Lab Report 4

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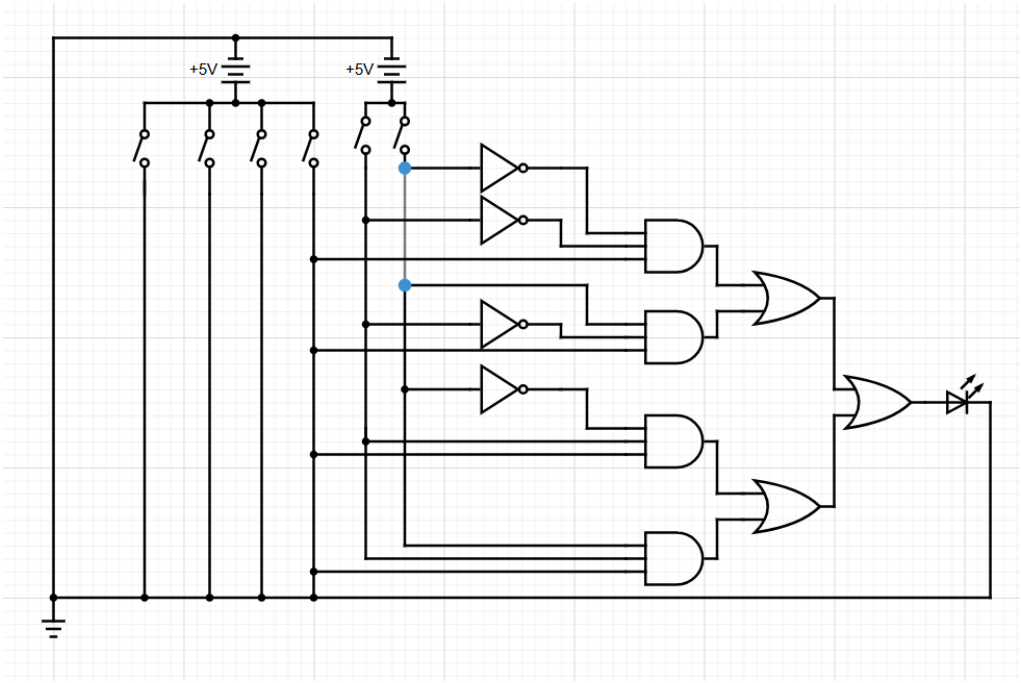
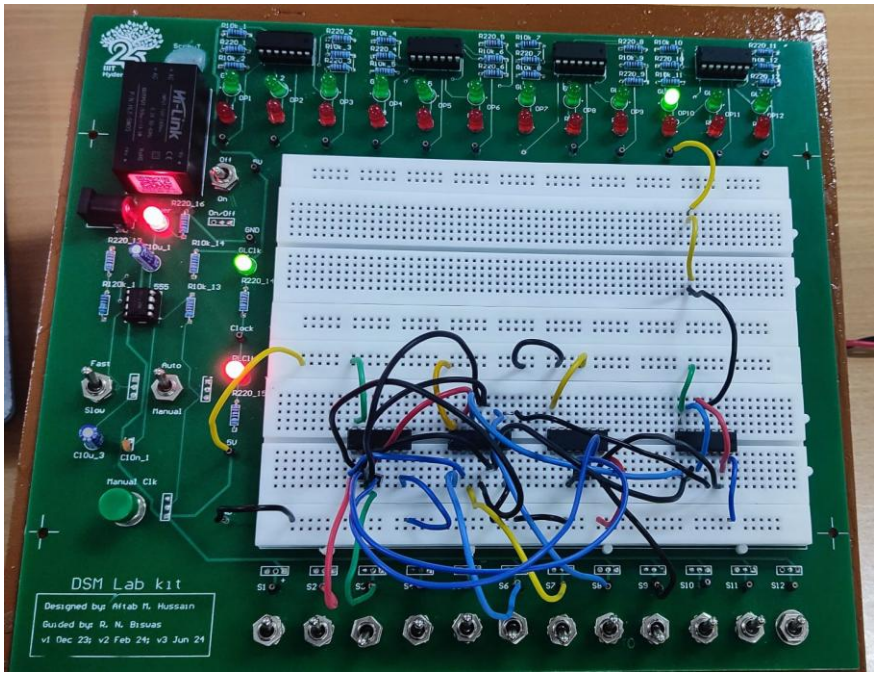
Experiment 1:

- Objective:

  To assemble a 4x1 multiplexer and observe its working.

- Electronic Components Used:
  - 7404 Hex Inverter
  - 7411 3-Input AND IC
  - 7432 2-Input OR IC
  - Digital Test Kit
- Reference Circuit:





- Procedure:

1. Ensure that the input pins IP1-12 and output LEDs LG1-12 and LR1-12 are working. Set the CLOCK of the kit in FAST mode.
2. Assemble the 4 x 1 Multiplexer as shown in the given circuit diagram.
3. Give different combinations of inputs to the selection lines S_0 and S_1 and to the inputs I_0, I_1, I_2, I_3, and draw the truth table for the outputs.
4. Verify the function of the Multiplexer by checking the truth table.

