: Jan to May 2019**
Course: Computer Organization **Course Code: CS45**

Activity V: Designing an ALU to perform arithmetic and logical functions using Logisim simulator.

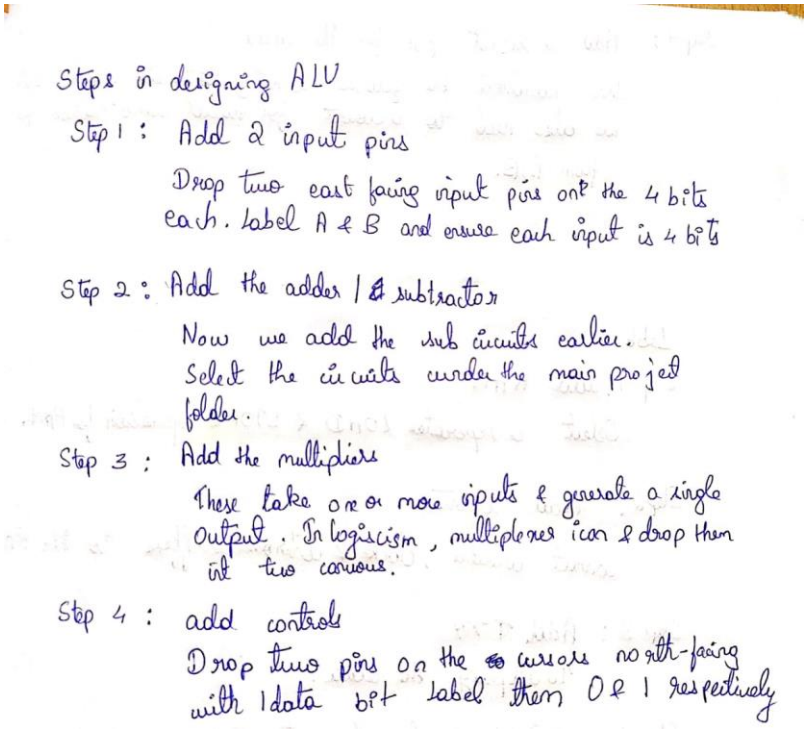
Name: Padi Suhas	**Marks: /10**	**Date:**
USN: 1MS18CS087	**Signature of the Faculty:**	

Objective: To simulate the working of Arithmetic and Logical Unit using simulator.

Simulator Description: Logisim is an educational tool for designing and simulating digital logic circuits. With its simple toolbar interface and simulation of circuits as you build them, it is simple enough to facilitate learning the most basic concepts related to logic circuits. With the capacity to build larger circuits from smaller sub circuits, and to draw bundles of wires with a single mouse drag, Logisim can be used (and is used) to design and simulate entire CPUs for educational purposes.

Activity to be performed by students:

List out the steps in designing ALU



Steps in designing ALU

Step 1: Add 2 input pins

Drop two east facing input pins onto the 4 bits each. Label A & B and ensure each input is 4 bits

Step 2: Add the adder / & subtractor

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

Step 3: Add the multipliers

These take one or more inputs & generate a single output. In logisim, multiplexers can & drop them in two versions.

Step 4: add controls

Drop two pins on the ~~co~~ cursors north-facing with 1 data bit label them 0 & 1 respectively

Step 5 : add a splitter

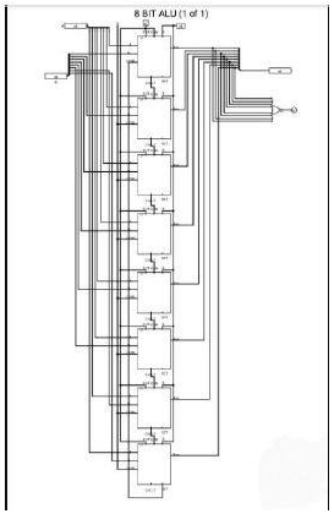
Now, we add splitter in our circuit that takes on line from the second multiplier & splitter to 4 inputs to OR gate for a 4 bit ALU.

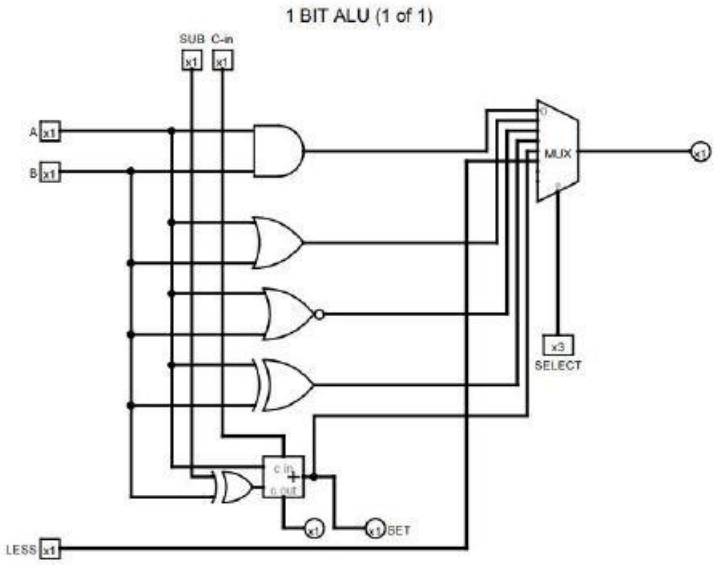
Step 6 : Add another OR gate after the gate, which has 4 inputs. To the right of the OR gate, add a NOT gate. This arrangement accounts for zero. The NOT gate following OR gate arranges this

Step 7 : Add a result pin for the mux

We handled the zeroes coming to the mux, but we also need to account for valid combination inputs from A, B.

