My Presentation Topic is

Encoder, Decoder, Mux & Demux

Presented By

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Outline

- Encoder
- Encoder Circuit & Truth Table
- Decoder
- Decoder Circuit & Truth Table
- Multiplexer (MUX)
- Multiplexer (MUX) Circuit & Truth Table
- Demultiplexer (DEMUX)
- Demultiplexer (DEMUX) Circuit & Truth Table
- Practical use of Encoder, Decoder, MUX and DEMUX

Encoder

- An Encoder is **a** combinational circuit that performs the reverse operation of Decoder .

- It has maximum of 2^n input lines and 'n' output lines, hence it encodes the information from 2^n inputs into an n-bit code.

- It will produce a binary code equivalent to the input, which is active High.
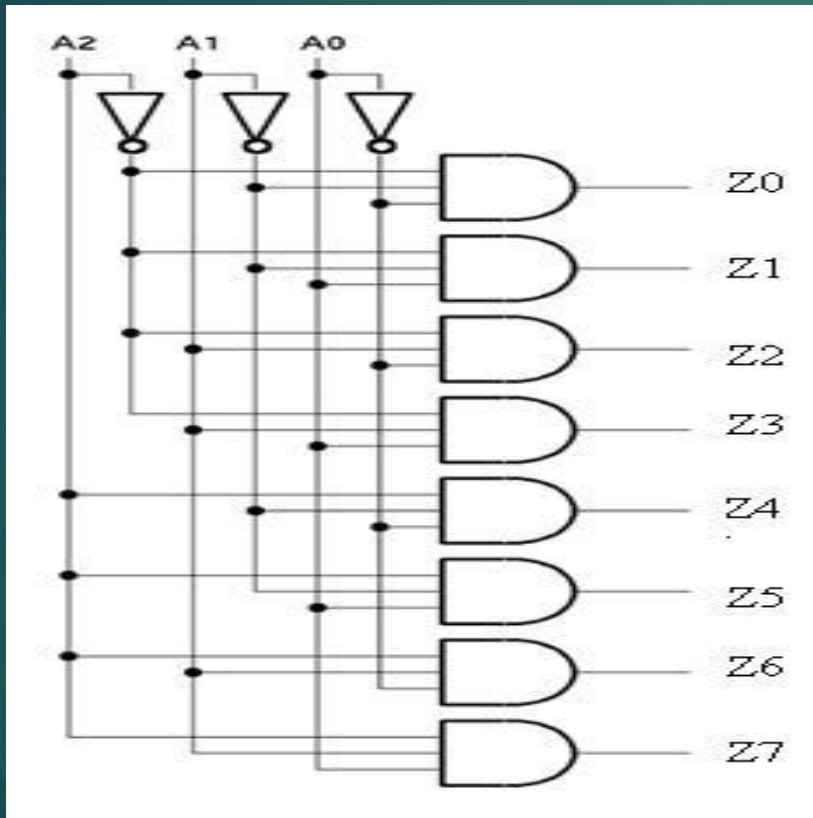
Encoder Circuit and Truth Table.
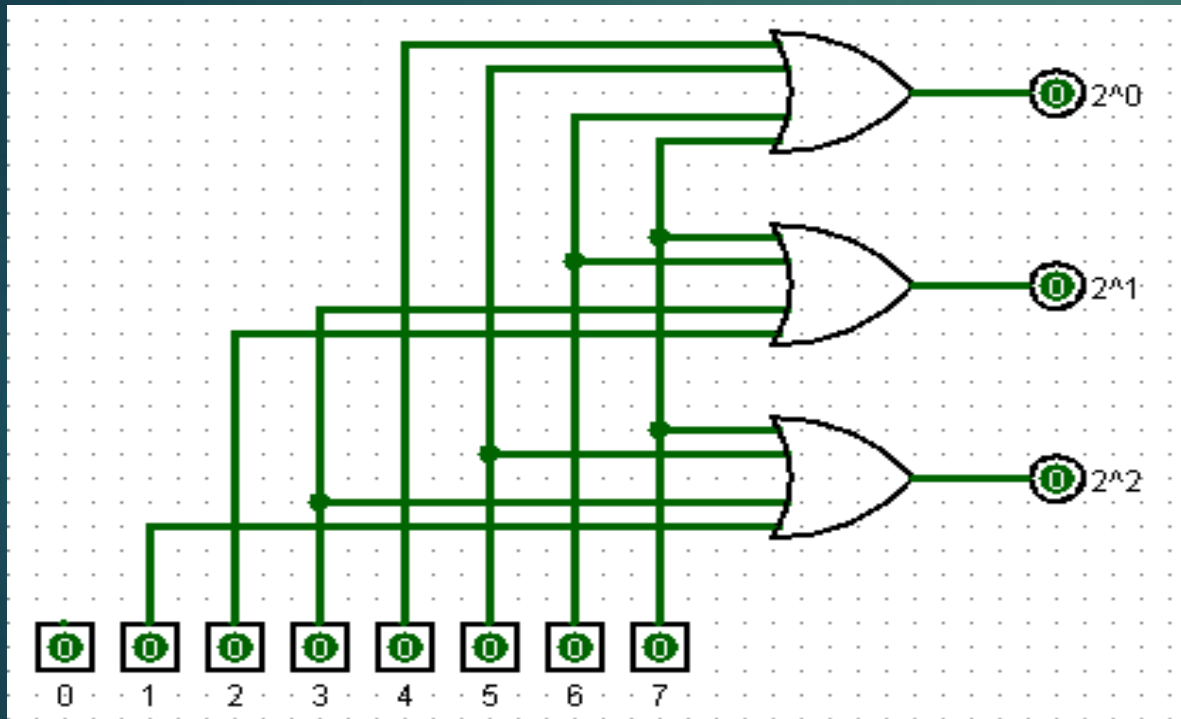
INPUT								OUTPUT		
D0	D1	D2	D3	D4	D5	D6	D7	Y2	Y1	Y0
1	0	0	0	0	0	0	0	0	0	0
X	1	0	0	0	0	0	0	0	0	1
X	X	1	0	0	0	0	0	0	1	0
X	X	X	1	0	0	0	0	0	1	1
X	X	X	X	1	0	0	0	1	0	0
X	X	X	X	X	1	0	0	1	0	1
X	X	X	X	X	0	1	0	1	1	0
X	X	X	X	X	X	X	1	1	1	1

