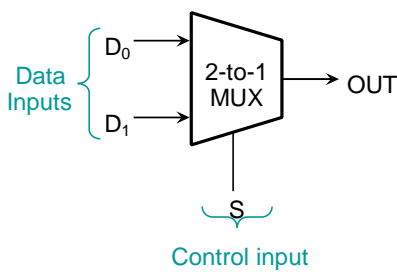


Multiplexer

(MUX for short) is a Combinational circuit that selects binary information from one of many input lines and directs it to single output line.

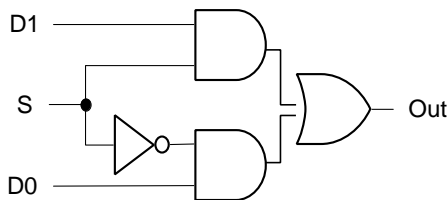
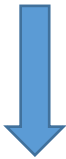
Multiplexer parts:

- 1- Selection lines
- 2- Input lines
- 3- Output line



S	OUT
0	D ₀
1	D ₁

S	D ₁	D ₀	OUT
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	1



Two
for a 2:1 MUX truth table

alternative forms

Note: MUX is decoder (“Active high outputs”) with AND & OR gates

Ex1: Design 4-to-1-line Multiplexer

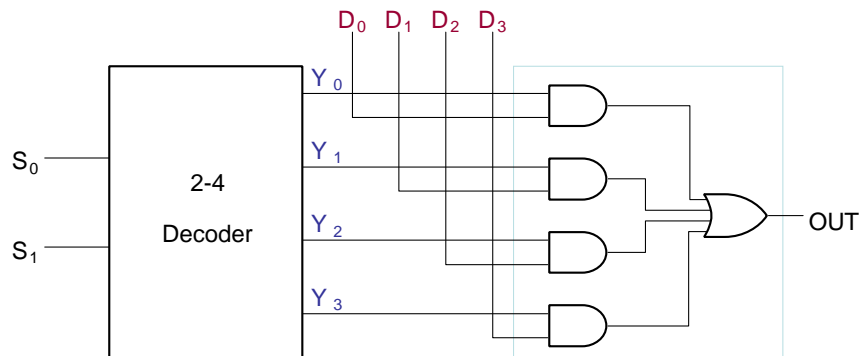
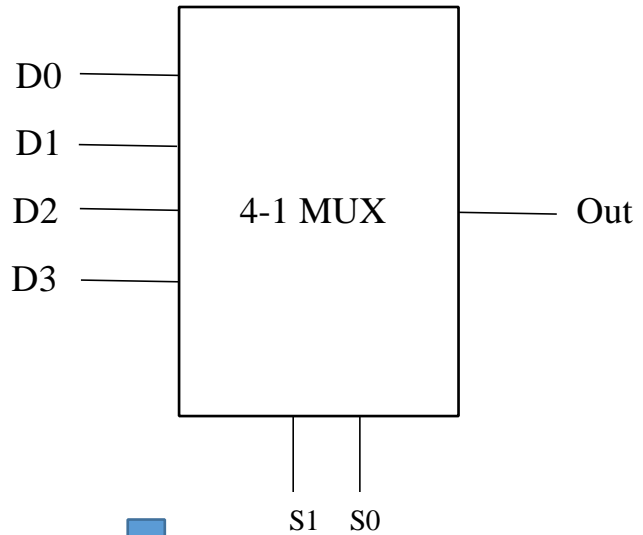
Let's say:

