Lab report:3

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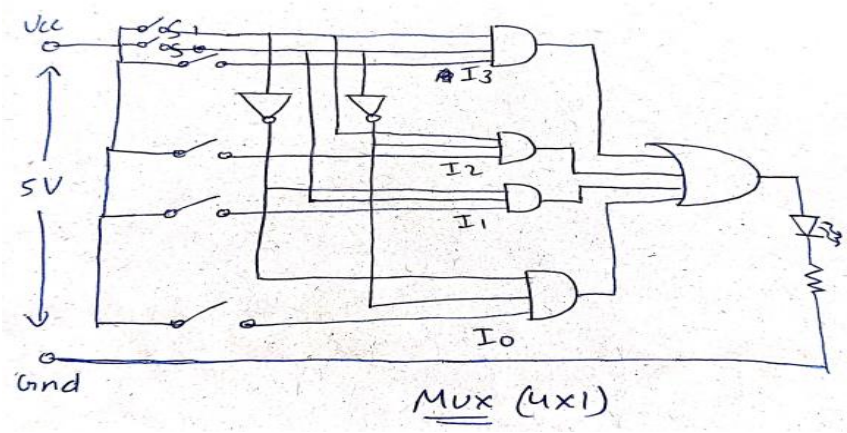
PART: A

OBJECTIVE: To Design a 4:1 Multiplexer using basic logic gates

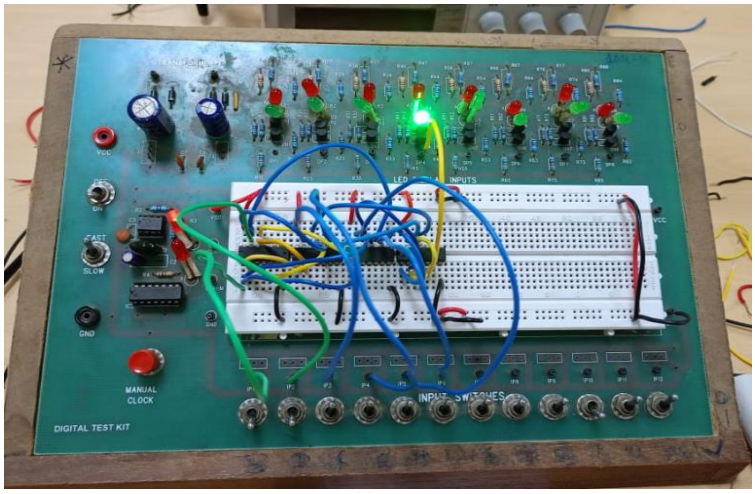
ELECTRONICS COMPONENTS USED:

- Coloured wires
- 74HC04(NOT)
- 74HC11(3 input AND)
- 74HC32(OR) ICs.

REFERENCE CIRCUIT:



LAB REFERENCE CIRCUIT:



PROCEDURE:

1. Set up the circuit as shown above on the digital test kit. (As shown in the reference circuit diagram)
2. Then, observe all the outputs by LEDs toggling switches for different cases.
3. Tabulate them in the form of truth table.

CONCLUSION:

The final output is taken from different inputs and select bits according to the given table:

S1	S2	Y
0	0	A
0	1	B
1	0	C
1	1	D

LINK FOR TINKERCAD SIMULATION:

https://www.tinkercad.com/things/bX6ef435CpJ-lab3amux/editel?sharecode=ap3iZs8YtyMfaMawjuZP_SWVQrDk0xk4WWbCVHKhofI

