INDRAPRASTHA INSTITUTE *of*
INFORMATION TECHNOLOGY
DELHI

Department
of
Electronics & Communication Engineering

ECE111|Digital Circuits

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Lab_4:Multiplexers

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Part A

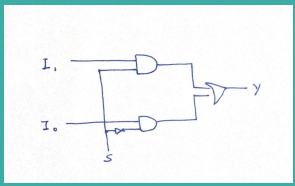
Aim: Design a 2x1 MUX using basic GATES in TinkerCad, and test its performance for various input and output combinations.

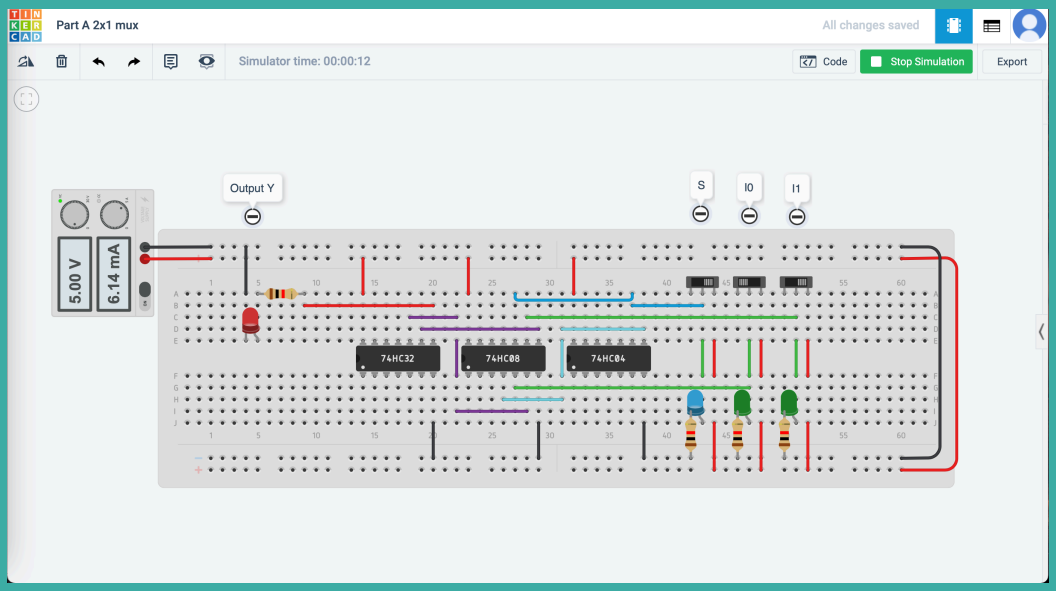
Components/ICs Used: Breadboard, LED, 1 kΩ Resistor, [5,5 Power Supply], Wire, slideswitch, Quad AND gate(74HC08), Quad OR gate(74HC32), Hex inverter(74HC04)

Link of TINKERCAD Workspace: https://www.tinkercad.com/things/jqHD4IaMMHG

Pin Diagram of the IC (If new):

Circuit Diagram:





Truth Table:

S	Y
0	I0
1	I1

Observations/Results: The circuit satisfies the truth table.

Applications of the experiment : Mux is implemented in various domains where there is a necessity of transmitting a large amount of data with the use of single line.
Communication System: A Mux is implemented in this system to increase efficiency. Using a single transmission line, various types of data (audio, video, etc.) are transmitted at the same instant.
Computer Memory: In a computer, the huge quantity of memory is implemented by means of the Mux. It also has an advantage of a reduction in the number of copper lines which are used for the connection of memory to other parts of the computer.

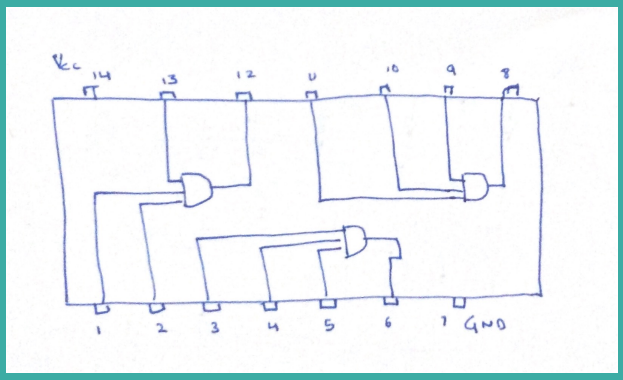
Part B

Aim: Design a 4x1 MUX using basic GATES in TinkerCad, and test its performance for various input and output combinations.