Decoder

- Decoder is a combinational circuit that has 'n' input lines and maximum of 2n output lines.

- One of these outputs will be active High based on the combination of inputs present, when the decoder is enabled.

- That means decoder detects a particular code.

- The outputs of the decoder are nothing but the min terms of 'n' input variables lines, when it is enabled.

Decoder circuit and truth table

INPUT			OUTPUT							
A_2	A_1	A_0	Z_0	Z_1	Z_2	Z_3	Z_4	Z_5	Z_6	Z_7
0	0	0	1	0	0	0	0	0	0	0
0	0	1	0	1	0	0	0	0	0	0
0	1	0	0	0	1	0	0	0	0	0
0	1	1	0	0	0	1	0	0	0	0
1	0	0	0	0	0	0	1	0	0	0
1	0	1	0	0	0	0	0	1	0	0
1	1	0	0	0	0	0	0	0	1	0
1	1	1	0	0	0	0	0	0	0	1

Practical Use of Encoder & Decoder

❑ **Encoder :**

➢ Encoders are used in devices that need to operate in high speed and with high accuracy.

➢ The method of controlling the motor rotation by detecting the motor rotation speed and rotation angle using an encoder is called feedback control (closed loop method).

❑ **Decoder :**

➢ A digital decoder converts a set of digital signals into corresponding decimal code.

➢ A decoder is also a most commonly used circuit in prior to the use of encoder.

➢ The encoded data is decoded for user interface in most of the output devices like monitors, calculator displays, printers, etc.

Multiplexer (MUX).

▶ In electronics, a **multiplexer** (or mux; spelled sometimes as multiplexor), also known as a data selector, is a device that selects between several analog or digital input signals and forwards the selected input to a single output line.

▶ The multiplexer or MUX is a digital switch, also called as data selector.

▶ It is a Combinational Logic Circuit with more than one input line, one output line and more than one select line.

▶ Accepts the binary information from several input lines or sources and depending on the set of select lines, a particular input line is routed onto a single output line.

