ECE111|Digital Circuits
Dr. Vish Visweswaran
Lab_4:

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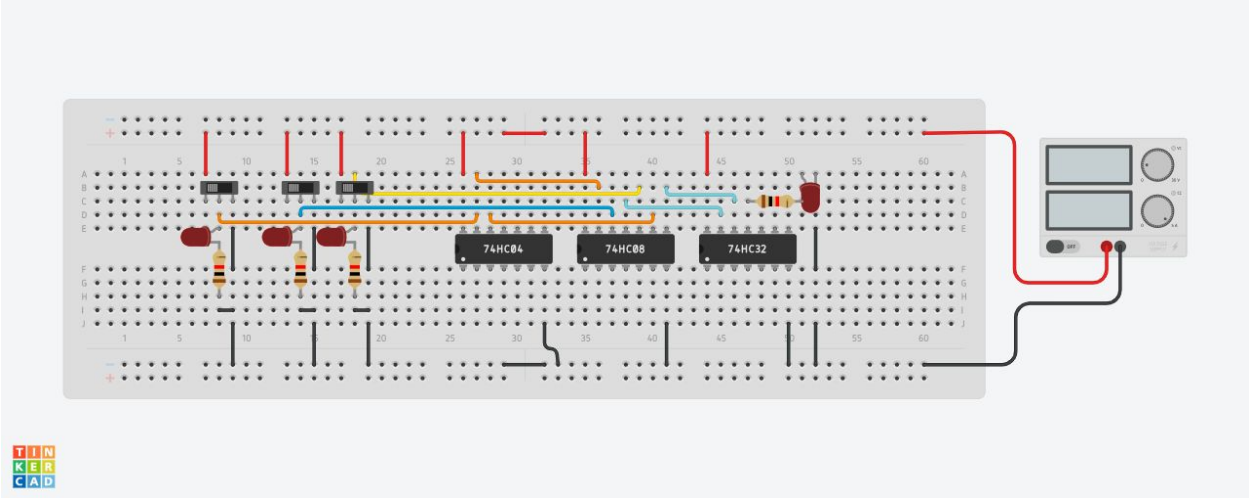
Aim 1: Design a 2x1 MUX using basic GATES

Components/ICs Use: 1 power supply, 3 slide switches, 4 resistors (1kohm), 4 LED, 1 Quad AND gate , 1 Quad OR gate, 1 Hex Inverter

Circuit Diagram:



Link of TINKERCAD Workspace:

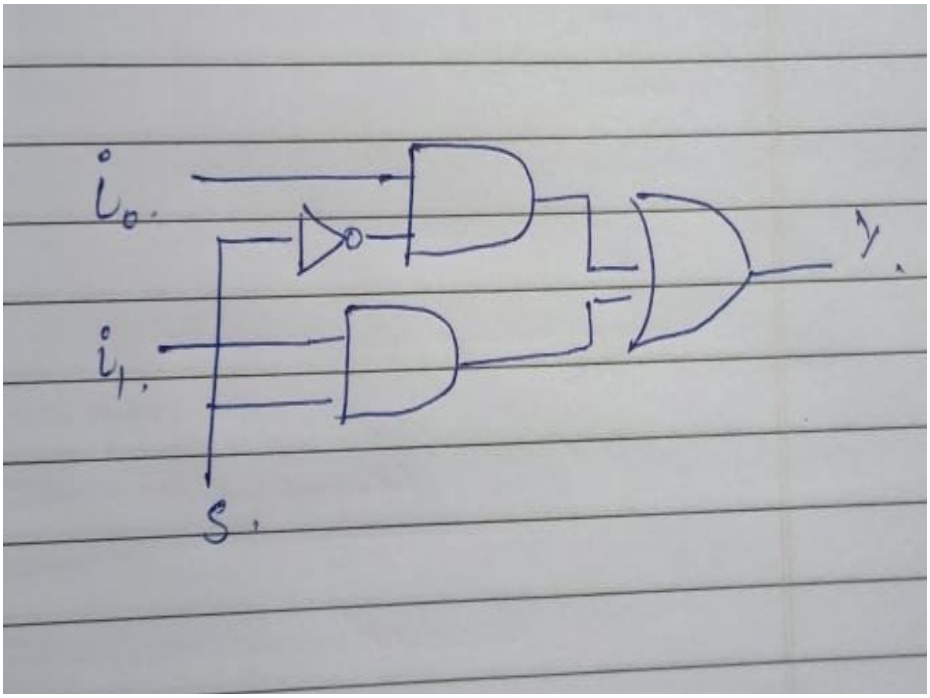
https://www.tinkercad.com/things/ctkA3LWDZD6-brilliant-robo-luulia/editel?sharecode=0quTkyTYoGmWxaN3XofEWB1Q-j_jA438nA_DbAtL4N8

Truth Table:

S	Output

0	**i0**
1	**i1**

Logic circuit diagram:



Observations/Results:

When the value of s is 0 the i0 is given as output however when s is 1 then i1 is given as output.

