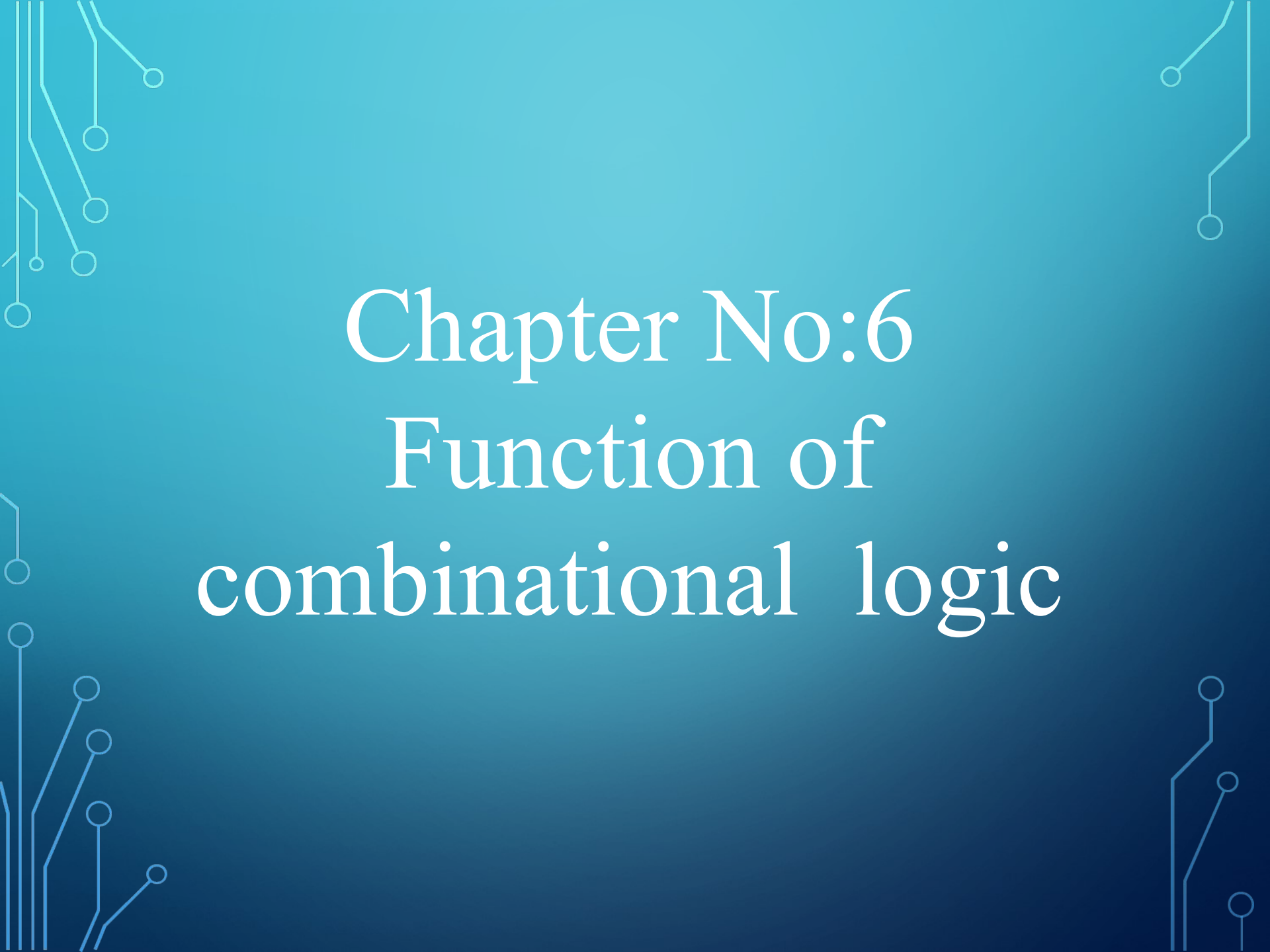


DIGITAL LOGIC DESIGN

EE(1005)

LECTURE-23

The background is a blue gradient with white circuit-like lines and circles in the corners. The text is centered in a white serif font.

