Lab Report 1

Computer Architecture Lab

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Aim

To make 4-Bit ALU using four units of 1-Bit ALU on Logisim.

Software Used

Logisim v.2.7.1

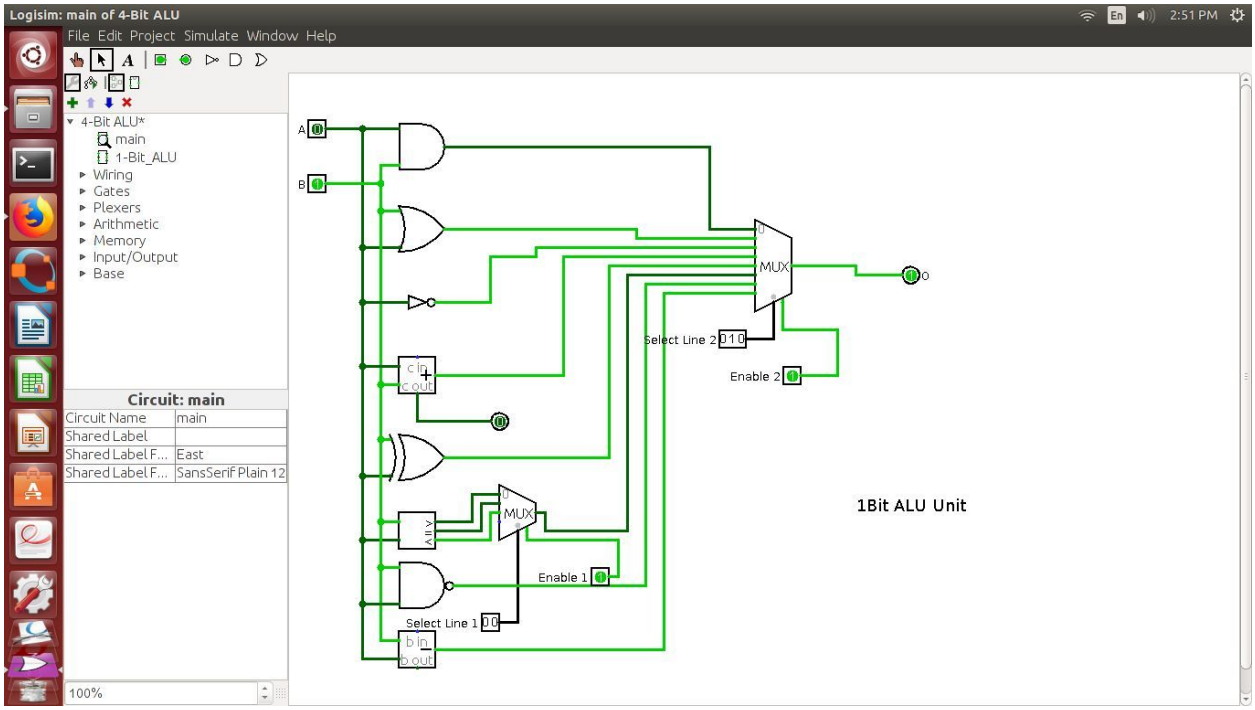
Theory

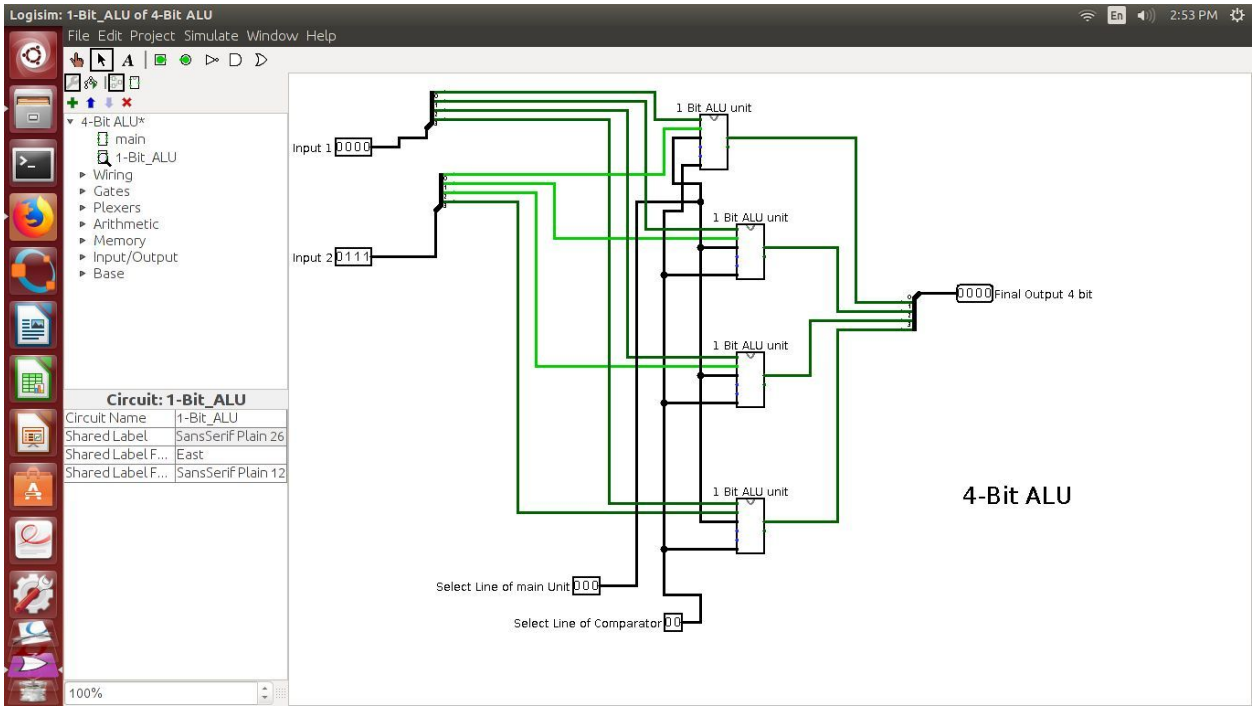
An arithmetic logic unit (ALU) is a digital circuit used to perform arithmetic and logic operations. It represents the fundamental building block of the central processing unit (CPU) of a computer. Modern CPUs contain very powerful and complex ALUs. In addition to ALUs, modern CPUs contain a control unit (CU). Most of the operations of a CPU are performed by one or more ALUs, which load data from input registers. A register is a small amount of storage available as part of a CPU. The control unit tells the ALU what operation to perform on that data, and the ALU stores the result in an output register. The control unit moves the data between these registers, the ALU, and memory.