$S_1 = 0, S_0 = 0$ then Output is D_0

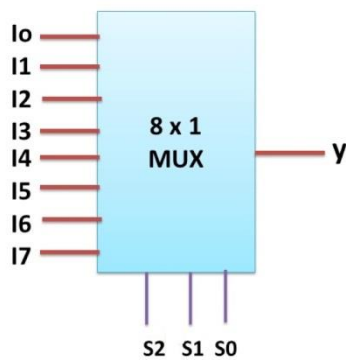
$S_1 = 0, S_0 = 1$ then Output is D_1

$S_1 = 1, S_0 = 0$ then Output is D_2

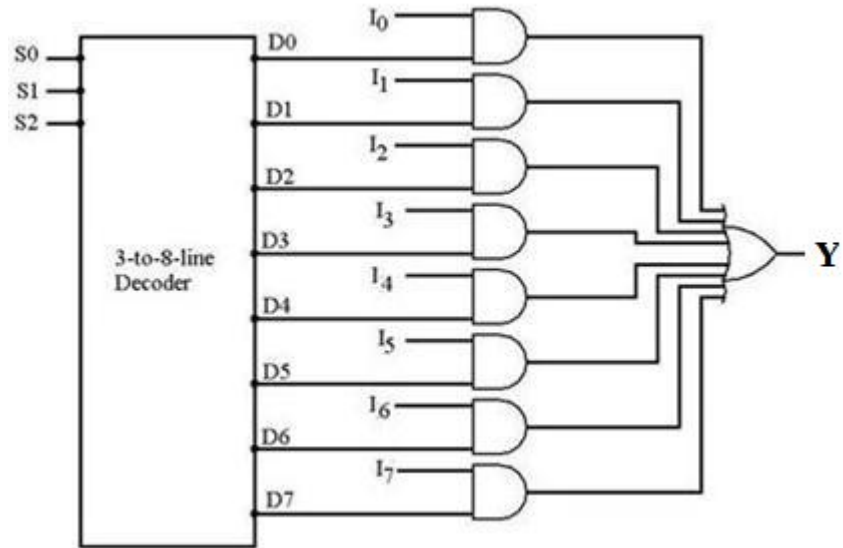
$S_1 = 1, S_0 = 1$ then Output is D_3



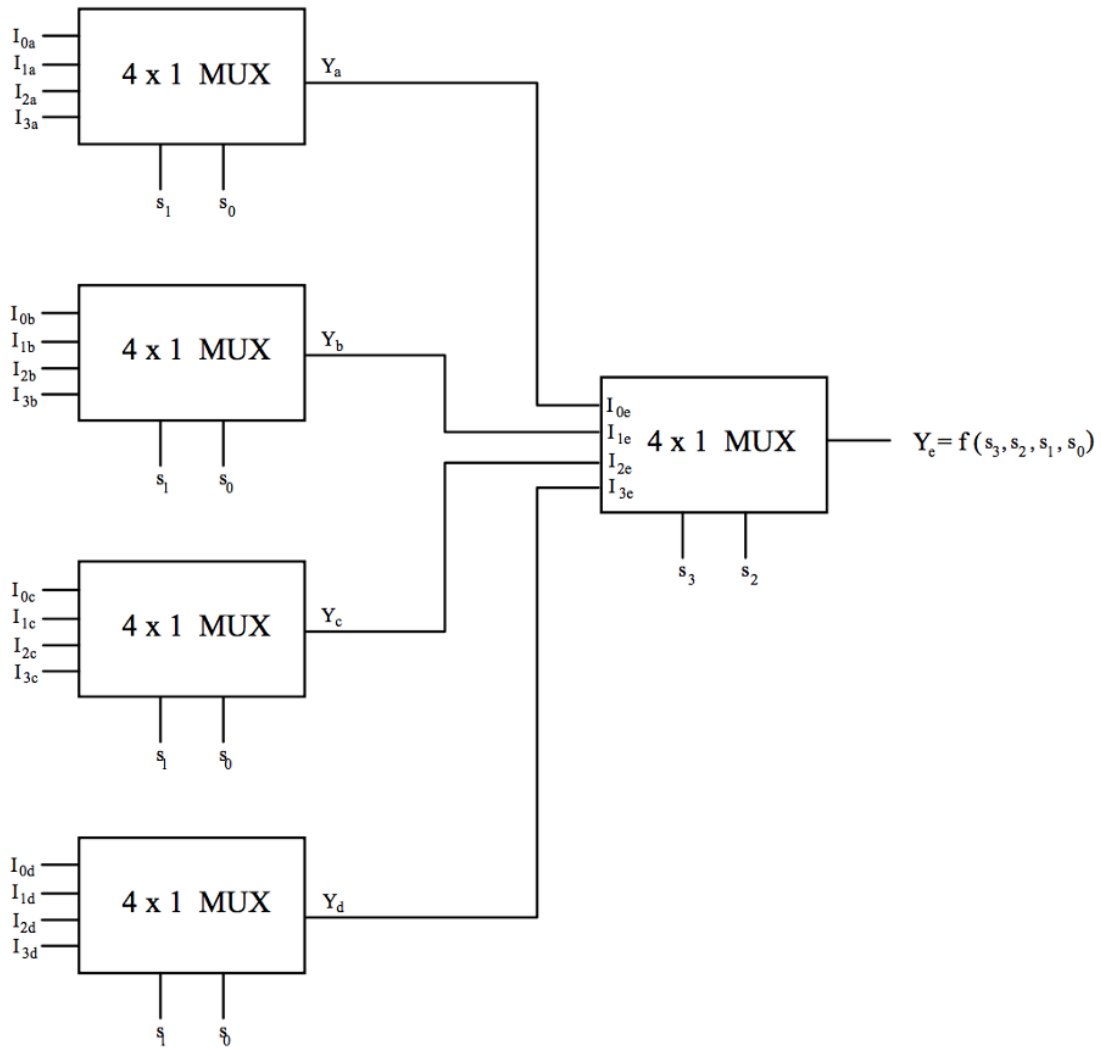
Ex2: Design 8-to-1-line Multiplexer



S2	S1	S0	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