Chapter No:6

Function of combinational logic

TOPICS

1. Half and Full Adders
2. Parallel Binary Adders
3. Comparators
4. Decoders
5. Encoders
6. Code Converters
7. Multiplexers (Data Selectors)
8. Demultiplexers

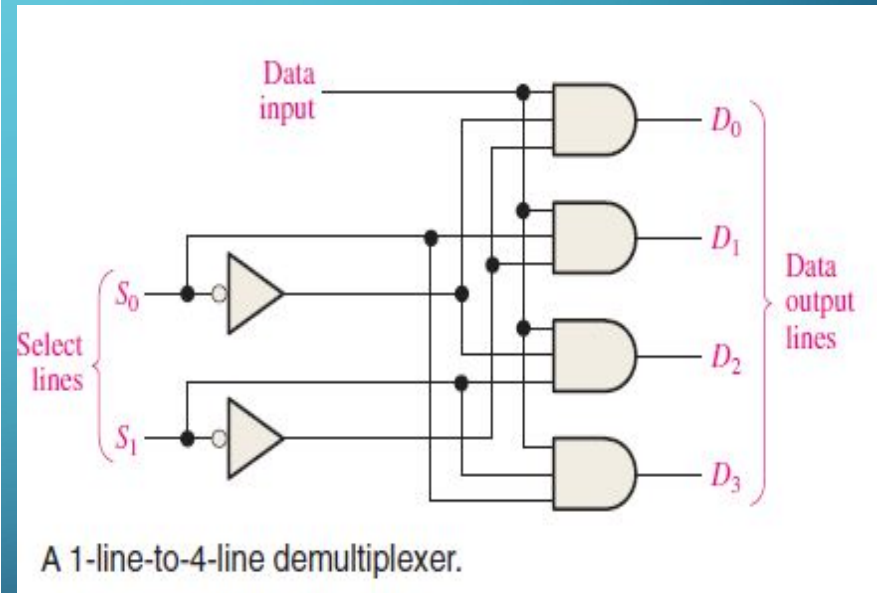
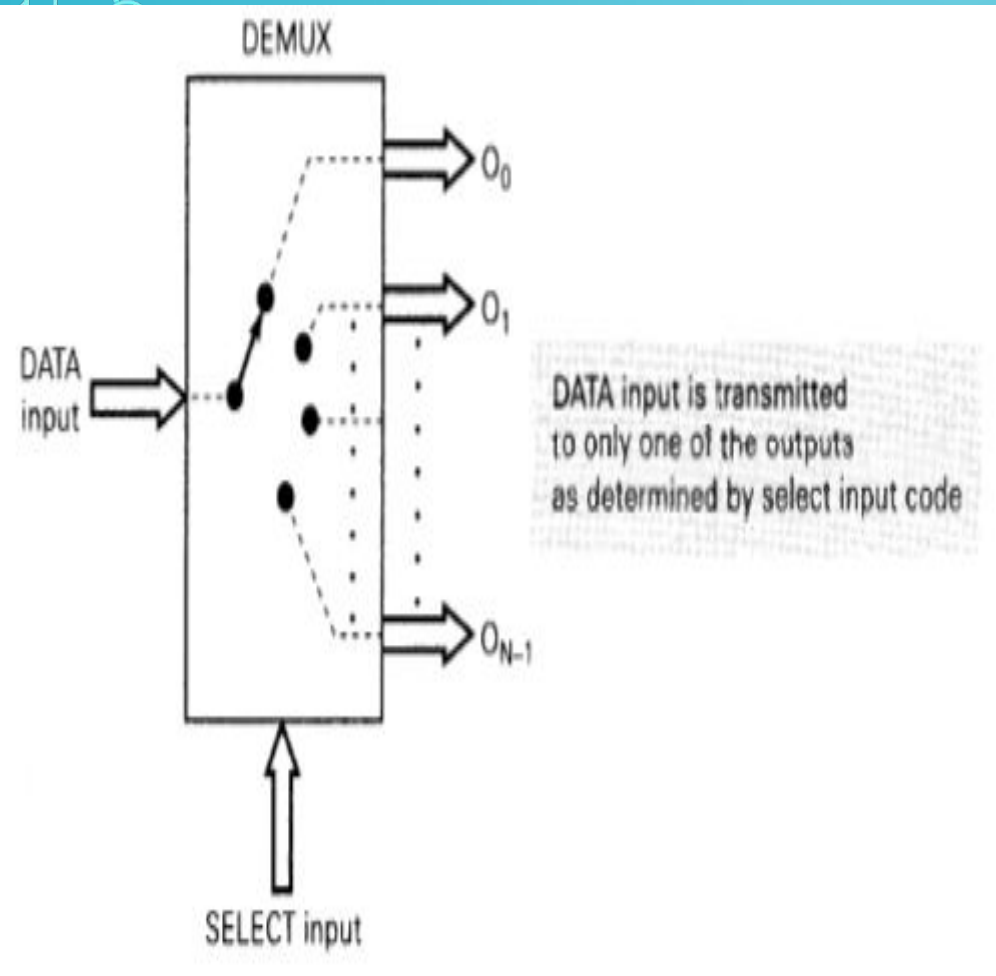
A 4-variable truth table has sixteen combinations of input variables.

