DIGITAL ELECTRONICS:
DEMULTIPLEXER

SNS COLLEGE OF ENGINEERING

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An Autonomous Institution

Accredited by NAAC – UGC with 'A' Grade

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

DEMULTIPLEXER

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DEMULTIPLEXER

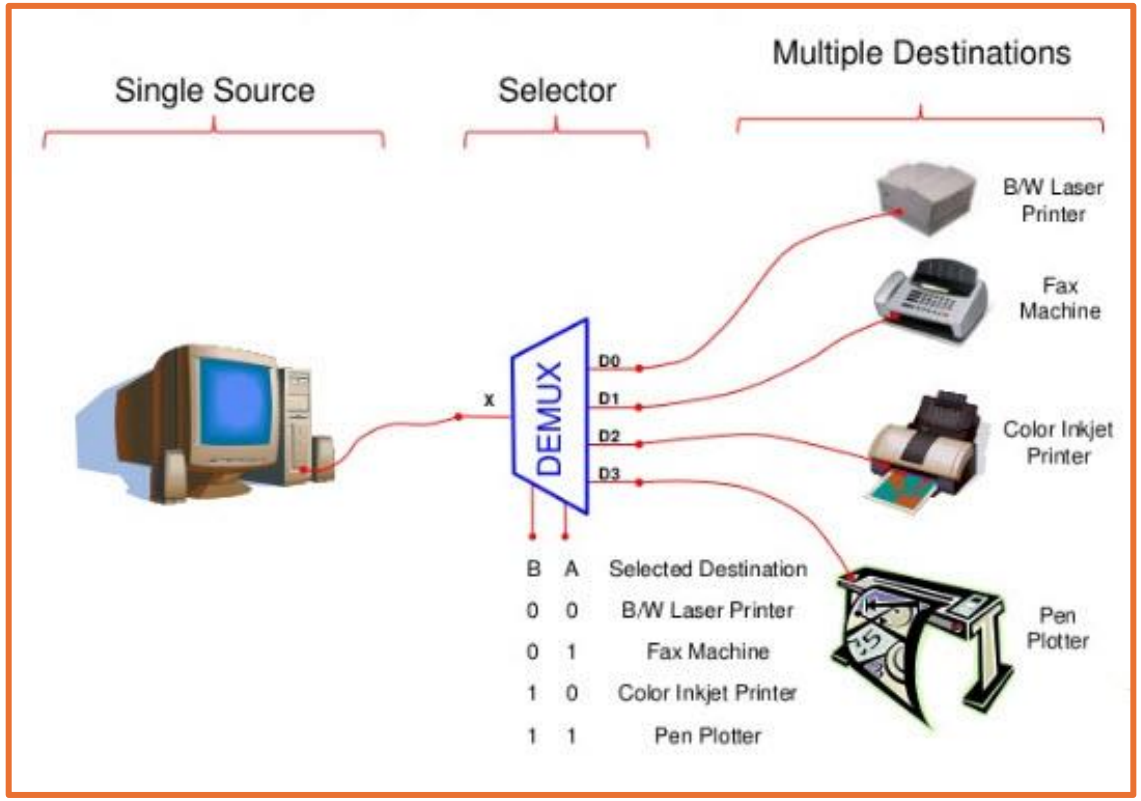
De-Multiplexer is a combinational circuit that performs the reverse operation of Multiplexer.

Demultiplexer is a **data distributor** which takes a single input and gives several outputs.

A Demultiplexer is a combinational circuit that has **one input line , 2^n output lines and 'n' selection lines.**

APPLICATIONS

- ✓ Demultiplexers are used in several input and output devices for data routing.
- ✓ Demultiplexers are used in digital control systems to select one signal from a mutual stream of signals.
- ✓ Demultiplexers are also employed for data transmission in synchronous systems.
- ✓ Demultiplexers are also utilized in data acquisition systems.
- ✓ Demultiplexers can be used for generating Boolean functions.
- ✓ Demultiplexers can be used in serial to parallel converters.
- ✓ Demultiplexers are used for broadcasting of ATM packets.
- ✓ Demultiplexers can also be used to design automatic test equipment, etc.