Snapshots:





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Activity VI: Designing memory system using Logisim simulator.

Name: Padi Suhas	Marks: /10	Date:
USN: 1MS18CS087	Signature of the Faculty:	

Objective: To simulate the writing operation on memory.

Simulator Description: Logisim is an educational tool for designing and simulating digital logic circuits. With its simple toolbar interface and simulation of circuits as you build them, it is simple enough to facilitate learning the most basic concepts related to logic circuits. With the capacity to build larger circuits from smaller sub circuits, and to draw bundles of wires with a single mouse drag, Logisim can be used (and is used) to design and simulate entire CPUs for educational purposes.

Activity to be performed by students:

List out the steps in designing memory system

Lab6

Step 1: add RAM

Select a seperater LOAD & STORE operation for RAM.

Step2: Add counter

Connect counter, clock & controller Buffers to the RAM

Step 3: Add TTY

To display the data.

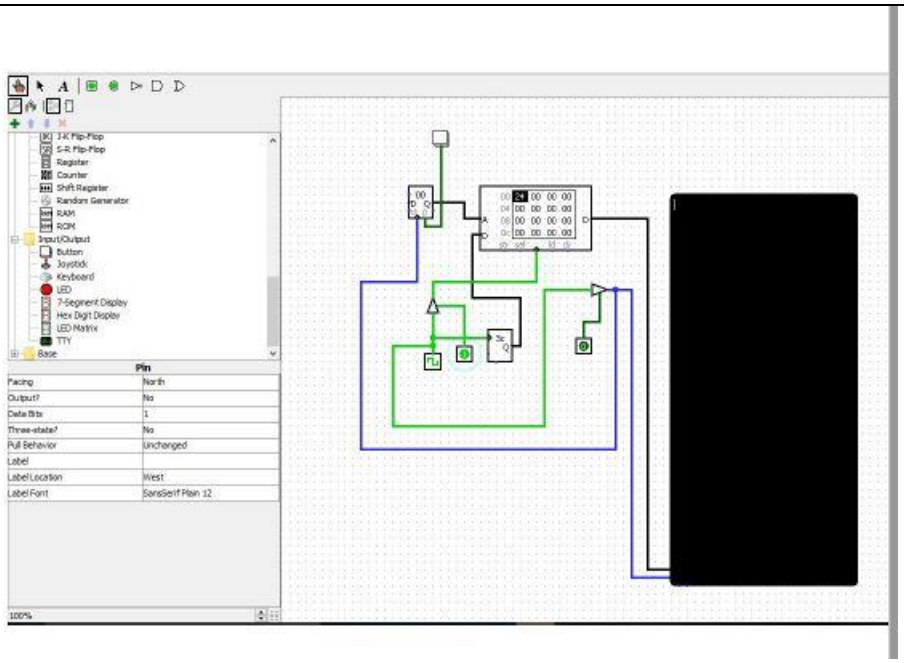
Step 4: Add Random Generator

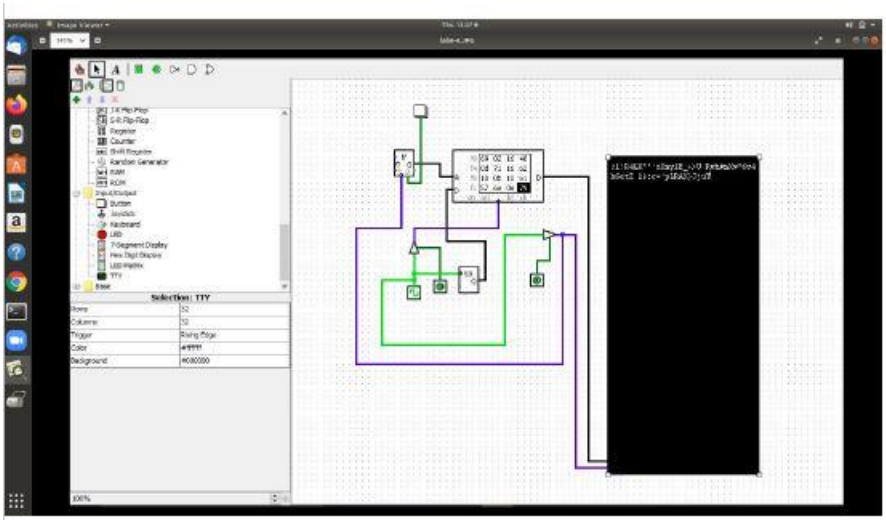
To generate different address location. Add inputs & another controller Buffer to the random generator.

Step5: Add Button

Connect Button to Counter.

Observations and Snapshots:


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%


Selection: TTY
100%