- Observation:

The observed Truth Table was:

S_0	S_1	Out
0	0	I_0
0	1	I_1
1	0	I_2
1	1	I_3

- Conclusion:

  The 4 x 1 Multiplexer has been assembled successfully.

- TinkerCAD Simulation:

  https://www.tinkercad.com/things/9BQHzFksia7-dsm-lab-4-exp-1?sharecode=UjYG-72zlE_TJ630N16Hz0Gwddj9Gw8xJbPZJIAx9_I

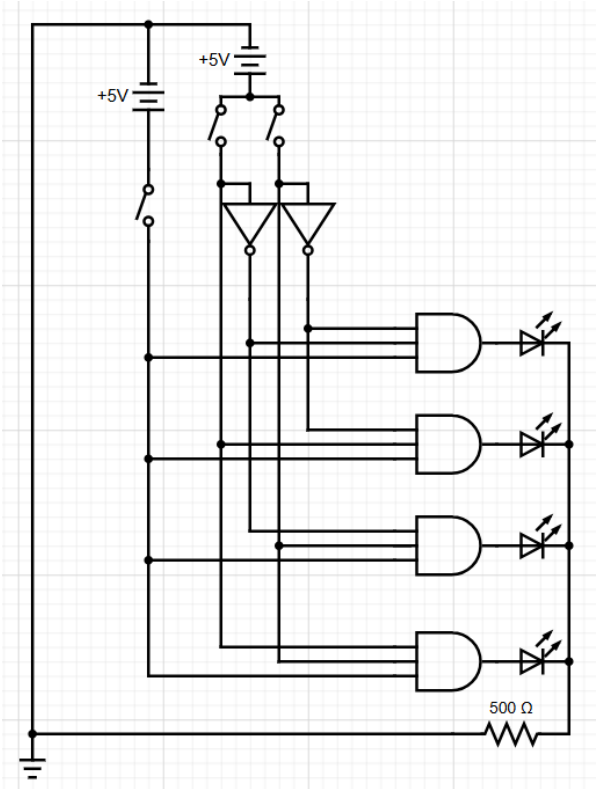
Experiment 2:

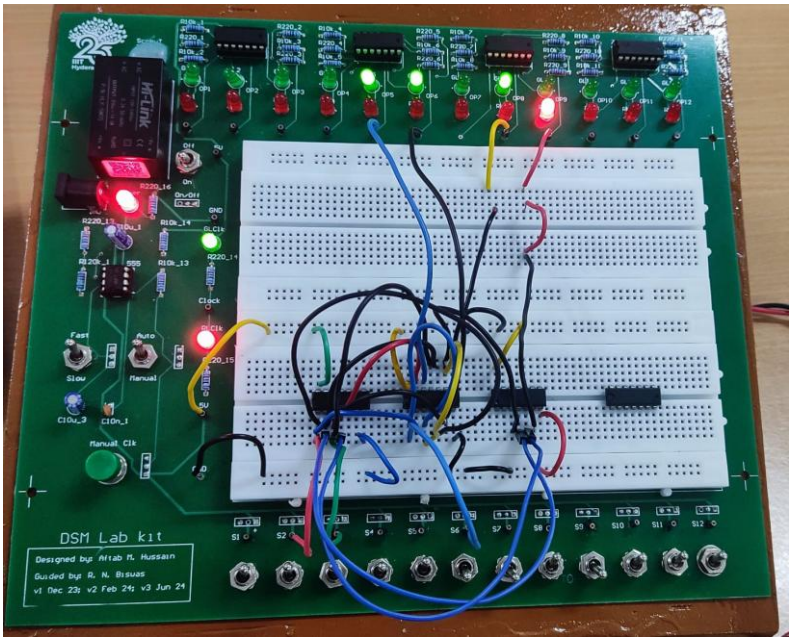
- Objective:

  To assemble a 1 x 4 Demultiplexer and observe its working.

- Electronic Components:
  - 7404 Hex Inverter
  - 7411 3-Input AND IC
  - Digital Test Kit

- Reference Circuit:





- Procedure:

1. Ensure that the input pins IP1-12 and output LEDs LG1-12 and LR1-12 are working. Set the CLOCK of the kit in FAST mode.
2. Assemble the 1 x 4 Demultiplexer as shown in the given circuit diagram.
3. Give different combinations of inputs to the selection lines S_0 and S_1 and to the input I and draw the truth table for the outputs O_0, O_1, O_2, O_3.
4. Verify the function of the Demultiplexer by checking the truth table.

- Observation;

Observed truth table:

S_0	S_1	O_0	O_1	O_2	O_3
0	0	**I**	0	0	0
0	1	0	**I**	0	0
1	0	0	0	**I**	0
1	1	0	0	0	**I**

- Conclusion:

  The 1 x 4 Demultiplexer has been assembled successfully.