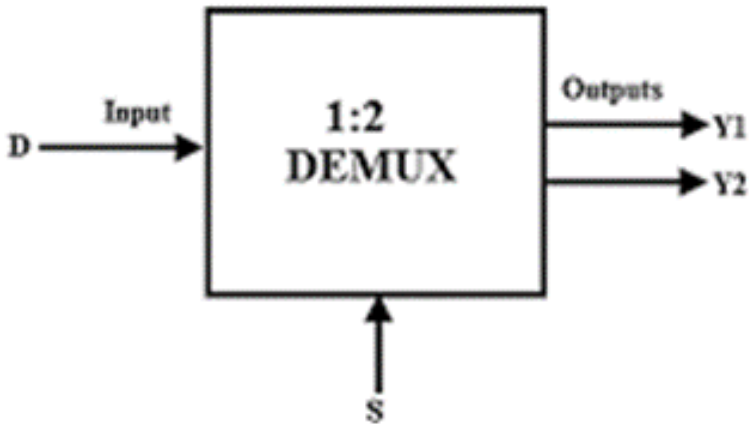


TYPES OF DEMULTIPLEXERS

- ✓ 1:2 Demultiplexer (1select line)
- ✓ 1:4 Demultiplexer (2 select lines)
- ✓ 1:8 Demultiplexer(3 select lines)
- ✓ 1:16 Demultiplexer (4 select lines)

1:2 DEMULTIPLEXER

There is one input (D), two outputs (Y_1 and Y_2), 1 selection line(S).



1:2 DEMULTIPLEXER

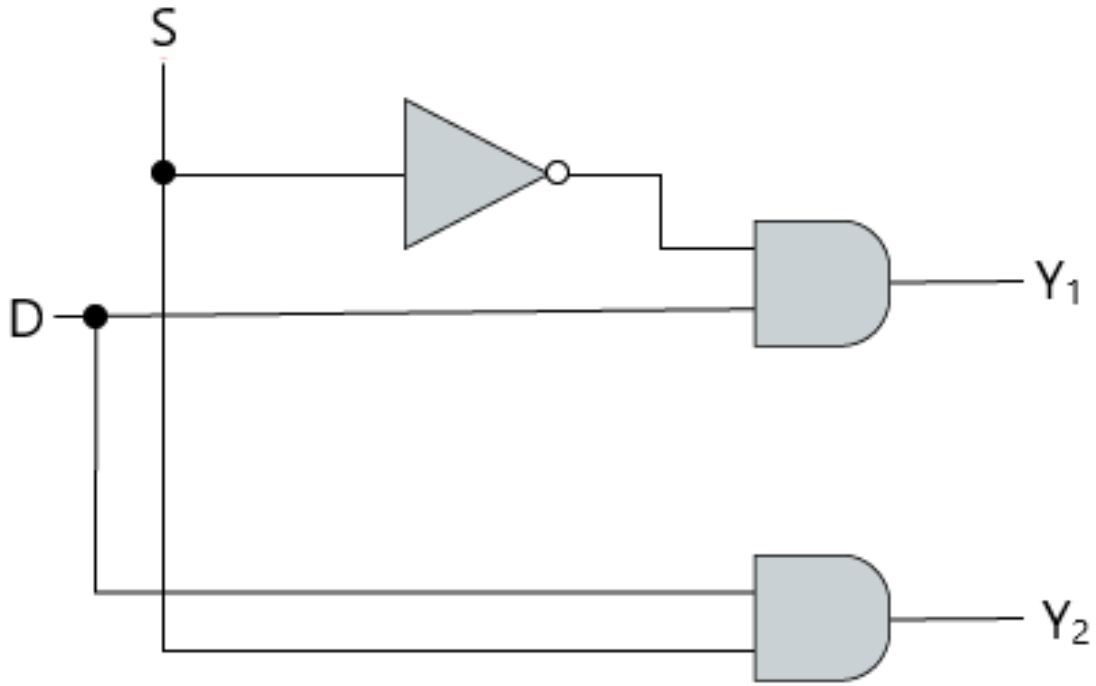
Truth Table

S (Selection line)	Y_1	Y_2
0	D	0
1	0	D

Boolean Expression

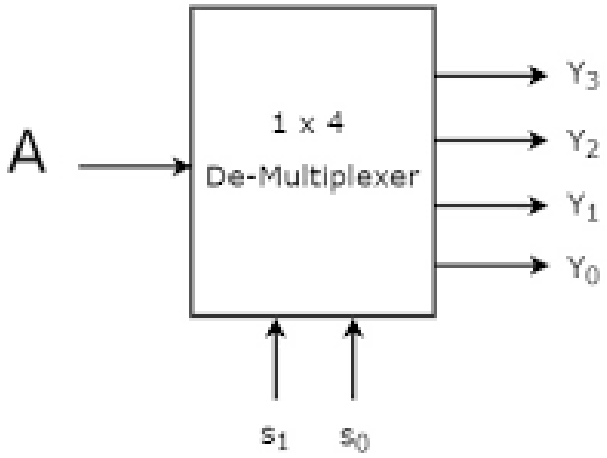
$Y_1 = DS'$

$Y_2 = DS$



1 : 4 DEMULTIPLEXER

There are four Outputs (Y_0, Y_1, Y_2, Y_3), 2 selection line(S_0,S_1) and single Input(A).