A 4-variable truth table has sixteen combinations of input variables. When an 8-bit data selector is used, each input is selected twice: the first time when A_0 is 0 and the second time when A_0 is 1. With this in mind, the following rules can be applied (Y is the output, and A_0 is the least significant bit):

1. If $Y = 0$ both times a given data input is selected by a certain combination of the input variables, $A_3A_2A_1$, connect that data input to ground (0).
2. If $Y = 1$ both times a given data input is selected by a certain combination of the input variables, $A_3A_2A_1$, connect the data input to $+V$ (1).
3. If Y is different the two times a given data input is selected by a certain combination of the input variables, $A_3A_2A_1$, and if $Y = A_0$, connect that data input to A_0 .
4. If Y is different the two times a given data input is selected by a certain combination of the input variables, $A_3A_2A_1$, and if $Y = \overline{A_0}$, connect that data input to $\overline{A_0}$.

DEMULTIPLEXERS

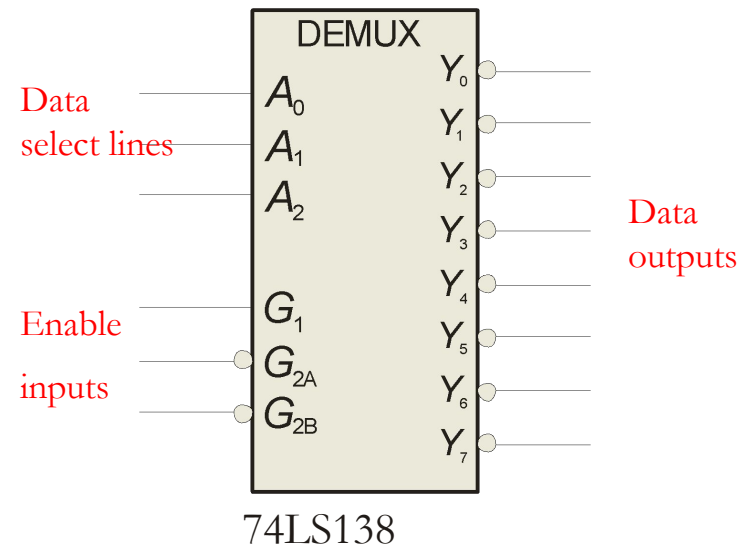
A **demultiplexer (DEMUX)** basically reverses the multiplexing function. It takes digital information from one line and distributes it to a given number of output lines.



Demultiplexers

A demultiplexer (DEMUX) performs the opposite function from a MUX. It switches data from one input line to two or more data lines depending on the select inputs.

The 74LS138 was introduced previously as a decoder but can also serve as a DEMUX. When connected as a DEMUX, data is applied to one of the enable inputs, and routed to the selected output line depending on the select variables. Note that the outputs are active-LOW as illustrated in the following example...