Components/ICs Used: Breadboard, LED, 1 kΩ Resistor, [5,5 Power Supply], Wire, slideswitch, Quad OR gate(74HC32), Hex inverter(74HC04), 2 Triple 3-Input AND gate(74HC11)

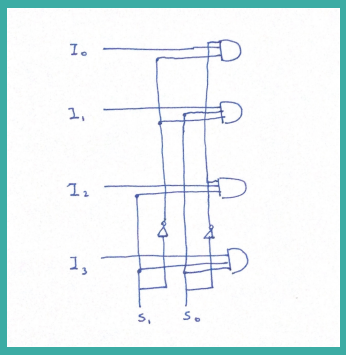
Link of TINKERCAD Workspace: https://www.tinkercad.com/things/7NyV1zfvGQc

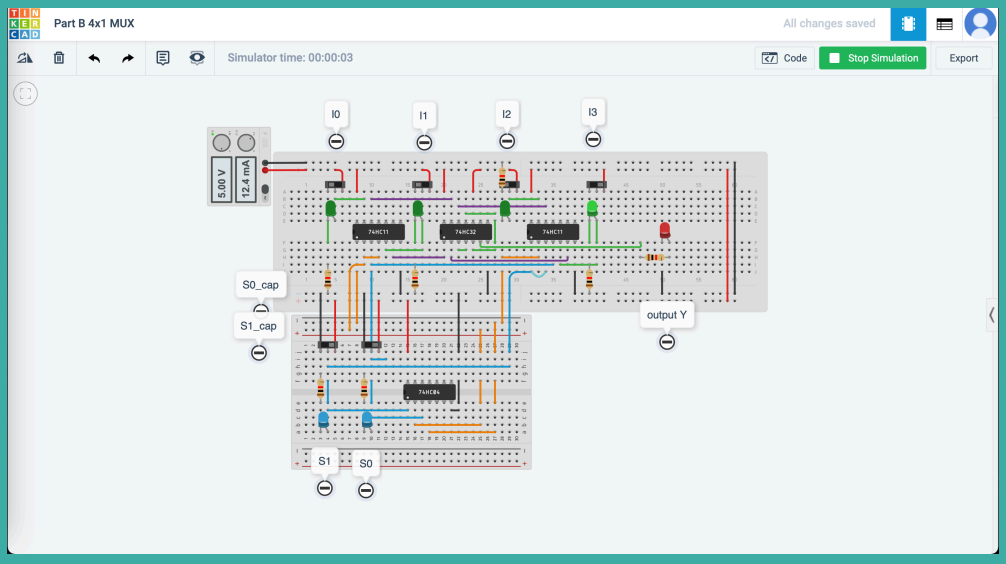
Pin Diagram of the IC (If new):



74HC11

Circuit Diagram:





Truth Table:

S1	S0	OUTPUT Y
0	0	I0
0	1	I1
1	0	I2
1	1	I3

Observations/Results: The circuit satisfies the truth table.

Applications of the experiment : Telephone Network. In a telephone network, the multiple audio signals are brought into a single line and transmitted with the implementation of a Mux. By this way, the numerous audio signals are made isolated and ultimately the recipient will receive the required audio signals.