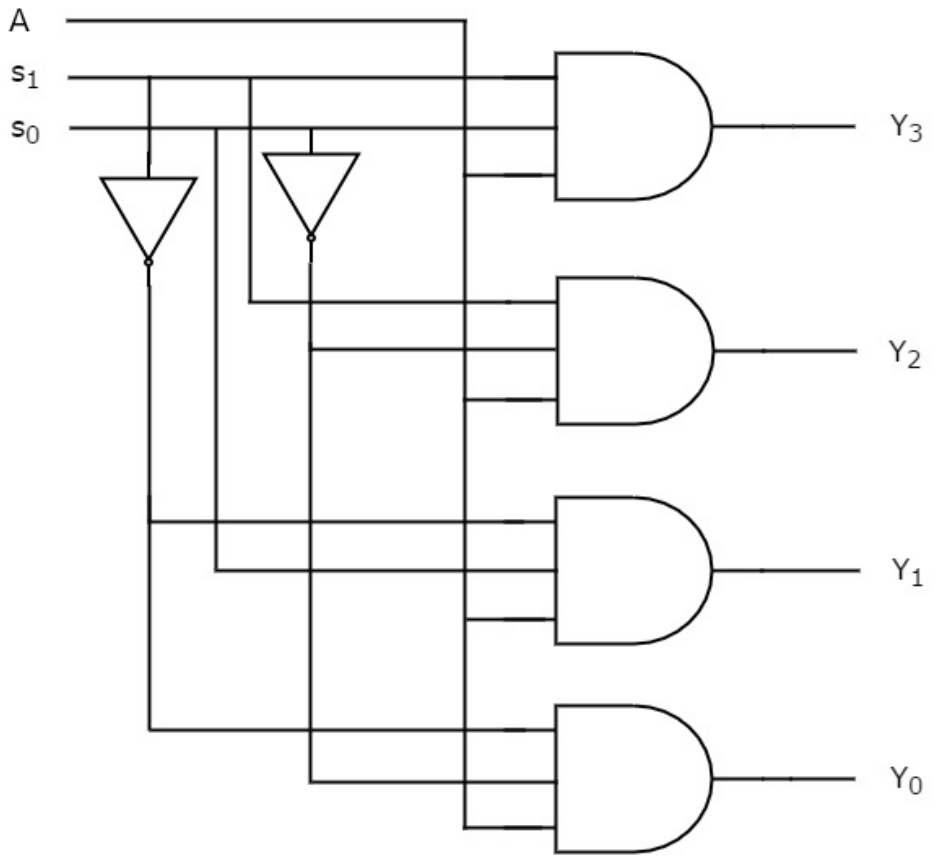
1:4 DEMULTIPLEXER

Truth Table

S_1	S_0	Y_3	Y_2	Y_1	Y_0
0	0	0	0	0	A
0	1	0	0	A	0
1	0	0	A	0	0
1	1	A	0	0	0

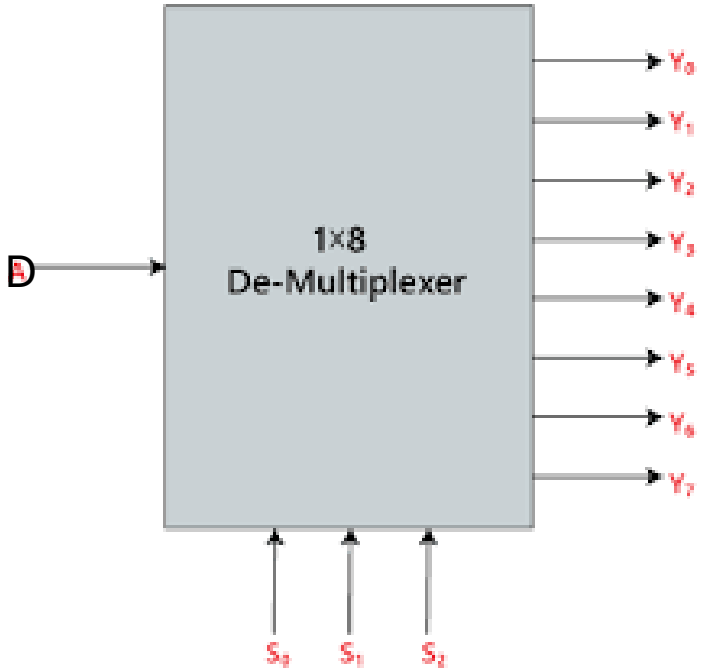
Boolean Expression

$Y_0 = A\, S_0' S_1'$
$Y_1 = A\, S_1' S_0$
$Y_2 = A\, S_1 S_0'$
$Y_3 = A\, S_1 S_0$



1 : 8 DEMULTIPLEXER

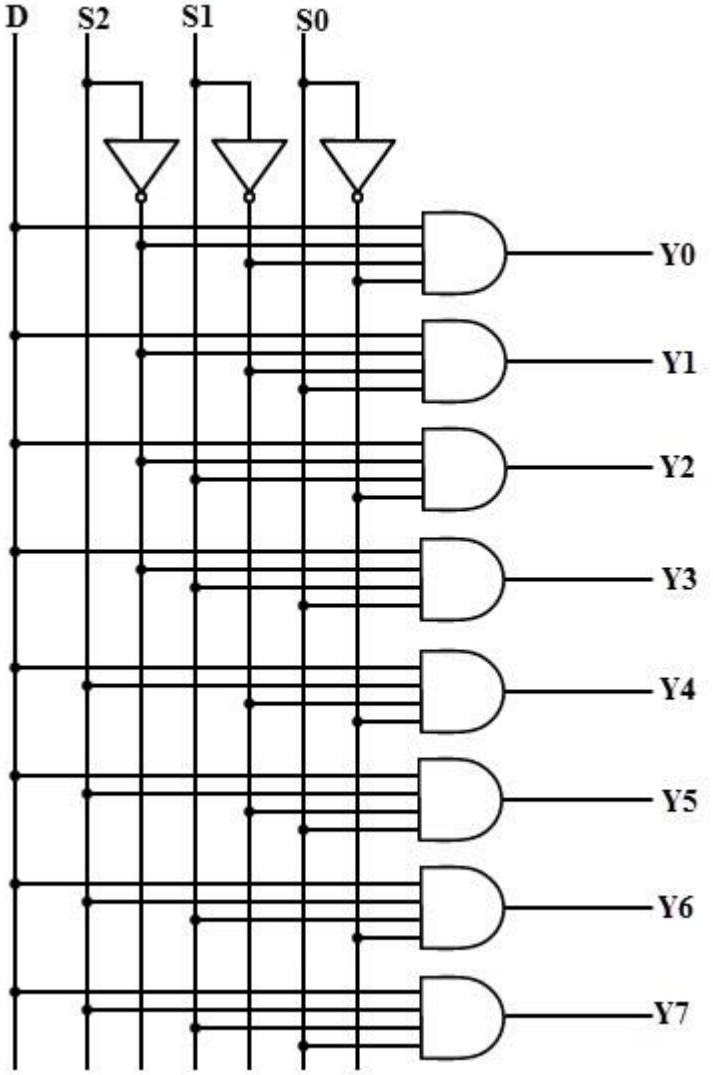
There are eight outputs,(Y_0, Y_1, Y_2, Y_3, Y_4, Y_5, Y_6, and Y_7), 3 selection line (S_0,S_1, S_2) and single Input(D).



1 : 8 DEMULTIPLEXER

Data Input	Select Inputs			Outputs							
D	S_2	S_1	S_0	Y_7	Y_6	Y_5	Y_4	Y_3	Y_2	Y_1	Y_0
D	0	0	0	0	0	0	0	0	0	0	D
D	0	0	1	0	0	0	0	0	0	D	0
D	0	1	0	0	0	0	0	0	D	0	0
D	0	1	1	0	0	0	0	D	0	0	0
D	1	0	0	0	0	0	D	0	0	0	0
D	1	0	1	0	0	D	0	0	0	0	0
D	1	1	0	0	D	0	0	0	0	0	0
D	1	1	1	D	0	0	0	0	0	0	0

$Y_0 = S_0'.S_1'.S_2'.D$
$Y_1 = S_0.S_1'.S_2'.D$
$Y_2 = S_0'.S_1.S_2'.D$
$Y_3 = S_0.S_1.S_2'.D$
$Y_4 = S_0'.S_1'.S_2\ D$
$Y_5 = S_0.S_1'.S_2\ D$
$Y_6 = S_0'.S_1.S_2\ D$
$Y_7 = S_0.S_1.S_3.D$



Assessment

1. For a 8:1 Demultiplexer, how many selection lines are required?

2. Name the device that converts serial data to parallel data .


Thank
you