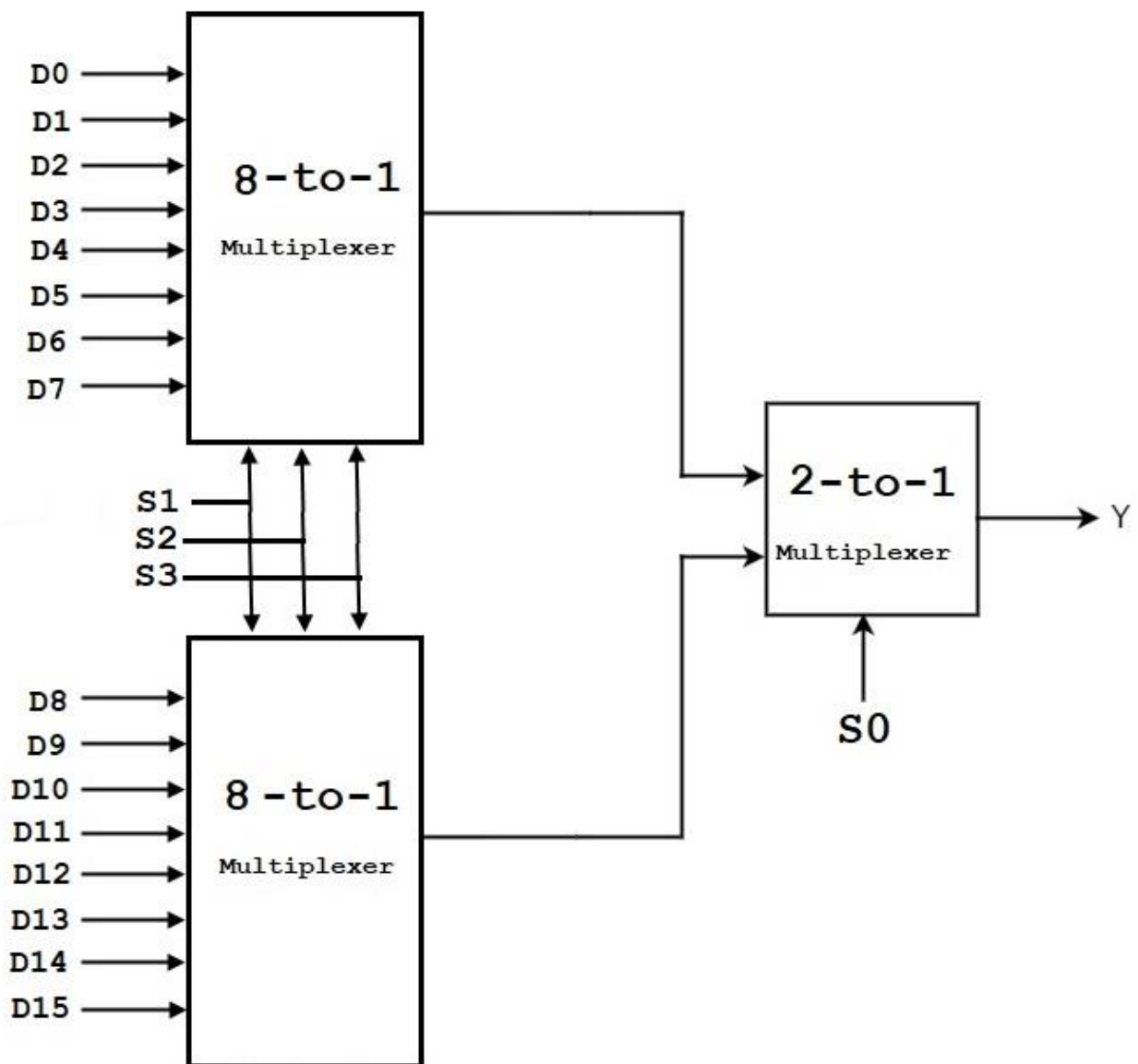


Ex3: Design 16-1 MUX using 5×(4-1 MUX)



H.W: Design 8-1 MUX using 2× (4-1 MUX) and 1× (2-1 MUX)

Ex4: Design 16-1 MUX using 2× (8-1 MUX) and 1× (2-1 MUX)



Demultiplexer

The demultiplexer (DEMUX) is a combinational logic circuit designed to switch one common input line to one of several separate output line

Demultiplexer Output Line Selection:

