DIGITAL SYSTEMS AND MICROPROCESSORS (ELE2002M)

TUTORIAL QUESTIONS
COMBINATIONAL LOGIC DESIGN

Instructor:

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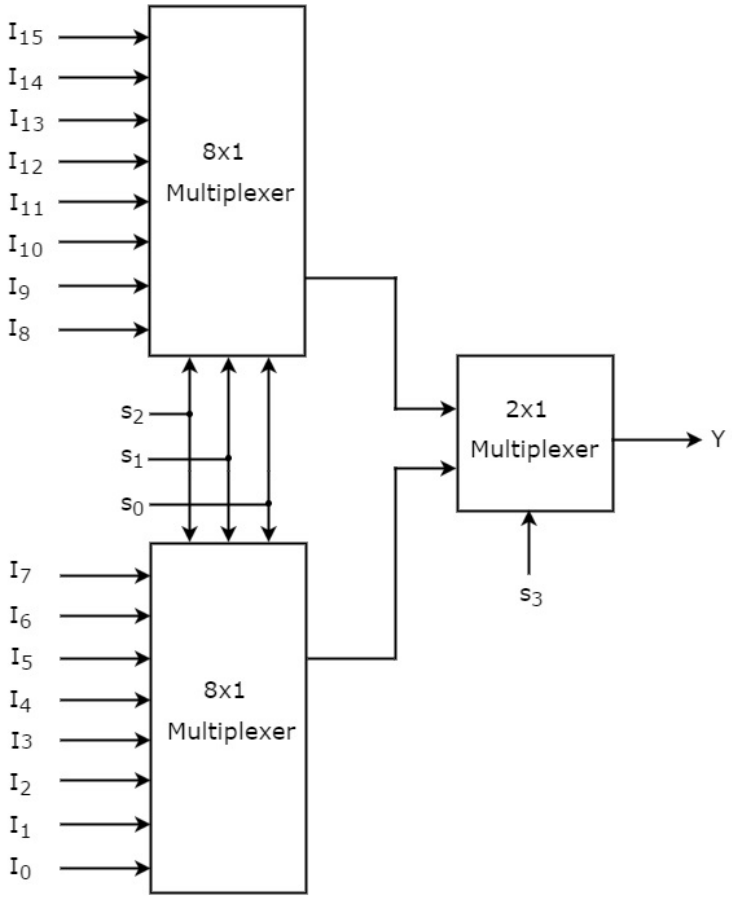
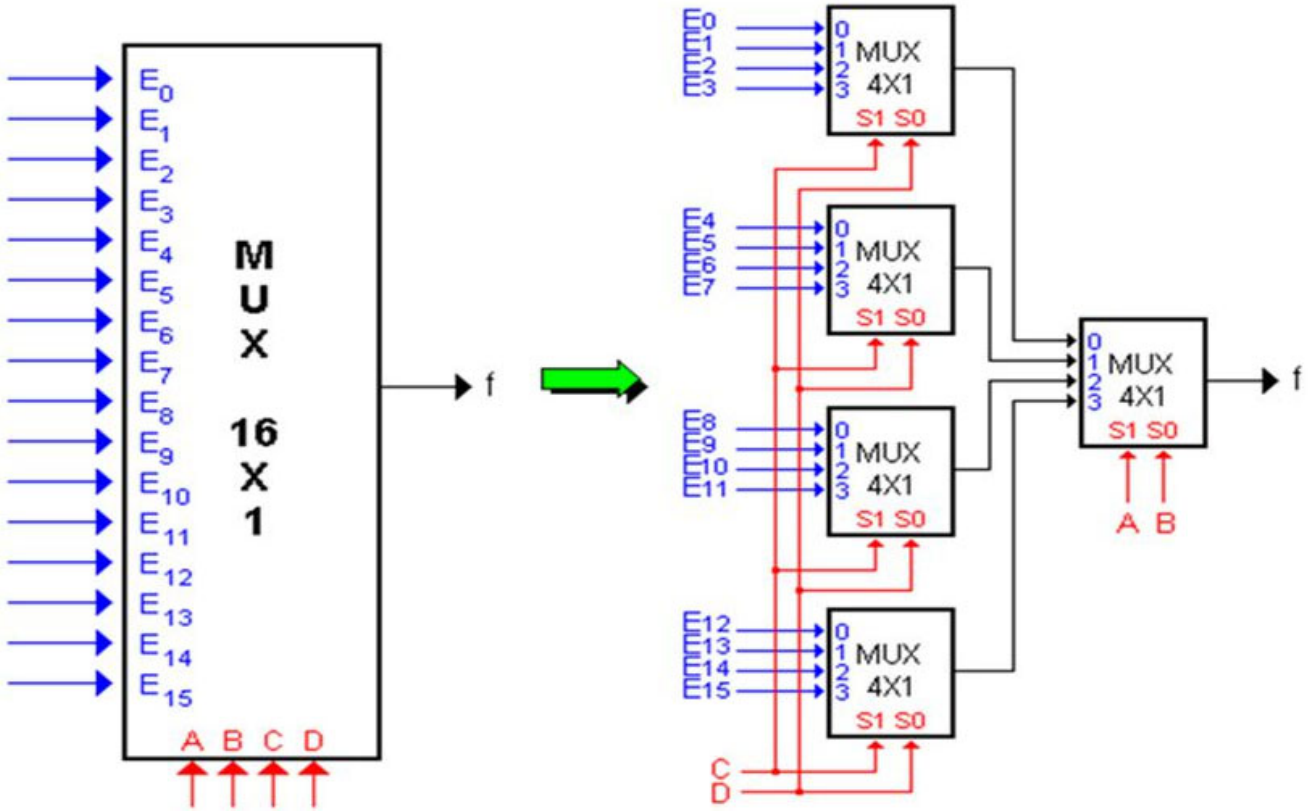
Example 1

Construct a 16:1 MUX using only two 8:1 MUX and one 2:1 MUX

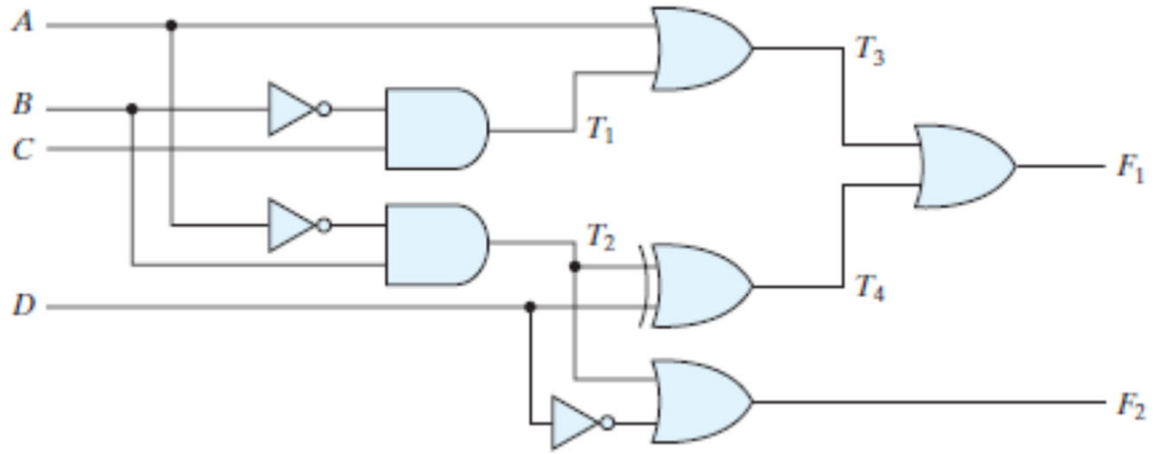


Example 2

Construct a 16:1 MUX using only 4:1 MUXs



Example 3

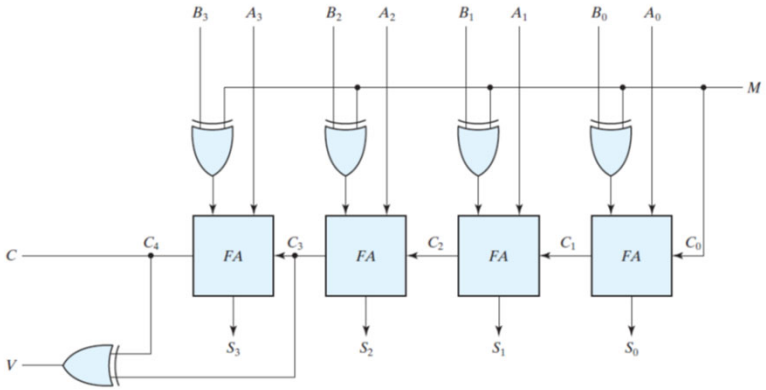


(a)* Derive the Boolean expressions for T_1 through T_4. Evaluate the outputs F_1 and F_2 as a function of the four inputs.

(b) List the truth table with 16 binary combinations of the four input variables. Then list the binary values for T_1 through T_4 and outputs F_1 and F_2 in the table.

(c) Plot the output Boolean functions obtained in part (b) on maps and show that the simplified Boolean expressions are equivalent to the ones obtained in part (a).

Example 4



The adder–subtractor circuit of Fig. 4.13 has the following values for mode input M and data inputs A and B.

	M	A	B
(a)	0	0111	0110
(b)	0	1000	1001
(c)	1	1100	1000
(d)	1	0101	1010
(e)	1	0000	0001

In each case, determine the values of the four SUM outputs, the carry C, and overflow V.

Example 5

Design a combinational circuit with three inputs, x, y, and z, and three outputs, A, B, and C. When the binary input is 0, 1, 2, or 3, the binary output is one greater than the input. When the binary input is 4, 5, 6, or 7, the binary output is two less than the input.

Solved in class.

Also available in the book.

Next Lecture

- Sequential Logic Design