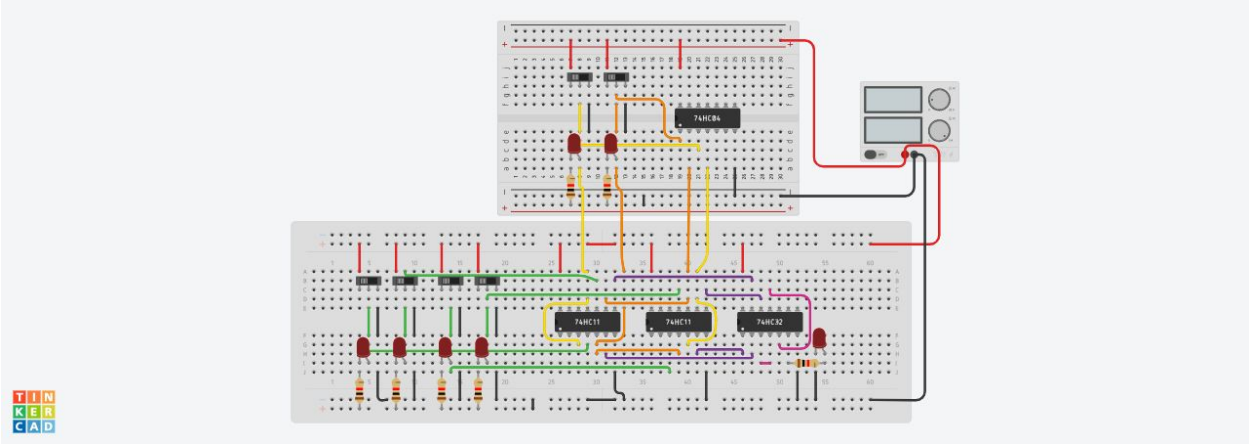
Applications of the 2x1 MUX

1) It is used to connect 2 data lines to the output and send only one of them on the basis of selection signal
2) Can be used to create higher degree mux like 4x1 MUX by using several 2x1 MUX together

Aim 2: Design a 4x1 MUX using basic GATES

Components/ICs Use: 1 power supply, 6 slide switches, 7 resistors (1kohm), 7 LED, 2 Triple AND gate , 1 Quad OR gate, 1 Hex Inverter

Circuit Diagram:



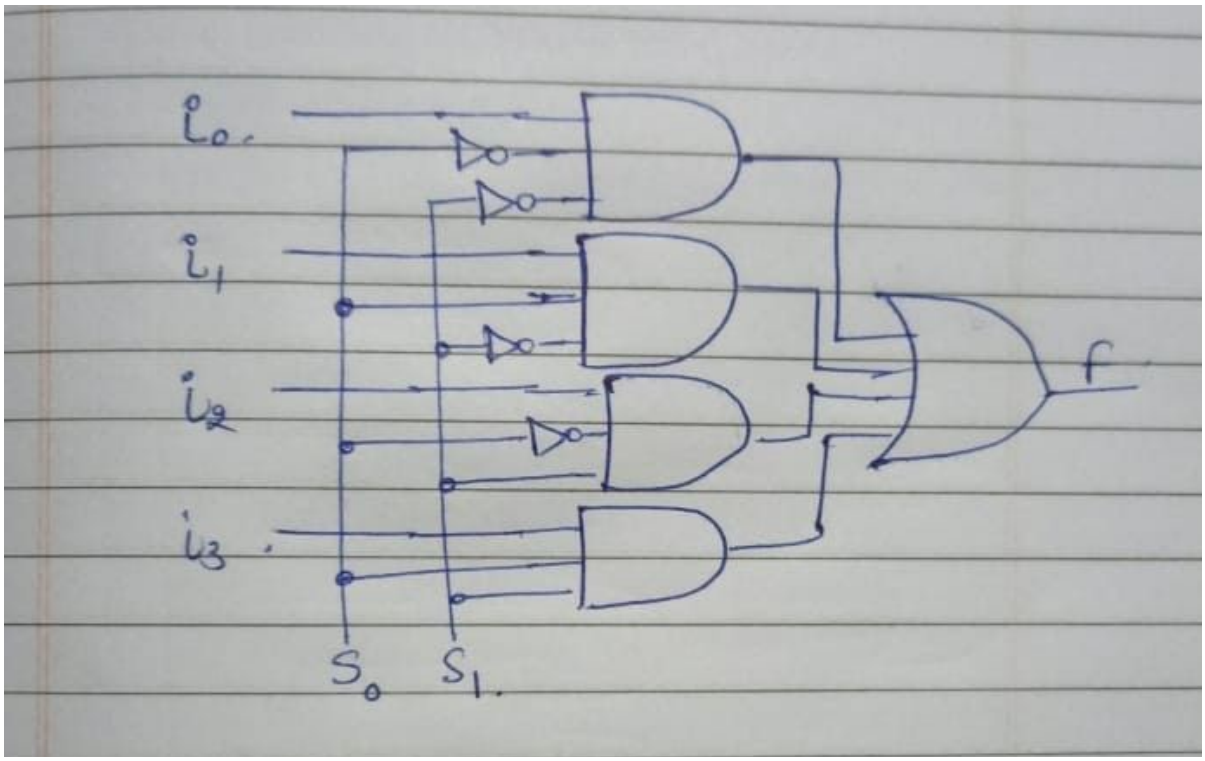
Link of TINKERCAD Workspace:

https://www.tinkercad.com/things/9m6lJPFm3NB-copy-of-2x1-mux/editel?sharecode=9SBCct6NFtACRkoM72fZVXxD-c62BQK7uVKbSUYfm2U

Truth Table:

s1	s0	Output
0	0	i0
0	1	i1
1	0	i2
1	1	i3

Logic circuit diagram:



Observations/Results:

From the given experiment we can prove that :

F = s1'.s0'.i0 + s1'.s0.i1 + s1.s0'.i2 + s1.s0.i3

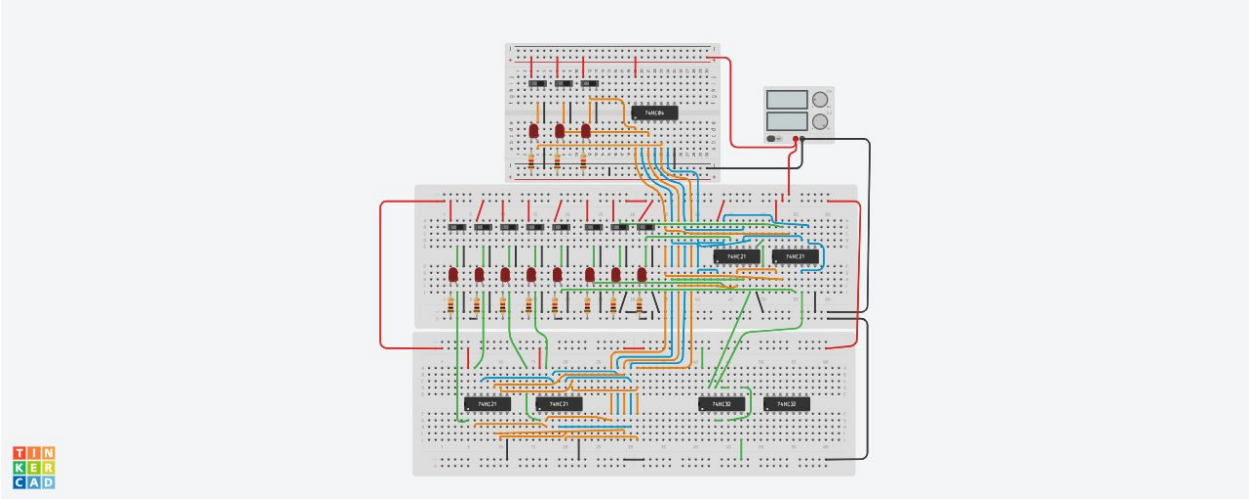
Applications of the 4x1 MUX

1) It is used to to give a single output from 4 input lines based on the selection signal
2) It is a good method for data routing

<u>Aim 3: Design a 8x1 MUX using basic GATES</u>

Components/ICs Use: 1 power supply, 11 slide switches, 12 resistors (1kohm), 12 LED, 4 dual AND gate , 2 Quad OR gate, 1 Hex Inverter

Circuit Diagram:



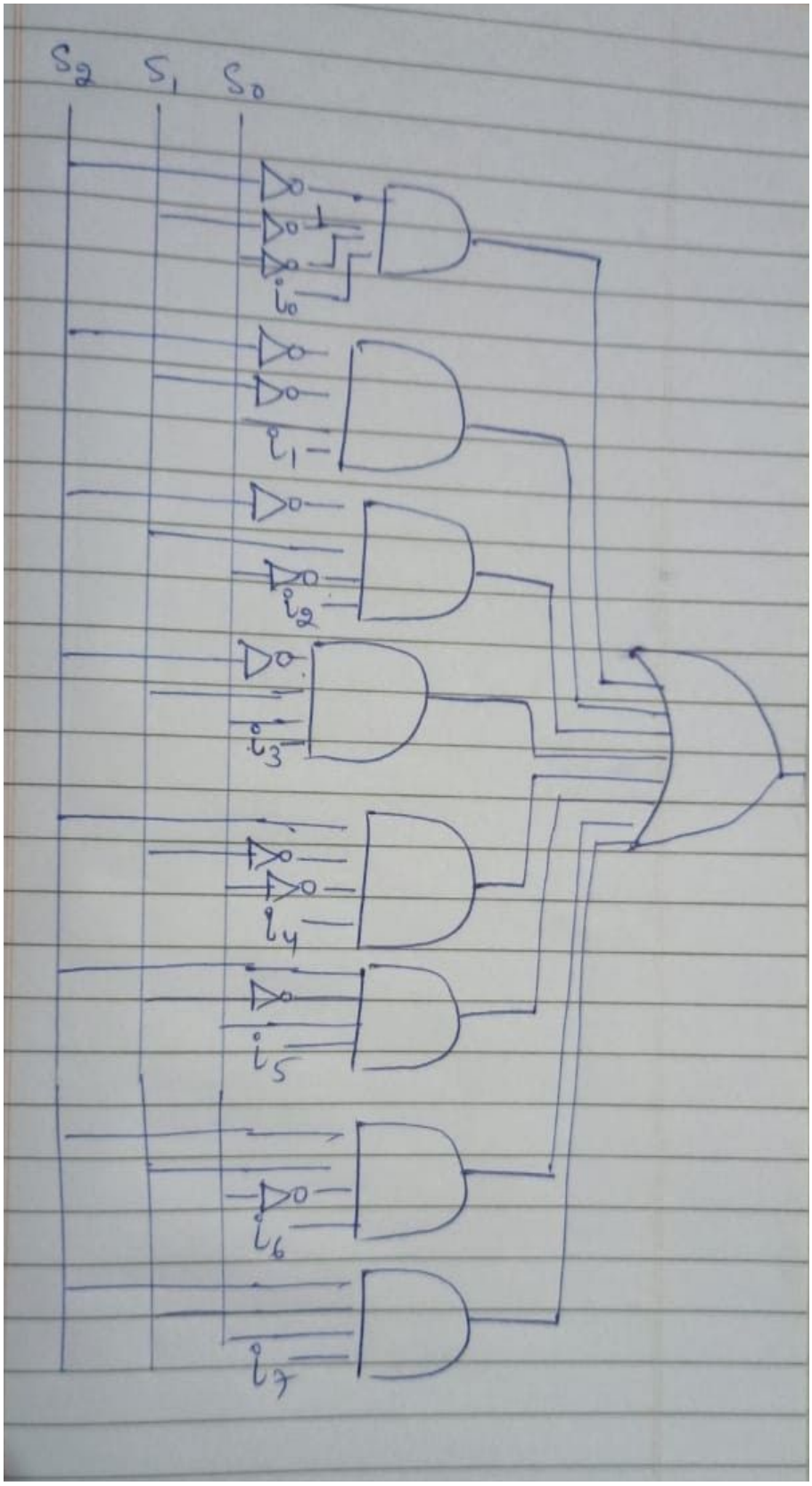
Link of TINKERCAD Workspace:

https://www.tinkercad.com/things/0jprE5VafuR-copy-of-4x1-mux/editel?sharecode=Uh16yMK133q-e5DPvC8DrmJOLMD4U8853gcR5JPnNV4

Truth Table:

s2	s1	s0	Output
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

Logic circuit diagram:



Observations/Results:

From the given experiment we can prove that :

F = s2'.s1'.s0'.i0 + s2'.s1'.s0.i1 + s2'.s1.s0'.i2 + s2'.s1.s0.i3 + s2.s1'.s0'.i4 + s2.s1'.s0.i5 + s2.s1.s0'.i6 + s2.s1.s0.i7

Applications of the 8x1 MUX

1) It is used to to give a single output from 8 input lines based on the selection signal
2) It is useful in parallel data transmission