Multiplexer (MUX) Circuit and Truth Table
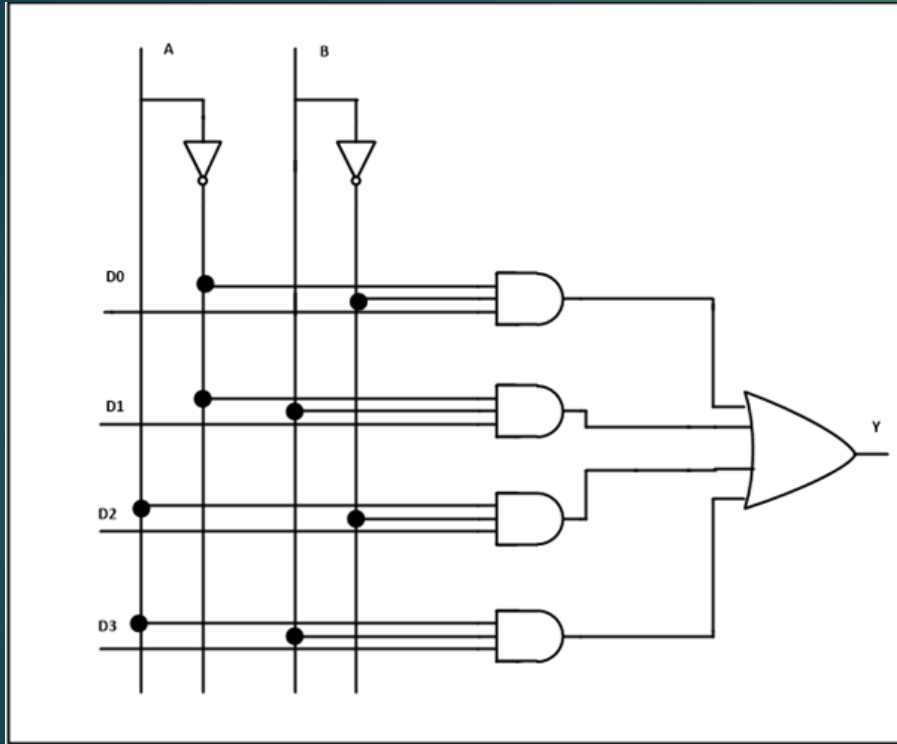
A	B	Y
0	0	D0
0	1	D1
1	0	D2
1	1	D3

Demultiplexer (DEMUX)

▶ **De-Multiplexer** is a combinational circuit that performs the reverse operation of Multiplexer. It has single input, 'n' selection lines and maximum of 2^n outputs.

▶ The input will be connected to one of these outputs based on the values of selection lines.

Demultiplexer(DEMUX) Circuit & Truth Table.
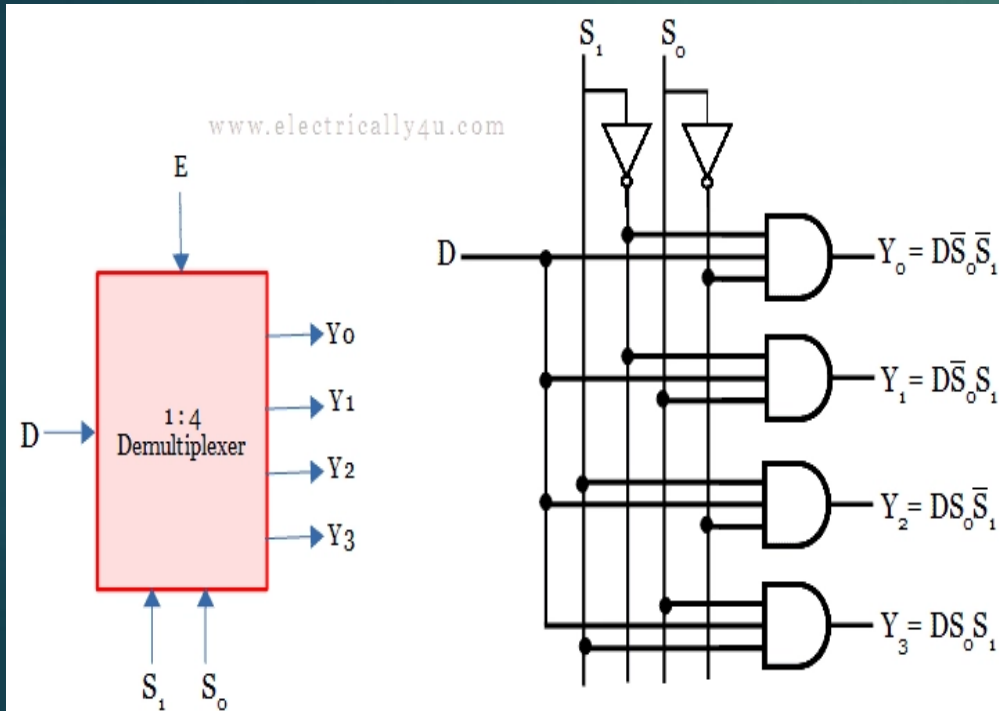
S1	S0	Y0	Y1	Y2	Y3
0	0	D	0	0	0
0	1	0	D	0	0
1	0	0	0	D	0
1	1	0	0	0	D

Practical Use of MUX and DEMUX

❏ **MUX:**

➢ Multiplexer allow the process of transmitting different type of data such as audio, video at the same time using a single transmission line.

➢ Telephone Network – In telephone network, multiple audio signals are integrated on a single line for transmission with the help of multiplexers.

❏ **DEMUX:**

➢ Demultiplexer are also used for reconstruction of parallel data and ALU circuits. Communication System – Communication system use multiplexer to carry multiple data like audio, video and other form of data using a single line for transmission.

➢ This process make the transmission easier.