

ASSIGNMENT 3: LOGISIM

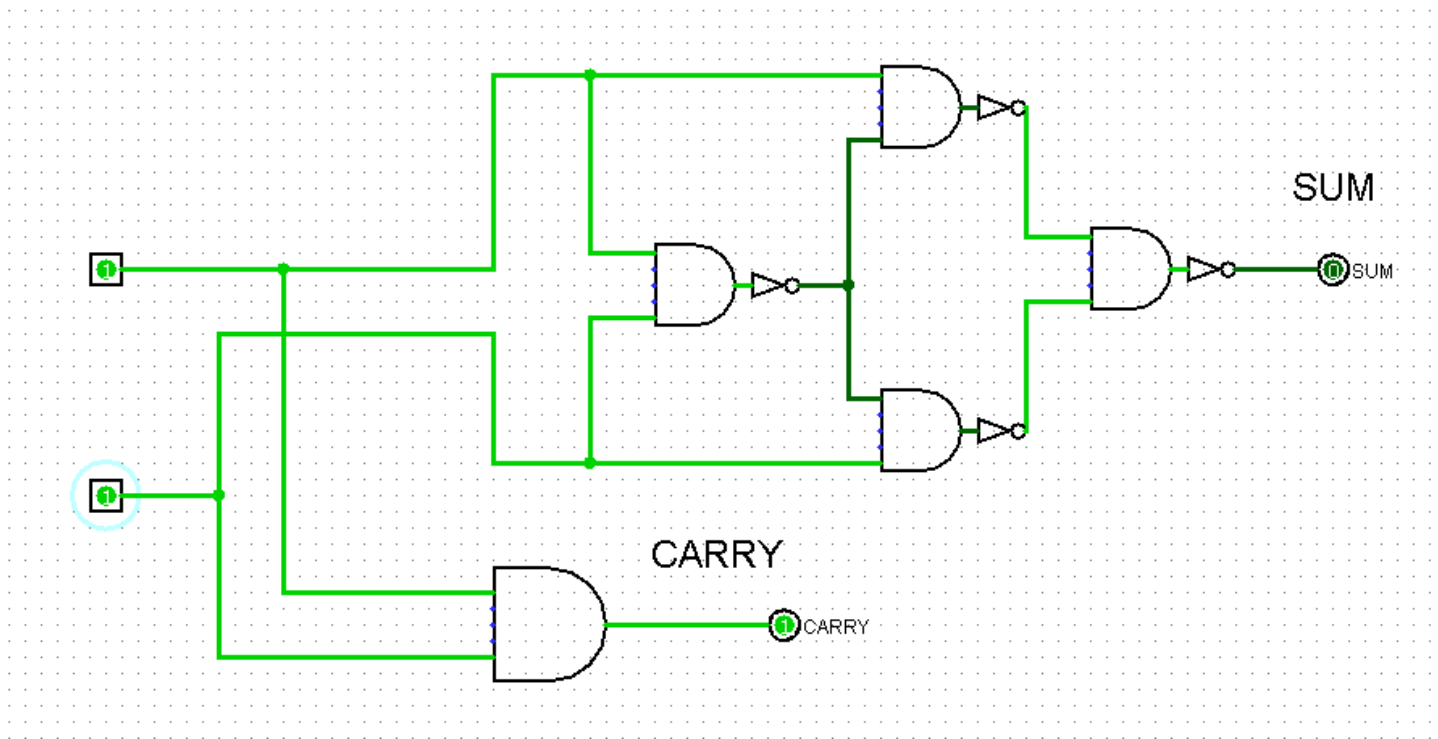
U19CS012

Use Logisim software to create and store the followings circuits for further usage: (For Practice)

1. 1-bit Half Adder

Build a 1-bit half adder. This takes two input wires, x0 and x1, and generates two output wires, s for the sum and c for the carry.