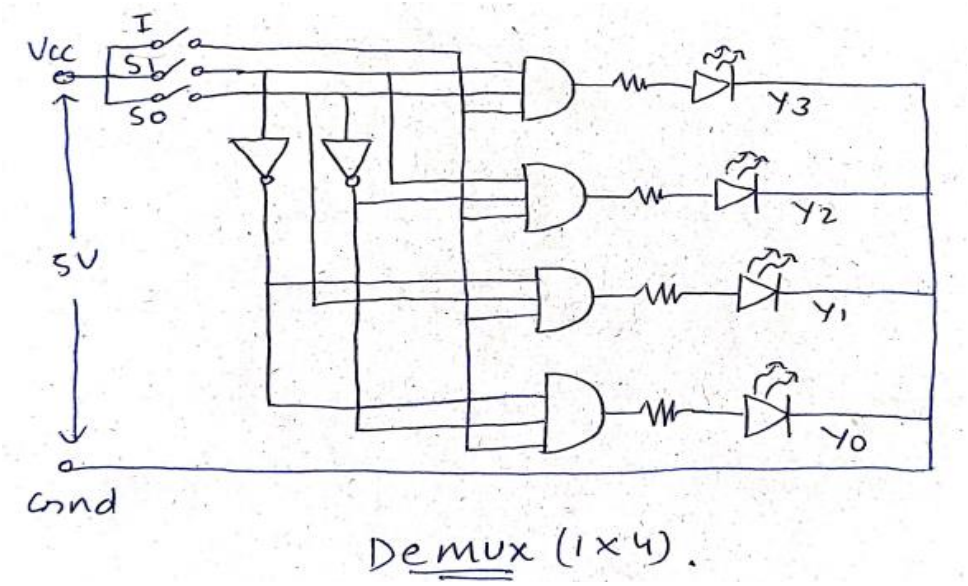
PART B

OBJECTIVE: To Design a 1:4 Demultiplexer using basic logic gates.

ELECTRONICS COMPONENTS USED:

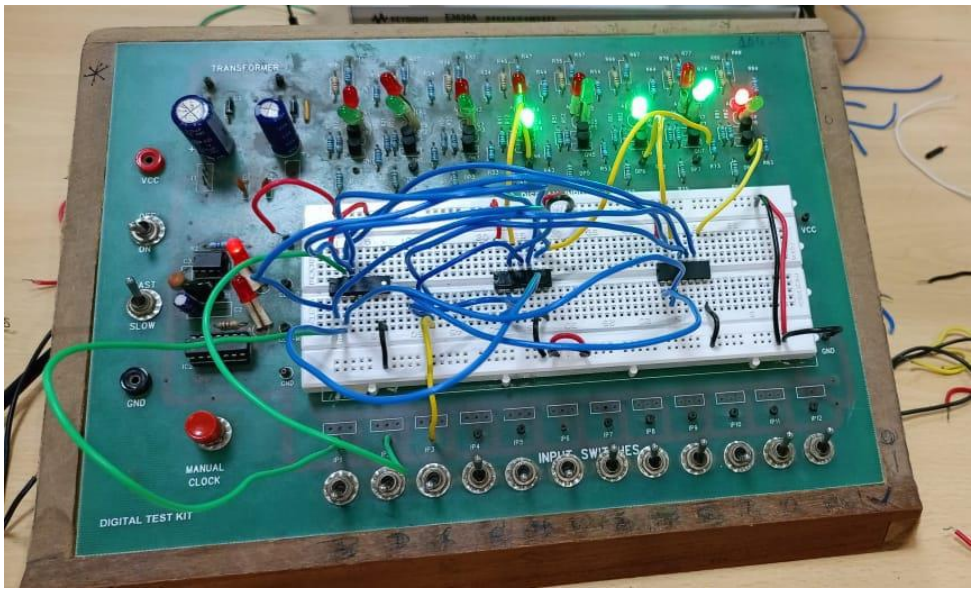
- Coloured wires
- 74HC04(NOT)
- 74HC11(3 input AND) ICs.

REFERENCE CIRCUIT:



Demux (1×4).

LAB REFERENCE CIRCUIT:



PROCEDURE:

1. Set up the circuit as shown above on the digital test kit. (As shown in the reference circuit diagram)
2. Then, observe all the outputs by LEDs toggling switches for different cases.
3. Tabulate them in the form of truth table.

CONCLUSION:

The final output is given to different LEDs from the input and select bits according to the given table:

S1	S2	Y3	Y2	Y1	Y0
0	0	0	0	0	1
0	1	0	0	1	0
1	0	0	1	0	0
1	1	1	0	0	0

LINK FOR TINKERCAD SIMULATION:

https://www.tinkercad.com/things/76UUGJ73g5i-lab3bdemux/editel?sharecode=GgjIJnIz66WxMVLCmJu1r_GMn2-xyBWhf4ZeU_aMoyw

