# DSM LAB REPORT - 5

Lab 5:
Arithmetic and
Logic Unit

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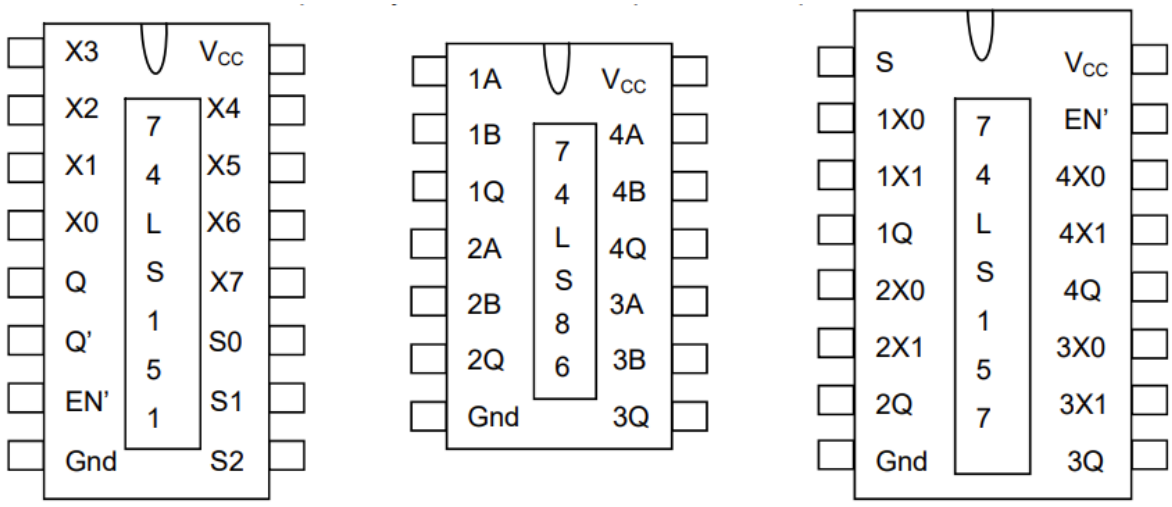
## Objective:

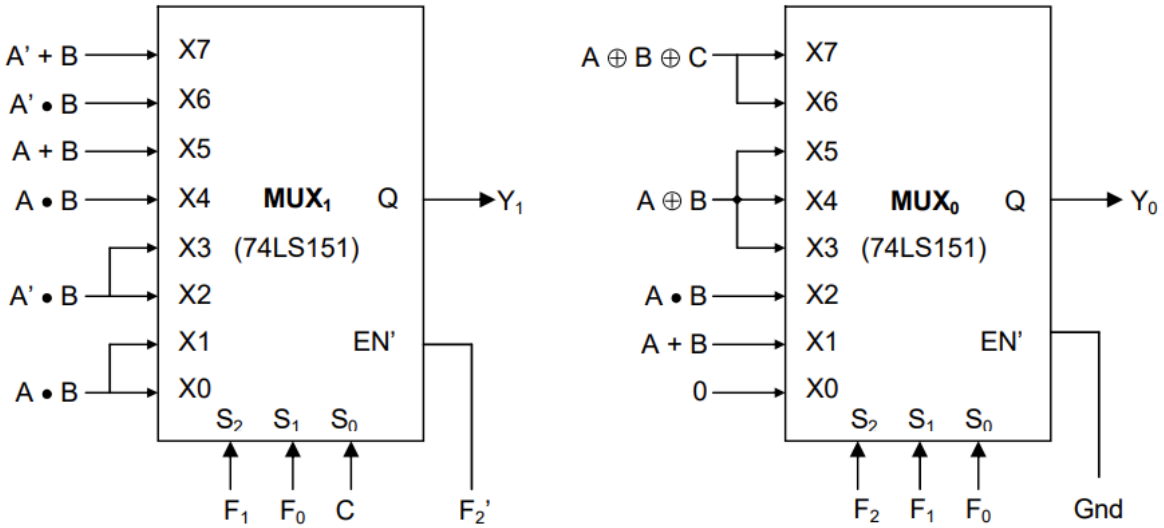
Assembling and testing an Arithmetic and Logic Unit.