Circuit Image:



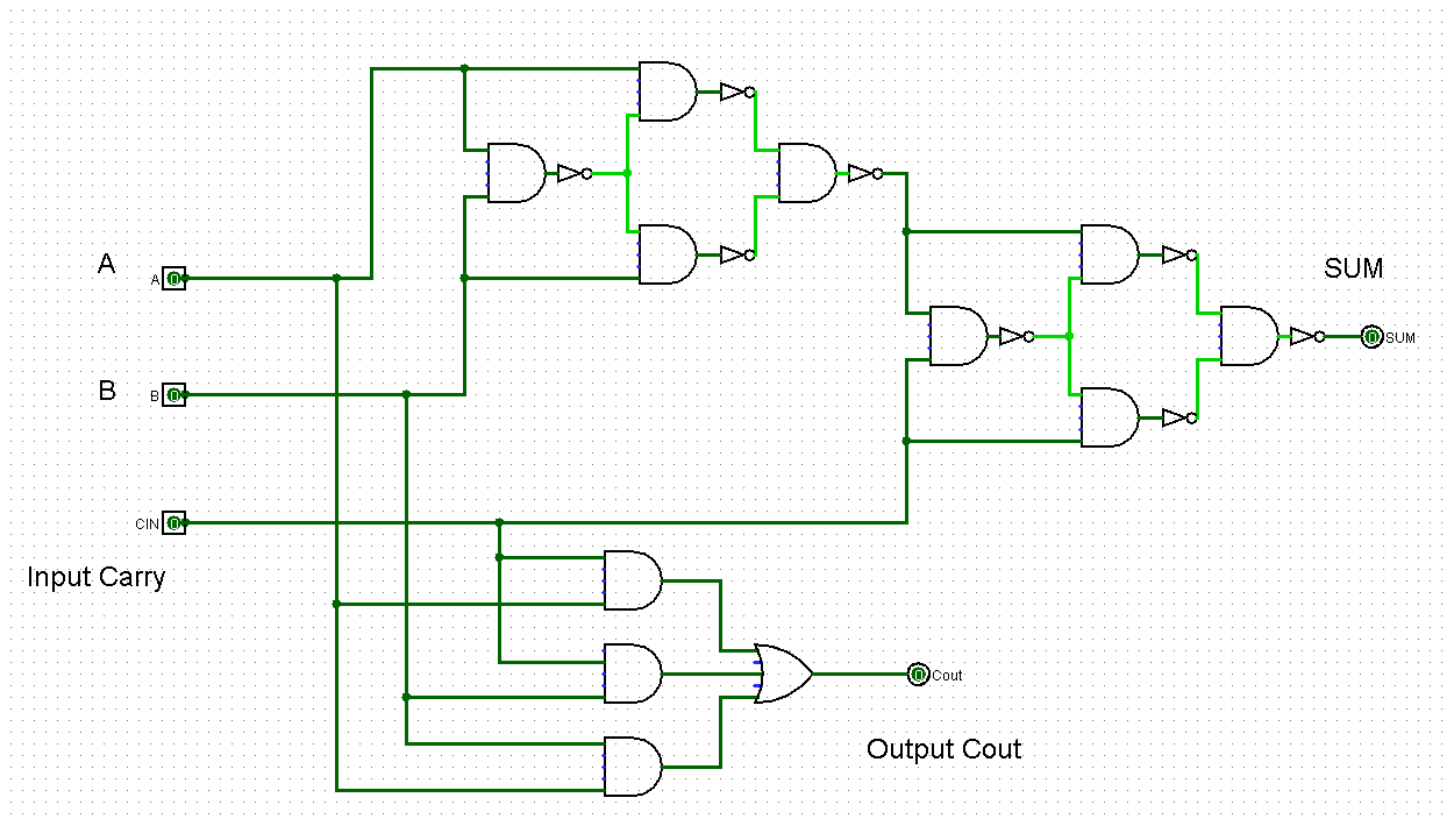
Truth Table:

a	b	SUM	CARRY
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

2. 1-bit Full Adder

The half-adder from the previous exercise can't be composed to make larger adders because it doesn't take a carry input, which is necessary if we're to chain them. Build a 1-bit full adder which takes c_{in} , x_0 , and x_1 as inputs, and generates s and c . (Note that we don't need any additional outputs here.)

Circuit Image:



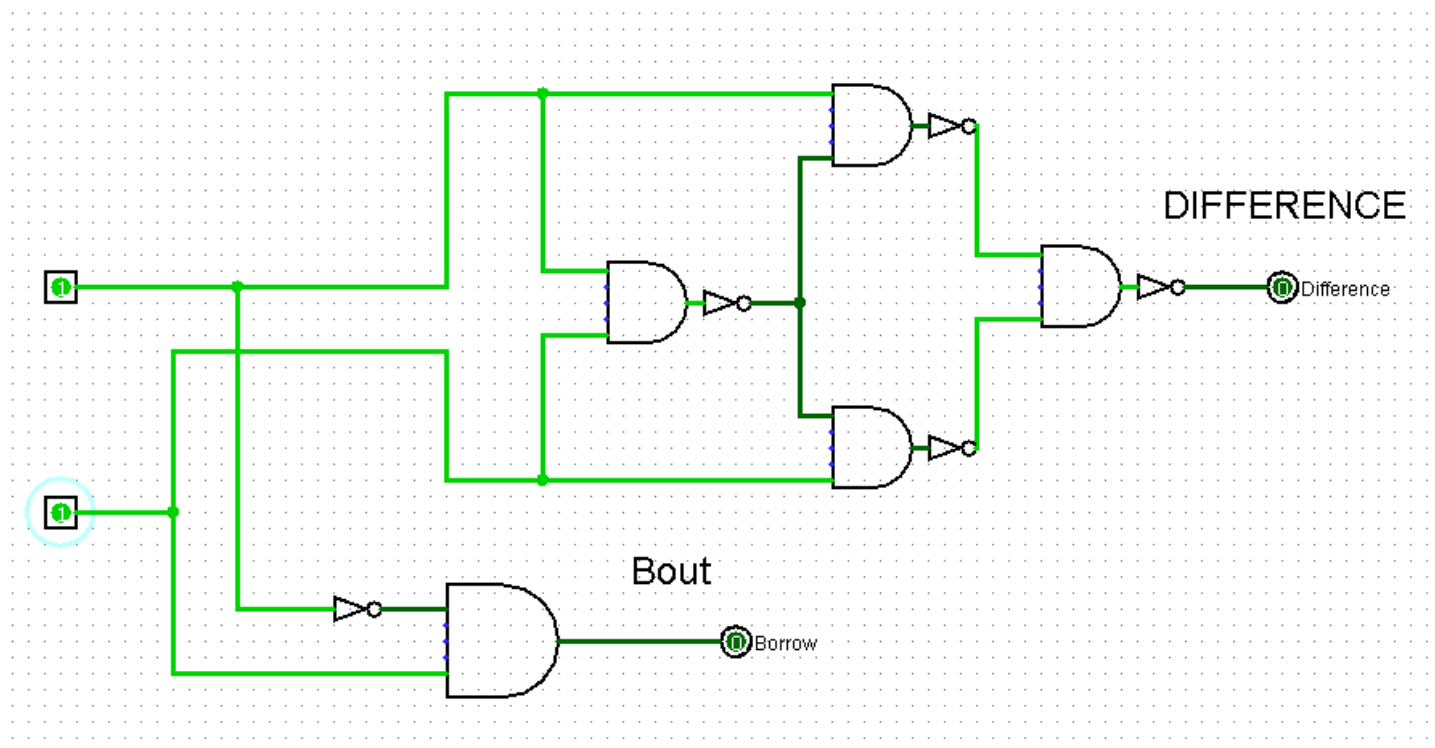
Truth Table:

A	B	CIN	SUM	Cout
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1
1	0	0	1	0
1	0	1	0	1
1	1	0	0	1
1	1	1	1	1

3. 1-bit Half Subtractor

Build a 1-bit half subtractor. This takes two input wires, x0 and x1, and generates two output wires, D for the difference and c for the borrow.