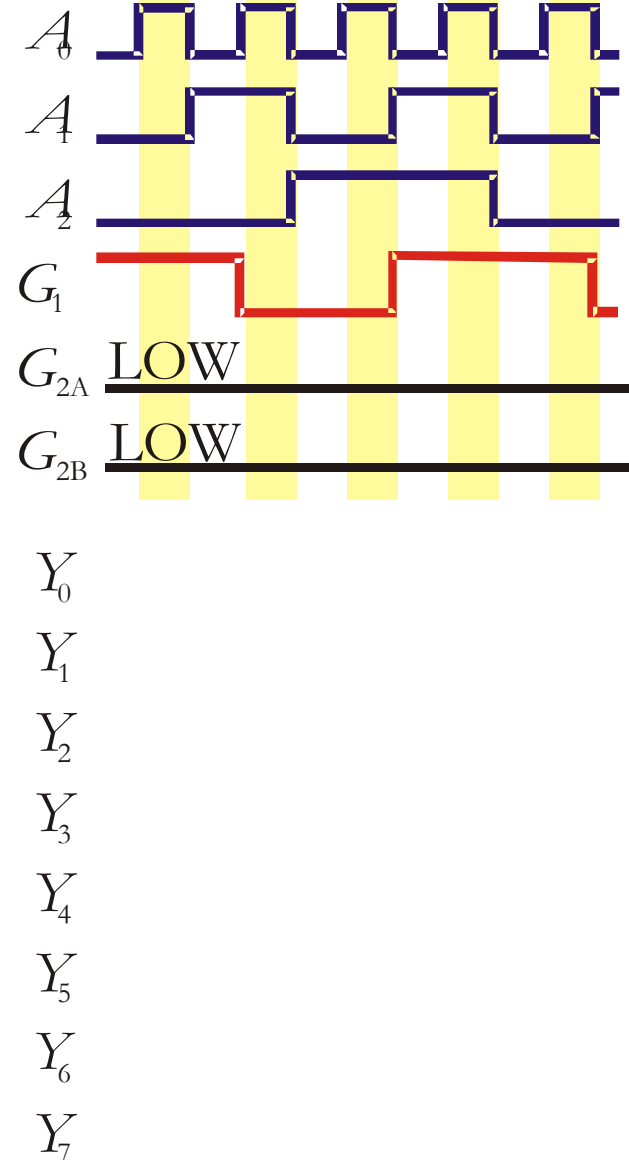
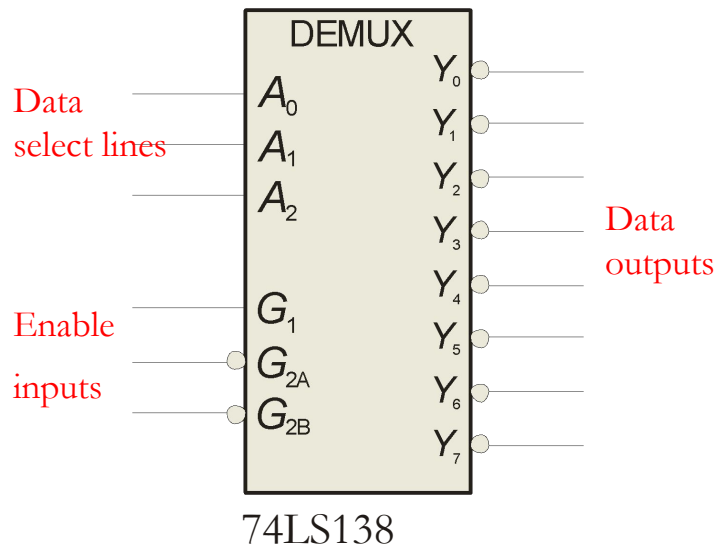


Demultiplexers

Example Determine the outputs, given the inputs shown.

Solution

The output logic is opposite to the input because of the active-LOW convention. (Red shows the selected line).



THE 74HC154 DEMULTIPLEXER