- TinkerCAD Simulation:

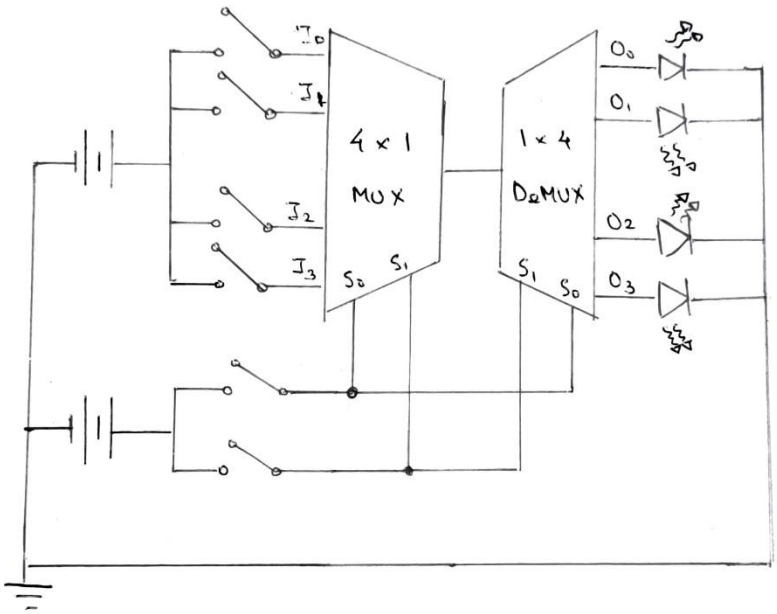
  https://www.tinkercad.com/things/aMexKApZ4eK-dsm-lab-4-exp-2?sharecode=SrXOc6lBEz6kO1tJshI7flqMcByYjs5xPBusE0rrrF4

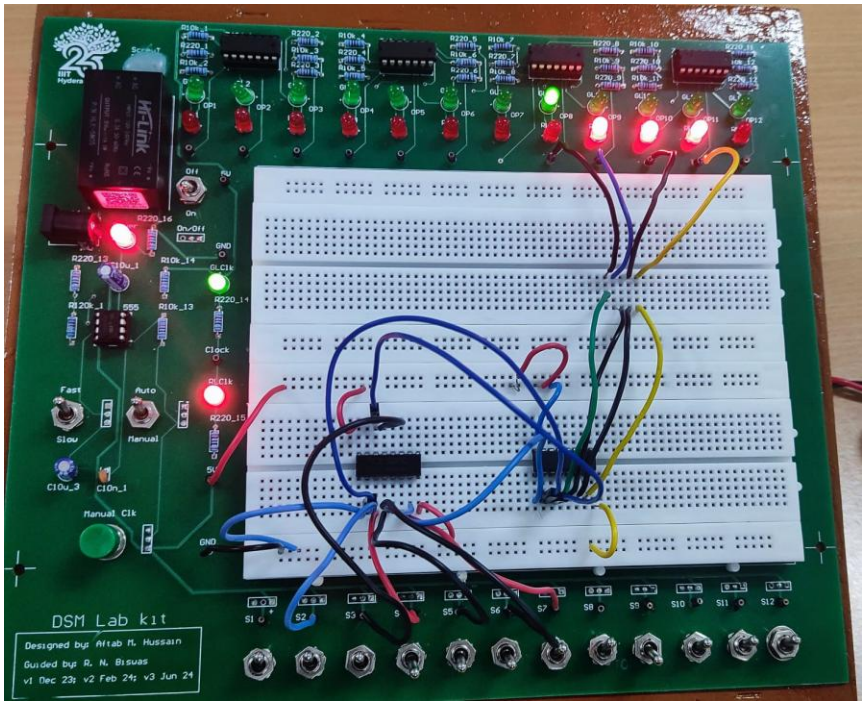
Experiment 3:

- Objective:

  To connect a 4 x 1 Multiplexer and a 1 x 4 Demultiplexer and observe their function.

- Electronic Components Used:
  - 74153 4 x 1 Multiplexer IC
  - 74139 1 x 4 Demultiplexer IC
  - Digital Test Kit
- Reference Circuit:





- Procedure:
    1. Ensure that the input pins IP1-12 and output LEDs LG1-12 and LR1-12 are working. Set the CLOCK of the kit in FAST mode.
    2. Connect any 4 of the input switches to the 4 x 1 Multiplexer IC and connect its output to the Demultiplexer IC. Connect the outputs of the Demultiplexer IC to any of the 4 output LEDs.
    3. Give different combinations of inputs to the selection lines S_0 and S_1 and to the inputs I_0, I_1, I_2, I_3, and draw the truth table for the outputs O_0, O_1, O_2, O_3.
    4. Verify the function of this combined circuit by checking the truth table.

- Observation:

  The obtained truth table is:

S_0	S_1	O_0	O_1	O_2	O_3
0	0	**I_0**	0	0	0
0	1	0	**I_1**	0	0
1	0	0	0	**I_2**	0
1	1	0	0	0	**I_3**

- Conclusion:

  The Multiplexer and Demultiplexer combination circuit has been assembled and its function has been analysed.

- TinkerCAD Simulation:

  https://www.tinkercad.com/things/9nARe3ujAqp-dsm-lab-4-exp-3?sharecode=9e9HjdU-LMj8nvJLrb_L60PxuL68mo19SLQaj7_dNeo