Screenshots

Gates used:-

AND, OR, Not, Adder, XOR, Comparator, NAND, Subtractor.


Logisim: main of 4-Bit ALU
File Edit Project Simulate Window Help
4-Bit ALU*
main
1-Bit_ALU
Wiring
Gates
Plexers
Arithmetic
Memory
Input/Output
Base
Circuit: main
Circuit Name main
Shared Label
Shared Label F... East
Shared Label F... SansSerif Plain 12
100%
A
B
MUX
Select Line 2
Enable 2
cin
cout
MUX
Enable 1
Select Line 1
bin
bout
1Bit ALU Unit


Logisim: 1-Bit_ALU of 4-Bit ALU
File Edit Project Simulate Window Help
4-Bit ALU*
main
1-Bit_ALU
Wiring
Gates
Plexers
Arithmetic
Memory
Input/Output
Base
Circuit: 1-Bit_ALU
Circuit Name 1-Bit_ALU
Shared Label SansSerif Plain 26
Shared Label F... East
Shared Label F... SansSerif Plain 12
100%
1 Bit ALU unit
Input 1
Input 2
1 Bit ALU unit
1 Bit ALU unit
1 Bit ALU unit
Final Output 4 bit
Select Line of main Unit
Select Line of Comparator
4-Bit ALU