PART C

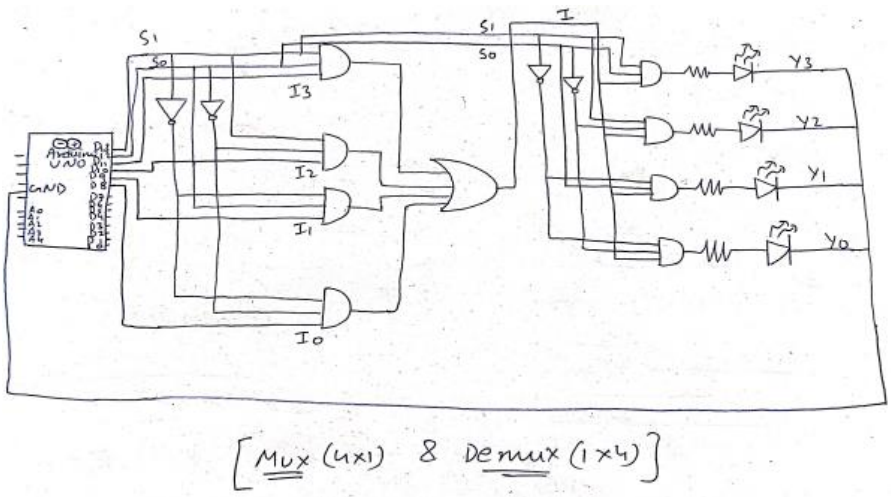
OBJECTIVE :

Assemble the Multiplexer and Demultiplexer into one circuit.

ELECTRONICS COMPONENTS USED:

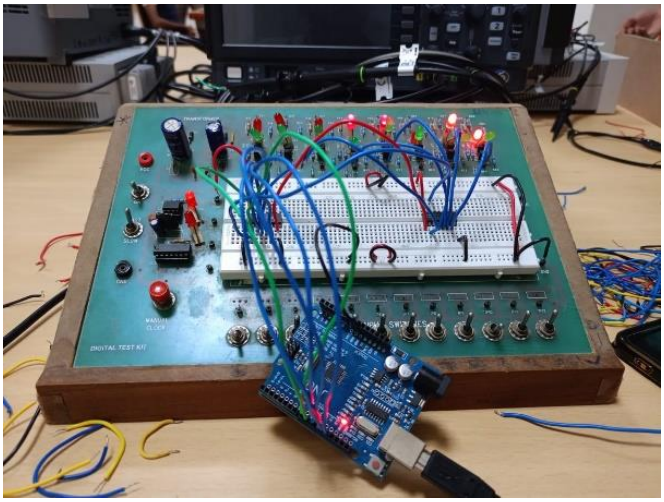
- Arduino Uno3
- Coloured wires
- 74HC04(NOT)
- 74HC11(3 input AND)
- 74HC32(OR) ICs.

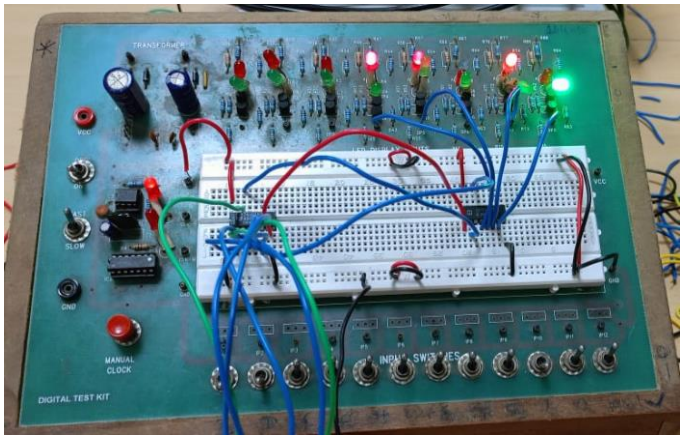
REFERENCE CIRCUIT:



[Mux (4x1) & Demux (1x4)]

LAB REFERENCE CIRCUIT:





PROCEDURE:

1. Connect the final output of the multiplexer to the input of the demultiplexer instead of the LED.
2. Replace the data inputs to the multiplexer with pins 13, 12, 11 and 10.
3. Replace the select inputs to both the circuits with pins 9 and 8.
4. Remove the power supply and ground the common cathode of the demultiplexer output LEDs using the GND pin.
5. Provide inputs through the pins using the Serial Monitor.

CONCLUSION:

For different values of 4 inputs and select bits, the outputs are from the respective LEDs.

LINK FOR TINKERCAD SIMULATION:

https://www.tinkercad.com/things/0LCHPWBIpaS-copy-of-lab3bdemux/editel?sharecode=yEa46-vMf8WpXdfVlNHjgcsrXjL_2axKMoJI1Jkp2iY