## Components Used:

Digital Test Kit, Two 8-input MUX ICs (74LS151), One Quad-input MUX IC (74LS157), One Quad-input XOR ICs (74LS86) and wires.

## Reference Circuit:



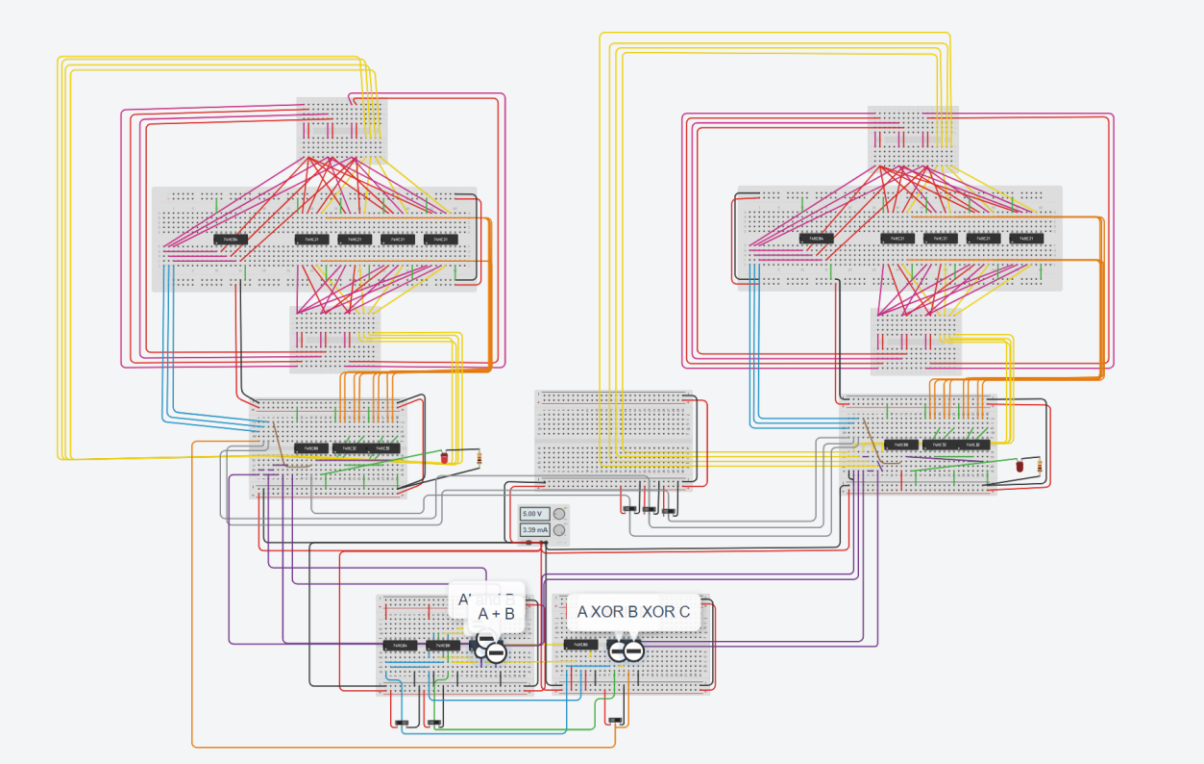



## Procedure:

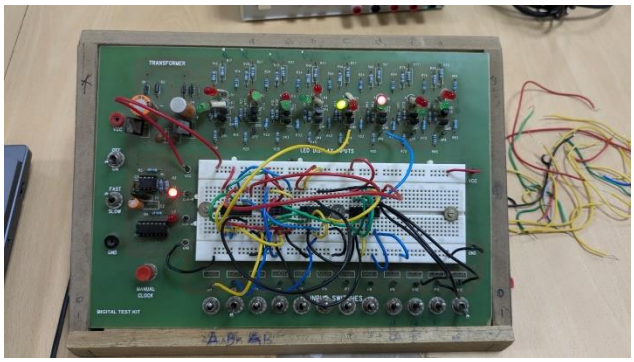
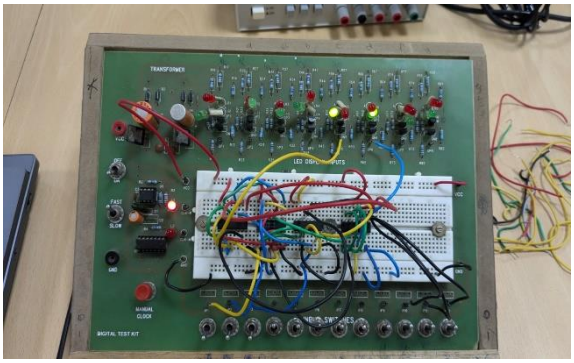
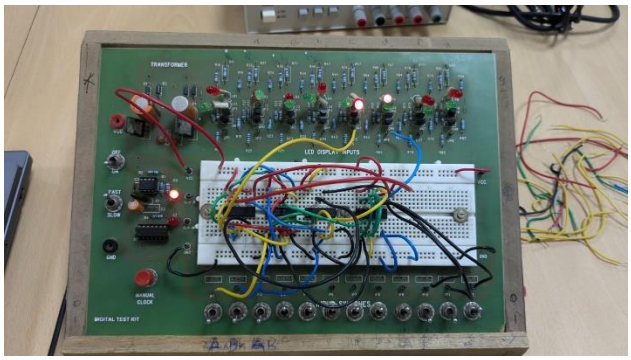
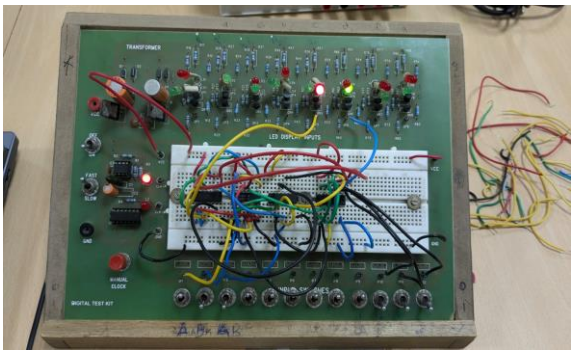
1. Connect the VCC and GND of the Digital Test Kit to the VCC and GND of the ICs. Ground the EN' to enable the MUX ICs.
2. Implement the input functions above using the Quad input mux IC.
3. The not of the necessary inputs is to be taken by XORing that input with '1', the VCC.
4. Then, appropriately connect these inputs to the 8-input MUX and take outputs y0 and y1 of MUX0 and MUX1, respectively, using any two of the display points.

## Tinkercad Simulations:

https://www.tinkercad.com/things/9BHSxIdPCd1-dsmlab5?sharecode=gYiWEMDJ1WpxqjsbxsxfHh-irKdGBUj0SebC-MG7Yrk



## Output:

## Conclusion:

Arithmetic and Logic Unit successfully assembled and tested. The following are the observations:

| F2F1F0 | ALU Function | Y1 | Y0 |
|---|---|---|---|
| 000 | 0 (Zero) | - | 0 |
| 001 | A OR B | - | A+B |
| 010 | A AND B | - | A·B |
| 011 | A XOR B | - | A⊕B |
| 100 | A PLUS B | Carry | Sum |
| 101 | A MINUS B | Borrow | Difference |
| 110 | A PLUS B PLUS C | Carry | Sum |
| 111 | A MINUS B MINUS C | Borrow | Difference |