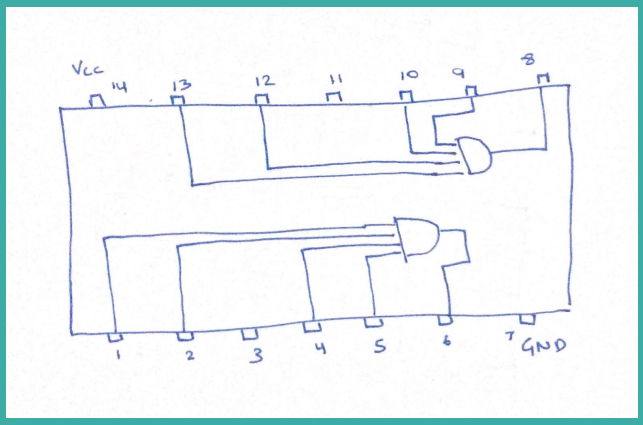
Part C

Aim: Design a 2x1 MUX using basic GATES in TinkerCad, and test its performance for various input and output combinations.

Components/ICs Used: Breadboard, LED, 1 kΩ Resistor, [5,5 Power Supply], Wire, slideswitch, 2 Quad OR gate(74HC32), Hex inverter(74HC04), 4 Dual 4-Input AND gate(74HC21)

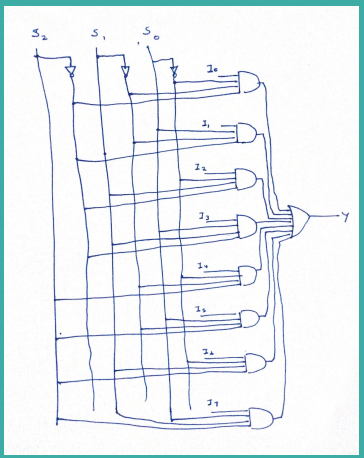
Link of TINKERCAD Workspace: https://www.tinkercad.com/things/9wZLsR5ZxCB

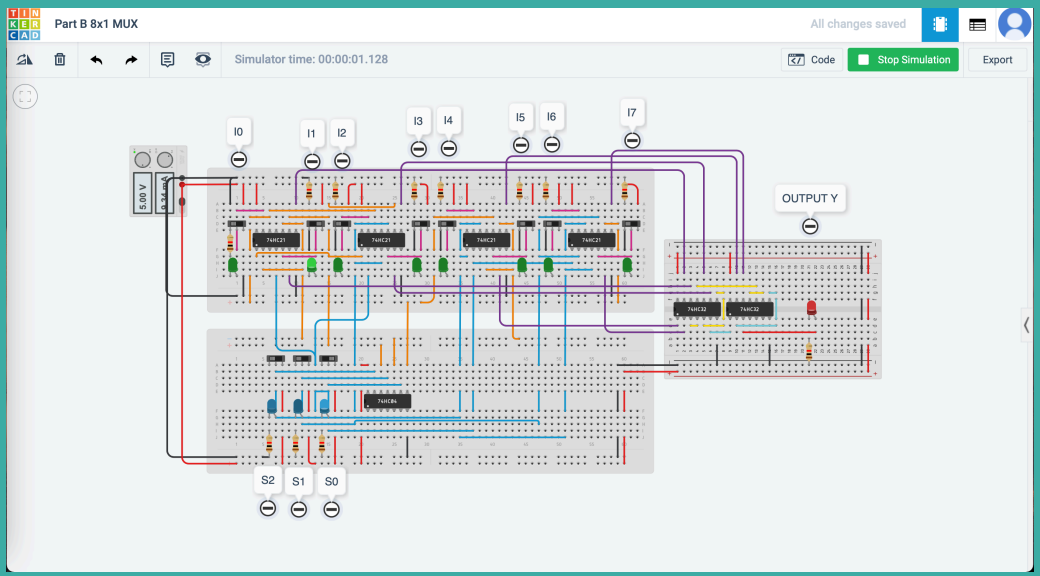
Pin Diagram of the IC (If new):



74HC21

Circuit Diagram:





Truth Table:

S2	S1	S0	OUTPUT Y
0	0	0	I0
0	0	1	I1
0	1	0	I2
0	1	1	I3
1	0	0	I4
1	0	1	I5
1	1	0	I6
1	1	1	I7

Observations/Results:The circuit satisfies the truth table.

Applications of the experiment: Computer System of a Satellite Transmission. Mux is used for the data signals to be transmitted from spacecraft or computer system of a satellite to the earth by means of GPS.