Circuit Image:



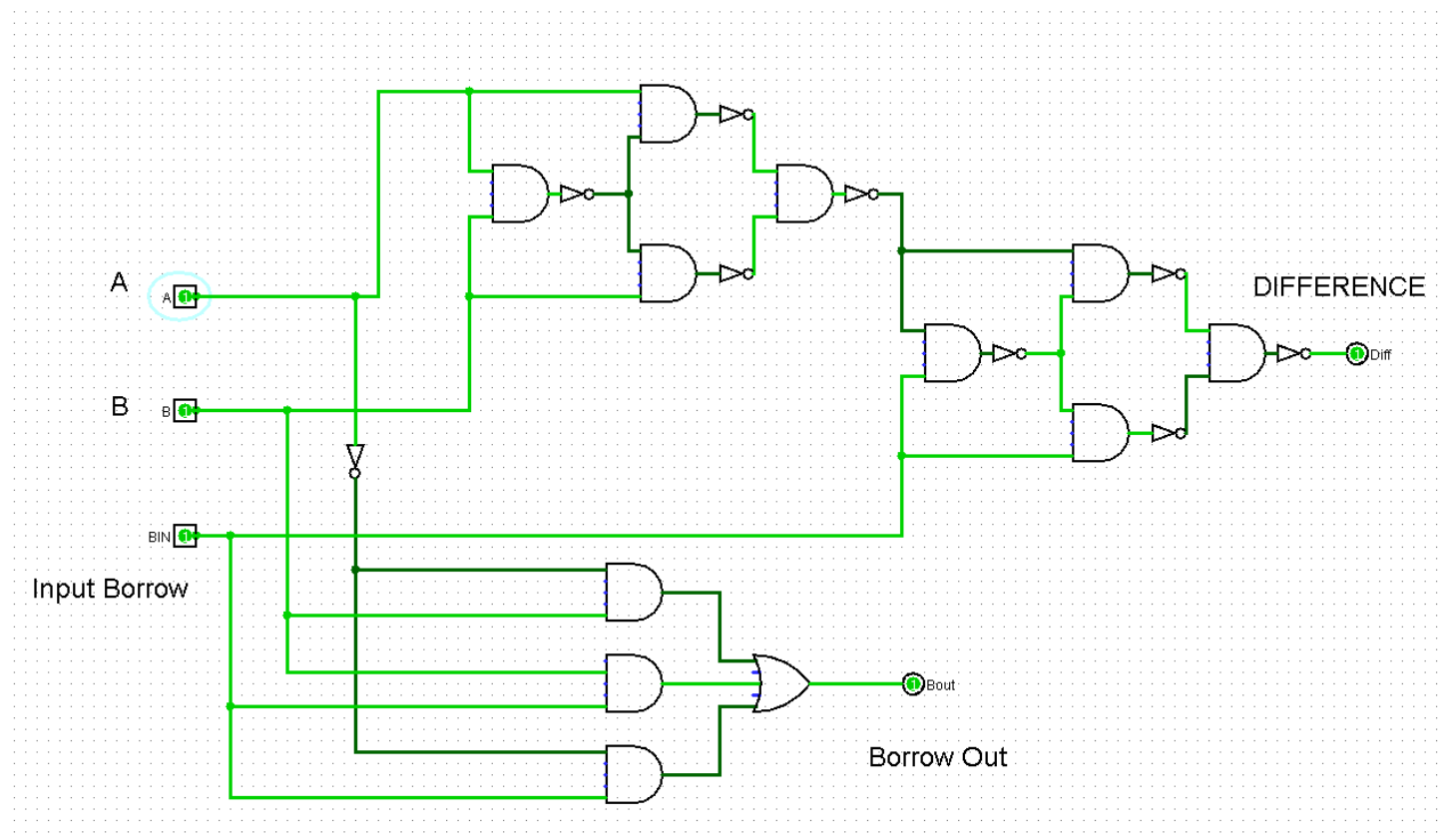
Truth Table:

a	b	Difference	Borrow
0	0	0	0
0	1	1	1
1	0	1	0
1	1	0	0

4. 1-bit Full Subtractor

Build a 1-bit full subtractor which takes c_{in} (Borrow), x_0 , and x_1 as inputs, and generates D (Difference) and c (Borrow).

Circuit Image:



Truth Table:

A	B	BIN	Diff	Bout
0	0	0	0	0
0	0	1	1	1
0	1	0	1	1
0	1	1	0	1
1	0	0	1	0
1	0	1	0	0
1	1	0	0	0
1	1	1	1	1

Submitted By:
Roll Number: U19CS012 (D-12)
Name: Bhagya Rana