ENEL 353 Section L02 Lecture

Fri Nov 29 2019

- Quizzes 1, 2, 3 and Midterm are available for pick up.
- Lab marking corrections will be done by early next week.

Set 10, Slide 18

N = 16

There are $2^{16} = 65,536$ rows. The depth is 65,536.

M = 8

There are 8 columns. The width (word size) is 8.

Number of stored bits $= 2^{16} \times 2^3$

$= 524,288$

Slide 22

ROM is combinational. The Data output is a function of the current address only

RAM is sequential. During a read, the Data output depends on the current Address input, and also depends on writes that occurred in the past.

Some RAM circuits are synchronous and others are asynchronous.

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Slide 25

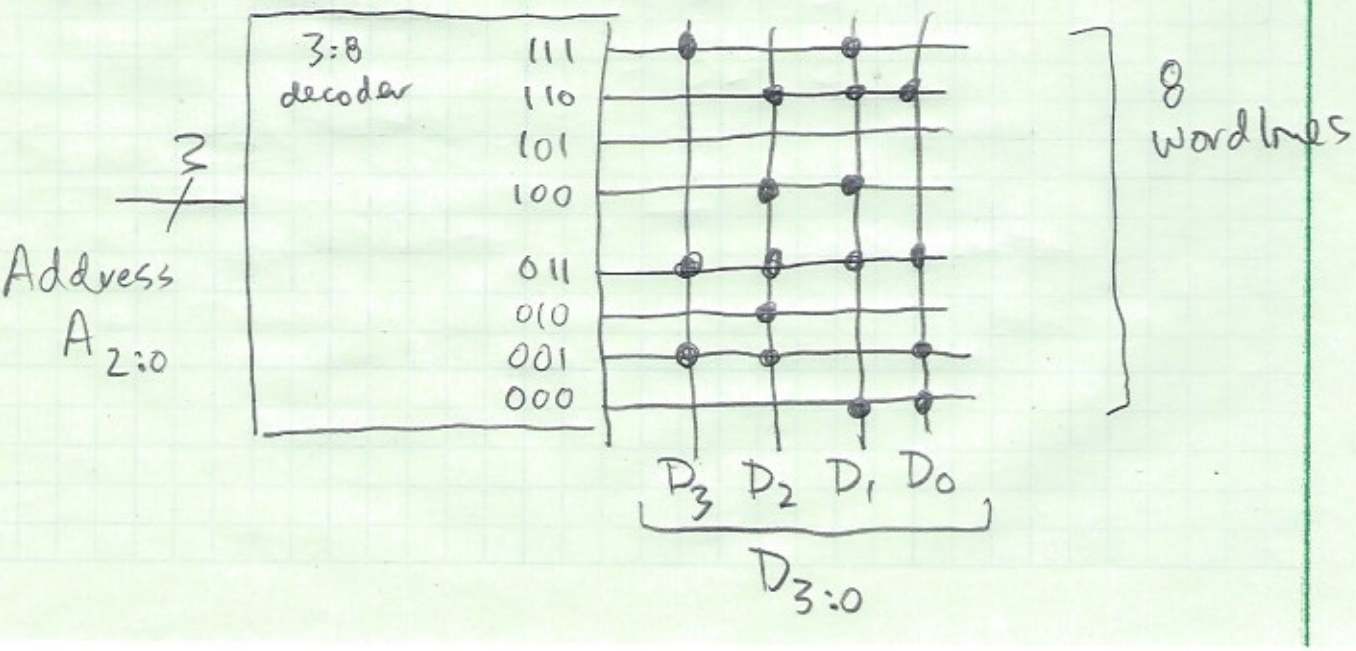
CORRECTION: ... ~~N~~ is stored ...

Number of wordlines $= 2^8 = 256$

Number of bitlines $= 9$

Slide 26 The "perfectly suited" element is a decoder. It receives an N-bit input, and turns on ONE of 2^N output wires.

Slide 29 IMPORTANT: Dots in this style of diagram do NOT represent simple connections of wires.



Slide 31

Example 1 — 2 input bits, 3 output bits
$\Rightarrow$ array $2^2 \times 3$

function	minterm numbers (binary)
$F = A \oplus B = \bar{A}B + A\bar{B}$	01, 10
$G = \overline{A \oplus B} = \bar{A}\bar{B} + AB$	00, 11
$H = \bar{A} + \bar{B}$	
$= \bar{A}(\bar{B}+B) + \bar{B}(\bar{A}+A)$	
$= \bar{A}\bar{B} + \bar{A}B + \cancel{\bar{A}\bar{B}} + A\bar{B}$	00, 01, 10

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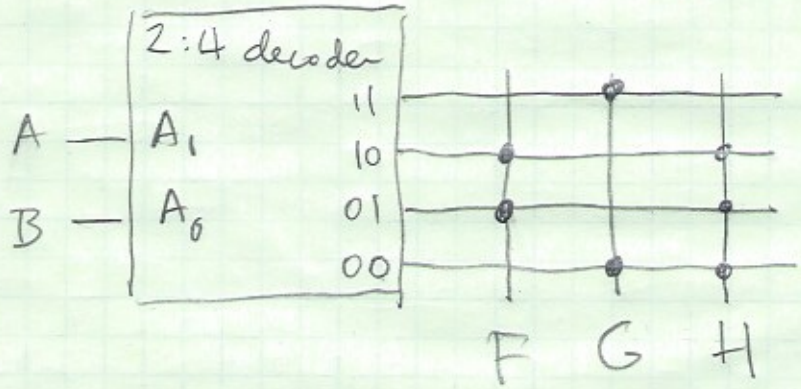

Example 2 — 3 input bits, 4 output bits
$\Rightarrow$ array size is $2^3 \times 4$

A	B	C	E	F	G	H
0	0	0	0	0	0	1
0	0	1	0	0	0	1
0	1	0	0	1	0	1
0	1	1	0	1	1	0
1	0	0	0	1	0	1
1	0	1	0	1	1	1
1	1	0	1	0	1	1
1	1	1	0	0	1	1