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Name: Om Vivek Gharge

8:1 MUX

8:1 MUX : Mux is device that has 2^n inputs and only one output, where n is number of input selector line

• Truth table:

S_2	S_1	S_0	Y
0	0	0	I_0
0	0	1	I_1
0	1	0	I_2
0	1	1	I_3
1	0	0	I_4
1	0	1	I_5
1	1	0	I_6
1	1	1	I_7

Here,

no. of inputs $= 2^3 = 8$

no. of selector lines $= 3$

Equation :

$$Y = \bar{S_2}\,\bar{S_1}\,\bar{S_0}\,I_0 + \bar{S_2}\,\bar{S_1}\,S_0\,I_1 + \bar{S_2}\,S_1\,\bar{S_0}\,I_2 + \bar{S_2}\,S_1\,S_0\,I_3 +$$
$$S_2\,\bar{S_1}\,\bar{S_0}\,I_4 + S_2\,\bar{S_1}\,S_0\,I_5 + S_2\,S_1\,\bar{S_0}\,I_6 + S_2\,S_1\,S_0\,I_7$$

* Design: 8:1 MUX

I_7

I_6

I_5

I_4

I_3

I_2

I_1

I_0

Y

S_2 $\bar{S_2}$ S_1 $\bar{S_1}$

S_2 S_1 S_0